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CONTENTS

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The Effect of the Crude Oil Price on the UK Manufacturing Companies

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ABSTRACT

This essay explores how the international price of crude oil affects the manufacturing sector within the UK economy. It employs a quantitative research approach using deductive reasoning to investigate the connection between these two factors. The study presents two hypotheses and develops two models – a linear regression model and a vector autoregressive model – to assess the impact of crude oil prices on manufacturing output. Both models consistently indicate a negative association between crude oil prices and manufacturing output. An increase in crude oil prices tends to reduce production among UK manufacturing firms, primarily due to rising production costs. Conversely, when crude oil prices decrease, production tends to increase. Furthermore, the research also uncovers negative influences on manufacturing output from inflation rates and exchange rates, while gross domestic product (GDP) exhibits a positive correlation with manufacturing output.

INTRODUCTION

Oil stands out as one of the most commonly utilized fuels, serving essential roles in both industrial production and daily life. Our reliance on oil and its byproducts is extensive, covering diverse applications such as vehicle fuel, plastics, and even pharmaceuticals. According to research by Chien et al. (2021), oil consumption constitutes nearly 40% of the world's total energy consumption. Impressively, over 90% of the energy used in the transportation sector is derived from oil-based products. While alternative energy sources like electricity, coal, natural gas, nuclear power, and hydroelectricity do exist, they currently lack the capacity to fully substitute for crude oil. Consequently, any fluctuations in the availability or price of oil have significant ramifications on a global scale. Whether oil prices surge or plummet, these shifts exert

substantial influence on socio-economic activities worldwide. High oil prices can benefit oil-producing and exporting nations but raise concerns for the rest of the world. For instance, in recent times, the sustained increase in global oil prices, particularly in the latter months of 2022 when prices surpassed $130 per barrel, poses threats to economic growth prospects and contributes to elevated levels of inflation.

With crude oil playing a particularly vital role, numerous studies have explored the influence of oil prices on various sectors, with a specific focus on the manufacturing sector in different economies. In their research, Li and Paraco (2018) investigate the effects of oil price shocks on several sectors in Australia, revealing a noteworthy finding: the impact of oil prices varies among different sectors. They observe a positive correlation between oil price shocks and the energy and materials industry, while the financial and industrial sectors exhibit an opposite trend. Aye et al. (2014) analyze South Africa's manufacturing sector and find that an increase in oil prices negatively affects this sector. Taiebnia and Shakeri (2012) delve into the connection between oil prices and sectoral output, using the Dutch disease theory as their framework. They categorize studied countries into two groups: those that produce oil and those that do not. The results indicate that oil prices have a detrimental effect on the manufacturing, agriculture, and service sectors in oil-producing countries, whereas no consistent pattern emerges for non-oil-producing nations.

However, despite the existing body of research on the correlation between oil price volatility and the manufacturing sector, my literature review reveals a limited number of studies that have explored this relationship within the context of the UK market. It is noteworthy that fluctuations in crude oil prices impact not only developing nations but also affect economies worldwide, including the United Kingdom. In particular, as highlighted by Guidi (2009), the manufacturing sector in the UK holds significant importance, not only due to its role in bolstering external financing but also as a key source of employment and wealth. Motivated by this analysis, I embark on this research endeavor to investigate the interplay between crude oil prices and the manufacturing sector in the UK. An innovative aspect of this study is its inclusion of the period encompassing the Covid-19 pandemic, aiming to discern if the relationship between these two factors differs from prior periods.

The primary finding of this research underscores the inverse connection between oil prices and manufacturing output within the UK market. It reveals that fluctuations in crude oil prices exhibit a negative impact on manufacturing output. In terms of empirical contributions to existing literature, this study provides supplementary evidence reinforcing the adverse correlation between oil price volatility and the performance of manufacturing companies. Additionally, it extends the methodological dimension of the literature. While prior studies predominantly rely on the autoregressive vector method, this study introduces an ordinary least square (OLS) model to assess the association between the variables under examination. The amalgamation of these two methodologies bolsters the credibility of the relationship between the variables. Furthermore, this research employs the most current and up-to-date data available, spanning the period before, during, and after the Covid-19 pandemic.

2. LITERATURE REVIEW

2.1. Theoretical framework

In theory, variations in oil prices theoretically impact a nation's overall economy and specific sectors like manufacturing companies through distinct mechanisms. These mechanisms include the principles of supply and demand, the wealth effect, and macroeconomic pathways.

The initial mechanism revolves around the principles of market supply and demand. As crude oil and its derivatives serve as crucial input materials for most manufacturing firms, an increase in oil prices raises the cost of production and finished goods, resulting in higher retail prices. From a supply and demand perspective, elevated retail prices constrain consumers' buying power, ultimately leading to a decrease in product consumption volume. When the supply exceeds demand, producers find themselves compelled to reduce production volumes and overall productivity (Hunt et al., 2001).

The second pathway through which oil prices exert influence is the wealth effect on demand, driven by the redistribution of income from oil-importing nations to oil-exporting ones. Consequently, purchasing

power shifts from countries reliant on oil imports to those engaged in oil exports. This shift results in a reduced aggregate demand in oil-importing countries, while the converse holds true for oil-exporting nations.

Additionally, several macroeconomic factors play significant roles in the relationship between oil prices and manufacturing output, encompassing elements like the inflation rate, interest rates, exchange rates, gross domestic product (GDP), and foreign direct investment (FDI). For instance, oil price volatility can directly impact interest rates, as noted in the work of Brown and Yucel (2002). When the supply of money in circulation and reserves falls short of demand due to rising oil prices, interest rates tend to rise. This increase is unfavorable for investment and overall economic growth. As a consequence, investments decrease as producers' profits dwindle, a phenomenon often referred to as "The real balance transmission channel." Bernanke et al. (1997) argue that the combination of a restrictive monetary policy and an oil price increase can weaken the economy due to a decline in investment. While the argument presented holds true and is widely accepted in developed countries or nations reliant on oil imports, it may not necessarily apply to mono economies like Nigeria, where the entire economy relies heavily on the oil export sector. The limitation in applying a straightforward monetary policy mechanism in an oil-dependent economy like Nigeria arises from the fact that the country's economic foundation hinges on externally determined oil prices. Consequently, the macroeconomic policies of such a nation are highly susceptible to shocks in oil prices. Therefore, it's essential to recognize that there exists a substantial divergence in the effects of crude oil prices and their fluctuations between developed, undeveloped, and developing countries, as well as between oil-exporting and oil-importing nations. This distinction underscores the need to consider the relationship between crude oil prices and manufacturing output within specific contextual circumstances.

2.2 Empirical Research

The subject of the relationship between crude oil prices and manufacturing output has garnered significant attention among researchers. Studies exploring this topic encompass various contexts, scales, and scopes, yielding diverse findings.

A substantial body of literature supports the notion of a negative connection between crude oil price shocks and manufacturing output. One notable study by Omolade et al. (2019) investigates how crude oil prices affect manufacturing firms in Nigeria via the monetary transmission channel. Employing the structural vector autoregression (SVAR) technique and collecting nearly four decades of data from 1970 to 2017, the researchers reveal that oil price volatility strongly influences the growth rate of manufacturing enterprises in the Nigerian economy. Specifically, positive oil price shocks lead to an increase in the inflation rate, subsequently causing a decline in manufacturing output. In another study conducted in the context of South Africa, Aye et al. (2014) aim to quantify the impact of oil price uncertainty on manufacturing production. They utilize a combination of the bivariate GARCH-in-mean model and the maximum likelihood function technique. By examining the response of the manufacturing sector to both positive and negative oil price shocks, the authors consistently find that manufacturing activities are significantly and negatively correlated with oil price changes. Additionally, they suggest that policies aimed at reducing oil price shocks and volatility are likely to contribute to increased manufacturing production and overall economic growth in South Africa. In an intriguing study conducted in the United States by Lee and Ni (2002), researchers investigate the impulse responses of demand and supply to oil price shocks across different sectors. Their conclusions are drawn from VAR modeling during the oil crises of 1973-1974 and 1978-1981. The study primarily relies on the monetary channel to elucidate the relationship between these factors, and its results affirm that international oil price shocks introduce uncertainty into both output and prices across various industries in the U.S. Specifically, sectors with substantial costs associated with oil and oil products, such as the petroleum and chemicals industry, experience oil price changes primarily impacting supply. Conversely, in other sectors like the automobile industry, demand is the factor most significantly affected by oil price fluctuations.

Multiple studies have revealed varied conclusions and even conflicting results on this subject. To illustrate, Jiménez-Rodríguez and Sanchez (2004) conducted research on a macroeconomic scale to empirically assess the impact of oil prices on the economic activities of several major industrialized countries.

Their findings unveiled a nonlinear relationship between oil prices and GDP. Specifically, they observed that GDP was more profoundly affected when oil prices increased compared to instances of oil price declines. Notably, the response of GDP to oil price shocks differed between oil-importing and oil-exporting nations. In particular, most oil-importing countries experienced adverse effects on their economic activities in response to changes in oil prices, except for Japan. Among oil-exporting nations, the UK's economy displayed an inverse relationship with higher oil prices, whereas Norway benefited from them. Additionally, a study by Jiranyakul (2006) scrutinized Thailand's economy over the period from 1990 to 2004. The study considered macroeconomic factors believed to influence manufacturing activities, including real money supply, real exchange rates, and international oil price shocks. Utilizing a specific version of the VAR model known as the error correction mechanism (ECM), the author arrived at intriguing outcomes. These results indicated a negative short-term relationship between the output of Thailand's manufacturing sector and oil price fluctuations, but a positive association in the long term. In the short run, industrial and manufacturing indices were found to be inversely affected by oil price shocks. However, in the long term, the Thai manufacturing industry demonstrated an ability to adapt to higher production costs resulting from increases in international crude oil prices. According to Jiranyakul (2006), "The positive long-run relationship between real money supply and international oil prices also implies that a surge in oil prices is accompanied by an increase in real money supply to stimulate real economic activity."

Despite the extensive body of literature exploring the connection between oil prices and the economy, there is a noticeable scarcity of research focusing on the relationship between oil prices and manufacturing output in the context of the United Kingdom. Among the limited studies available, Guidi (2010) stands out as one of the few researchers who have delved into this subject. In Guidi's investigation titled "The Economic Effects of Oil Price Shocks on the UK Manufacturing and Services Sector," conducted in 2009, the author scrutinized how fluctuations in oil prices influenced production in the manufacturing and service industries using vector autoregressive models. The outcomes of this research revealed that positive changes in oil prices consistently led to reductions in manufacturing output. Interestingly, the services sector appeared to be less impacted by oil price fluctuations. Instead, it was observed that the services industry was more sensitive to declines in oil prices rather than increases. This inverse response of the manufacturing sector to oil price volatility aligns with findings from the study conducted by Jiménez-Rodríguez and Sanchez (2004) when they examined the UK economy.

As per the comprehensive review and discussion of the literature, it becomes evident that the impact of oil prices on the economy in general, and the manufacturing industry in particular, exhibits a diverse and inconsistent pattern. This relationship is intricately intertwined with various other macroeconomic factors, including inflation rates, exchange rates, GDP, investment, and political dynamics. Moreover, this relationship behaves differently between oil-importing countries and oil-exporting countries. In economies entirely reliant on oil exports, studies often indicate a positive association between oil price shocks and economic growth, including the activities of manufacturing industries. Conversely, in nations that predominantly import oil and petroleum products, an increase in oil prices tends to have adverse effects, resulting in elevated production costs and diminished economic growth, and vice versa. Given these observations, the research proposes two hypotheses concerning the connection between oil prices and manufacturing sector output in the UK. The first hypothesis (H0) represents the null hypothesis, while the second hypothesis (H1) posits a negative relationship between these two factors.

H0: The is no relationship between the crude oil price and the manufacturing sector in the UK.

H1: The crude oil price negatively impacts the manufacturing sector’s output in the UK.

3. RESEARCH METHODOLOGY

3.1 Linear Regression Model

To assess these hypotheses, a regression model is constructed, with the crude oil price serving as the independent variable and the total output of the manufacturing sectors in the UK as the dependent variable. This constitutes the core model for this research and is presented in Eq. (1).

$$MO_{i,t} = \beta_0 + \beta_1 CP_{i,t} + \beta_2 INFR_{i,t} + \beta_3 EXR_{i,t} + \beta_4 GDP_{i,t} + \mu_{i,t} \quad (1)$$

In this model, the variables are defined as follows: t is the time, typically measured in quarters. MO: Dependent variable, representing manufacturing output. CP: Independent variable, representing the crude oil price. Control variables include: INFR: Inflation rate; EXR: Exchange rate; and GDP: Gross Domestic Product. These variables are employed to investigate the relationship between crude oil prices and manufacturing output in the UK while accounting for the potential influence of inflation rates, exchange rates, and GDP on the manufacturing sector's performance.

3.2 The Vector Autoregressive Model (VAR)

Past studies examining the relationship between crude oil prices and the total output of the manufacturing industry have frequently employed the Vector Autoregressive (VAR) technique to assess the connection between these two factors. The rationale behind using VAR models lies in the potential delay in the response of an endogenous variable (y) to changes in exogenous variables (x_1, x_2, x_3, ..., x_n). Therefore, to estimate this delay accurately, it is necessary to utilize a model that incorporates lags of exogenous variables and/or lags of endogenous variables.

Sims (1980) introduced the Vector Autoregressive model (VAR), which is predicated on the assumption that the VAR model represents a "structure in which each variable is a linear function of past lags of itself and past lags of the other variables." Consequently, this modeling approach can be applied to multivariate time series data. The reduced VAR model is represented in Eq. (2):

$$Y_t = \sum_{1}^{k} \alpha_i Y_{t-i} + \mu_t$$

Where t is the time (quarter). Y represents the manufacturing sector's output (MO), the crude oil price (CP), the inflation rate (INFR); the exchange rate (EXR), and Gross Domestic Product (GDP).

There are two tests involved: Unit Root Test Result and Granger Causality Test.

Unit Root Test

The unit root test is employed to ascertain whether a time series variable is non-stationary and possesses a unit root. In this test, the null hypothesis presupposes the presence of a unit root, while the alternative hypothesis posits the contrary. If the results of the stationary test are statistically significant, it indicates that the variable is stationary and lacks a unit root. Consequently, we reject the null hypothesis and accept the alternative hypothesis. This verification process holds great significance in the context of the vector autoregressive model (VAR) since this model can only be applied when all the variables involved are stationary.

Granger Causality Test

The Granger causality test serves the purpose of examining the influence and causal relationship between the variables under study within the vector autoregressive model. It's important to note that this test is conducted subsequent to the unit root test (stationarity test). This sequencing allows for the evaluation of Granger causality in both the short and long run. In the Granger causality test, the null hypothesis posits that the reference variable does not Granger cause the selected variable. Conversely, if the p-value associated with the test is statistically significant, we have grounds to reject the null hypothesis. This implies that the reference variable does indeed Granger cause the selected variable, indicating a causal relationship between them.

4. STATISTICAL DESCRIPTION, RESULTS, AND DISCUSSION

4.1 Statistical Description

The data utilized in this study was collected by the author from the Bloomberg Terminal and the OECD Main Economic Indicators database. It spans a period of 53 years, encompassing data from 1970 to 2022. Figure 1 presents the historical trend of crude oil prices over this 53-year period, from 1970 to 2022. Upon examining the oil price chart, it is evident that oil prices displayed a fluctuating upward trend during this five-decade span. Notably, the highest oil price was observed in 2008, reaching approximately $130 per barrel, while the lowest price occurred in 1971, exceeding $3 per barrel. Specifically, it is notable that from 1998 onwards, oil prices exhibited significant volatility. Over the course of a decade, from 1998 to 2008, the price of oil gradually increased by more than 16-fold, starting at $8 per barrel and reaching $130 per barrel. However, within just one year, in 2009, the price of oil experienced a sharp decline, plummeting to $30 per barrel, marking a more than four-fold reduction. Subsequently, oil prices demonstrated a slow but steady increase, fluctuating around the $100 per barrel mark until 2014. Since then, the oil price market has undergone two notable downward shocks, one in 2016 and a particularly severe one in 2020, bringing prices down to as low as $15 per barrel. Following the bearish shock in 2020, oil prices began a recovery phase, eventually surpassing $100 per barrel in 2022.

Figure 1. The crude oil price over the years (from 1970 to 2022)

Source: Bloomberg Terminal and the OECD Main Economic Indicators database

The fluctuations in crude oil prices are often closely tied to significant political-economic events, economic development cycles, and particularly recessionary cycles in the global economy. Here are a few examples to illustrate this relationship: 1) The Price Surge between 1971 and 1974: the price of oil more than doubled. This increase was primarily attributed to two major factors: the shock in gold prices and the imposition of an embargo by OPEC (Organization of the Petroleum Exporting Countries). The embargo was a response to political developments, especially involving Persian Gulf countries, and it resulted in a significant hike in oil prices; 2) The Oil Crash in April 2020 marked a historic event in the world oil industry when oil prices turned negative for the first time. This meant that sellers had to pay buyers to take delivery of oil contracts. This "negative oil price crash" was a consequence of the oil crisis that unfolded in the physical oil market. The extreme and unfavorable price movements stemmed from both the supply and demand sides of the oil market. On the supply side, there was an excess supply characterized by a

Strakelberg imbalance, while on the demand side, there was an abrupt and substantial decline driven by the global Covid-19 pandemic.

These examples underscore the intricate connection between crude oil prices and various geopolitical, economic, and global events, highlighting how these events can result in substantial fluctuations in the oil market. Moving on, Table 1 provides statistical information about the research variables. The dependent variable, manufacturing output (MO), attained its highest value, nearly 300 billion USD, in 2007, while the lowest value, 85 billion USD, was recorded in 1970. Over the 53-year period under examination, the average value of manufacturing output reached 193 billion USD, with a standard deviation of nearly 64 billion USD. It's worth noting that the late 1990s and early 2000s are often regarded as the peak years of the UK economy in many respects. During this period, the UK was not only a dominant military and political force but also the leading global economy. Thanks to the industrial revolution, the UK had earlier established itself as a global powerhouse in manufacturing and the industrial sectors

Table 1. The research variable's statistic

	N	*Range*	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
MO	212	214.370	85.300	298.560	193.774	63.776
CP	212	123.566	3.560	128.080	40.055	33.066
INFR	212	23.733	0.480	24.210	5.390	5.160
FER	212	1.401	1.270	2.550	1.713	0.341
GDP	212	2989.680	131.690	3,122.480	1544.155	1047.650

MO unit: Billion US Dollars
CP unit: US Dollar
GDP unit: Billion US Dollars

Source: own

Table 2 presents the correlations between the variables under investigation in this research. In general, the correlation values between pairs of variables are notably high. For instance, the correlation between manufacturing output and GDP is 0.961, indicating a strong and positive correlation between these two variables. However, it's important to note that despite these high correlations, all the Variance Inflation Factor (VIF) values are less than 5. This suggests that there is no significant issue of multicollinearity among the variables. In other words, the high correlations observed do not pose a serious problem in terms of multicollinearity, and the variables can be considered fairly independent in the regression analysis.

Table 2. Matrix of correlation

Correlations						
	MO	*CP*	*INFR*	*FER*	*GDP*	*VIF*
MO	1					
CP	.751**	1				3.808
INFR	-.730**	-.386**	1			2.215
FER	-.592**	-.424**	.559**	1		1.612
GDP	.961**	.833**	-.651**	-.559**	1	5.763

Source: own

Figure 2 illustrates a graph depicting crude oil prices and the production value of the UK manufacturing industry spanning from 1970 to 2022. A noticeable pattern emerges from the graph is that the curves

representing crude oil prices and manufacturing output appear to exhibit similar trends. In particular, both oil prices and manufacturing output demonstrate an upward trajectory over this time period. This observation aligns with the expectation of a positive relationship between these two factors, suggesting that they tend to move in tandem.

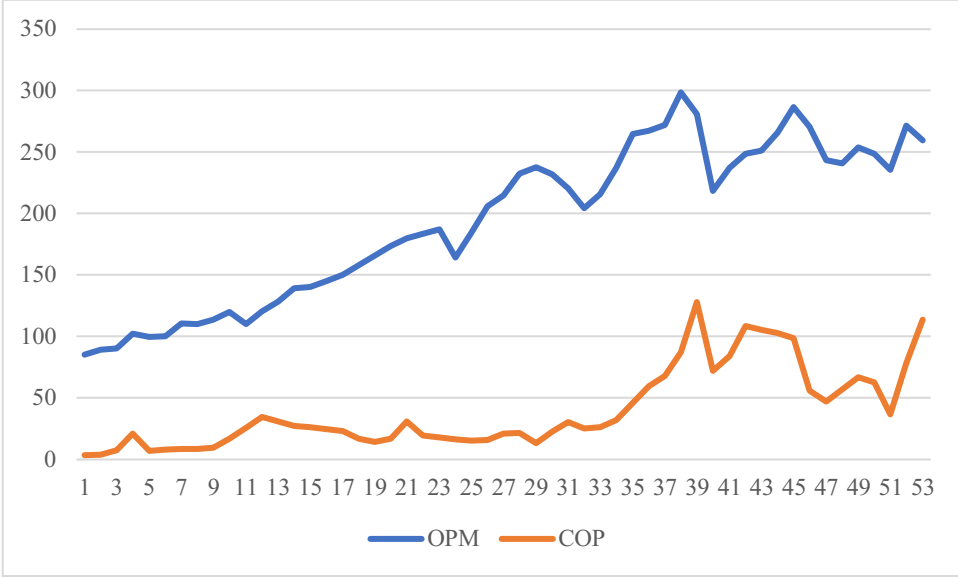

Figure 2. The crude oil price and manufacturing output over the years (from 1970 to 2022)

Source: own

4.2. Results, and Discussion

4.2.1. Linear Regression Model

Table 3 provides a summary of the results from the regression model. The R-squared value, also known as the coefficient of determination, is a statistical measure in linear regression that reflects the percentage of variation in the dependent variable explained by the independent variables in the model. In essence, R-squared assesses how well the dataset fits the regression model. In this research model, the R-squared value is calculated to be 0.755, which equates to 75.5%. This high R-squared value indicates a strong fit of the dataset to the linear regression model. More specifically, it suggests that over 70% of the variance in the total output of manufacturing firms in the UK can be accounted for by the combination of independent and control variables, including crude oil prices, the inflation rate, the exchange rate, and the total gross domestic product (GDP). This high explanatory power underscores the effectiveness of the model in explaining the fluctuations in manufacturing output.

Table 3. Regression model summary

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*	*Durbin-Watson*	*F-Test*	
						F-Test Value	*Sig.*
1	.869	.755	.738	15.410866	.603	205.449	.000

a. Predictors: (Constant), GDP, FER, INFR, CP

b. Dependent Var: MO

Table 4. Regression result

Model		Unstandardized Coef.		Standardized Coef.	t	Sig.	Collinearity	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	133.856	15.828		8.457	.000		
	CP	-.165	.127	-.083	-1.266	.021	.263	3.808
	INFR	-1.625	.621	-.148	-2.956	.005	.452	2.215
	FER	-4.979	8.021	-.031	-.723	.473	.620	1.612
	GDP	.038	.005	.917	11.316	.000	.174	5.763

a. Dependent Variable: MO

Source: own

Table 4 presents a detailed breakdown of the estimates for the regression model. The coefficient associated with the crude oil price variable is -0.166, and it comes with a p-value of 0.000. This statistical result indicates that the crude oil price has a highly significant and negative impact on the manufacturing output in the UK. In practical terms, the rejection of the null hypothesis (**H0**) and the acceptance of the hypothesis (**H1**) imply that an increase in the crude oil price is associated with a decrease in the production of UK manufacturing firms. This relationship is attributed to the heightened production costs associated with higher oil prices. These findings align with prior research outcomes, which also support the notion of a negative relationship between crude oil prices and manufacturing output (as observed in studies such as Papapetrou, 2009; Aye et al., 2014; Omolade et al., 2019).

Additionally, the analysis reveals that the inflation rate and foreign exchange rate both exert negative influences on the manufacturing output of UK firms. The coefficient associated with each of these control variables is -1.625 and -4.979, respectively. However, it's worth noting that only the impact of the inflation rate is statistically significant, with a p-value of 0.005. On the other hand, the variable GDP exhibits a coefficient of 0.038, and its p-value is 0.000, indicating that it has a positive and significant effect on the production of the manufacturing sector. This outcome aligns with the expectations outlined in the previous sections of the research, suggesting that changes in the gross domestic product (GDP) positively influence the manufacturing sector's production.

4.2.2 VAR Model

Table 5 presents the results of the Dickey–Fuller test, a statistical technique used to test the null hypothesis that a unit root is present in an autoregressive (AR) time series model. The key observations from this table are as follows: 1) All the p-values are statistically significant (less than 0.05); 2) The absolute values of all the t-statistics are greater than the critical value (at the 5% significance level). These results collectively indicate that the null hypothesis, which suggests the existence of a unit root, is rejected for all the variables included in the Vector Autoregressive (VAR) model. Consequently, it can be concluded that all the variables in the VAR model are stationary, which is a crucial assumption for the proper application of the VAR model in this research.

Table 5. Result for unit root test

Variable	*Dickey-Fuller Critical value (5%)*	*ADF*	*P-value*	*Status*
MO	-2.926	-4.312	0.000	1(1)
CP	-2.926	-5.507	0.000	1(1)
INFR	-2.926	-4.329	0.000	1(1)
FER	-2.926	-4.018	0.000	1(1)
GDP	-2.926	-6.569	0.000	1(1)

Source: own

Table 6 displays the results of the Granger Causality Wald Test. Notably, all the p-values associated with this test are statistically significant, indicating that the null hypotheses related to Granger causality can be rejected for all variables tested. Specifically, the results indicate that the crude oil price Granger causes the manufacturing sector's output, which is consistent with the findings observed in the regression model. Additionally, the inflation rate, exchange rate, and GDP also Granger cause the production output of UK manufacturing firms. This Granger causality analysis further supports the relationships identified in the research, highlighting the causal influences between these economic variables.

Table 6. Granger causality Wald test

Equation	*Excluded*	*Chi2*	*df*	*Prob>chi2*
MO	CP	9.1426	5	0.000
MO	INFR	4.7083	5	0.034
MO	FER	9.0270	5	0.083
MO	GDP	7.2016	5	0.006
MO	ALL	52.3900	20	0.000

Source: own

CONCLUSION

This research delves into the relationship between crude oil prices and manufacturing output within the UK. It adopts a positivist approach, emphasizing quantitative research methods and employing a deductive framework for the study. Drawing upon insights from the literature review, the research formulates research questions and establishes two hypotheses (H0 and H1) regarding the impact of crude oil prices on the manufacturing sector. Subsequently, two econometric models are constructed to assess and test these hypotheses.

The findings of this research support hypothesis H1 while rejecting the null hypothesis H0, indicating a significant and negative relationship between crude oil prices and manufacturing industry production. This outcome aligns with prior research that has also pointed to a negative association between crude oil prices and manufacturing output. Importantly, this research contributes to the existing literature by adding insights specific to the UK context. Furthermore, the study's results demonstrate that the inflation rate and exchange rate negatively impact the manufacturing output of UK firms, while gross domestic product (GDP) exhibits a positive relationship with manufacturing output. Additionally, this research contributes methodologically by utilizing two distinct econometric models, namely the ordinary least squares (OLS) technique and the vector autoregressive model (VAR). This methodological diversity enhances the research's contribution to the field.

The use of the vector autoregressive model (VAR) has been a common approach among previous researchers investigating the impact of crude oil prices on manufacturing output. The incorporation of the ordinary least squares (OLS) model in this research enhances the methodological robustness of the findings, providing a stronger foundation for the results. Additionally, this research uniquely spans the time of the COVID-19 pandemic and the post-COVID-19 period, which offers valuable insights into the relationship during these exceptional circumstances. For future research, there is potential to explore a combination of quantitative and qualitative research methods to gain a deeper understanding of the relationship between crude oil prices and manufacturing output. Furthermore, expanding the research model to include additional variables that influence manufacturing industry output could yield intriguing insights into this complex relationship.

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Corruption as an Obstacle or an Incentive to FDI Flows: A Panel Data Analysis

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ABSTRACT

Corruption is a ubiquitous societal problem that significantly influences corporate investment decisions in the international economic environment of today. Considerable attention is paid primarily to the economic effects of corruption. Its influence on foreign direct investment is one of the topics investigated. Some studies show that corruption deters foreign investors from making known investments in a country. However, some studies prove that this may not be the case at all and that corruption can, on the contrary, attract companies from certain countries to invest. This paper aims to explore in depth the multifaceted impact of corruption on foreign direct investment and dissect its role in corporate strategic choice, risk management, and sustainable development. Through the comprehensive use of literature research, case analysis, and theoretical discussion, the relevant multiple linear regression model is established. This paper adopts the corruption perception index published by Transparency International as the core independent variable and uses the panel data of 28 countries or regions from 1995 to 2022 to estimate the model and verify the relevant hypotheses. The results show that the effect of corruption on FDI is related to the level of corruption. When the corruption level is low, the breeding of corruption has a significant inhibitory effect on foreign investment, but when the corruption level is high, the increase in corruption perception does not show a significant linear relationship with foreign direct investment. By delving into the impact of corruption on corporate investment decisions, this paper is expected to provide business managers, policymakers, and academic researchers with practical insights and promote a deeper understanding of this complex topic.

INTRODUCTION

In the realm of economic theory, corruption, and foreign direct investment are now popular research subjects, however most of these studies are conducted independently. Most of the existing literature now concentrates on the qualitative effects of corruption on social and economic development, and the quantitative effects of corruption on these developments must be investigated in the field of economics.

This paper focuses on the analysis of the relationship between the corruption level of the country and foreign direct investment and studies how to attract foreign direct investment and promote economic development by changing the existing policies. Based on the current situation of the global FDI market, this paper analyzes the reasons why foreign investors are interested in investing in the host country, and on this basis, combined with the corruption index, obtains the relationship between the corruption index and foreign direct investment. It can contribute to future scholars' research on corruption and foreign direct investment and enrich relevant literature. Foreign direct investment is an important part of international economic activities. The research content of this paper covers various elements of attracting foreign direct investment. It can help the government to improve the investment environment and attract more foreign direct investment.

Based on the above mentioned this paper aims to analyze the impact of corruption on foreign direct investment flows in a selected group of countries. Three hypotheses are verified concerning the aim of the paper:

H1: Regardless of the level of corruption, an increase in the level of corruption inhibits FDI.

H2: In the case of low corruption level, an increase in corruption level will inhibit FDI; At high levels of corruption, an increase in the level of corruption attracts FDI.

H3**:** In the case of low corruption level, the increase of corruption level will inhibit FDI; At high levels of corruption, an increase in the level of corruption does not have a significant effect on FDI.

1. LITERATURE REVIEW

"Corruption is a major problem facing the current society and a hot topic of academic attention. As a social phenomenon, corruption exists in all countries in the world" (Olken & Pande, 2012). Corruption is a political concept, and Tanzi (1998) gave a common definition of corruption: abusing public power for private gain. In economic research, corruption is defined as *"the behavior of state workers using public power and resources to seek private gains"* (Shaheer & al.,2019). The research on corruption mainly focuses on the influencing factors of corruption, the economic consequences of corruption, and other aspects.

1.1 The economic consequences of corruption

There are two main phases to the research on how corruption affects the economy. The primary focus of the first stage is an economic analysis of the causes and effects of corruption. At this point, the research mostly follows two lines: one is macro-perspective, and Shleifer and Vishny's (1993) research serves as a representative example. Rose-Ackerman (2013) argued that widespread corruption would erode government legitimacy and efficiency, leading to economic inequality and social instability. They believe that different characteristics of governments and different political procedures will determine the degree of corruption. The government is the source of corruption. They concentrate on how demand-side features impact corruption. Bardhan and Mookherjee (2006) is a sample study that highlights the impact of opportunity cost, supervision, and sanction procedures on corruption. According to Aidt (2003), inadequate oversight, an unfinished market, and the concentration of power are all strongly associated with corruption. Rose-Ackerman (1975) investigated how corruption will be impacted by various product market models. Most studies during this period did not use empirical methodologies, mostly because it was not possible to measure the extent of national corruption.

The Transparency International Bribery Payers Index (BPI) and Corruption Index (CPI) as well as the World Bank's Corruption Control Index (CCI) were major sources of information for the research conducted in the second stage. Because these three indices are based on subjective perception, it is doubtful whether their validity and dependability accurately reflect reality for the following reasons:

– Many indicators of corruption are difficult to define precisely, ambiguous indicators inevitably deviate from reality, and different indicators use different measurement standards.

- Lag and concealment are features of the measurement of corruption. When corruption is found, though, the data frequently becomes out of date and becomes impossible to use as a reliable source of information.
- Because subjective opinions exist, different people see corruption in different ways and judge the extent of corruption in different ways during an inquiry.

However, since it is difficult to measure and quantify the degree of political corruption, this paper still takes these three indexes as part of the reference basis. Most of the research that has been done about how corruption affects economic development concludes that *corruption restricts economic growth* (Bitterhout and Simo-Kengne, 2020; Feruni et al., 2020; Moldogaziev and Liu, 2020). This is because corruption lowers the effectiveness of social public expenditure, and increased public expenditure effectiveness promotes long-term economic growth.

P. Mauro (1995) found that in his sample countries, the total institutional indicator "corruption indicator" was negatively correlated with total investment. Corruption erodes a significant share of GDP, and this lost GDP affects the efficient allocation of resources. Corruption often undermines efficient and innovative firms by giving them undue power. If corruption is tolerated, it will accelerate the economic downturn and encourage more people to engage in bribery. M. Habib and L. Zurawicki (2002) found that corruption would hinder FDI inflow. S. Wei and A. Shleifer (2000) used a rigorous empirical method to prove a significant negative correlation between the degree of corruption in the host country and FDI in the long run.

1.2 The link between corruption and FDI

The term foreign direct investment (FDI) describes the capital inflow of businesses or individuals from one nation into businesses or assets in another nation through the purchase of equity, the creation of subsidiaries or joint ventures, etc., to gain control or a sizable amount of influence over the business (Lestari et al., 2022). Regarding the studies on the effect of corruption on foreign direct investment (FDI), the results vary and are still up for debate because different researchers looked at different samples and methods. There are three types of corruption's effects on foreign direct investment:

A. Foreign direct investment is discouraged by corruption. This opinion, which is also consistent with common sense, maintains that there is a substantial negative correlation between foreign direct investment and corruption. This is because corruption inevitably raises the level of uncertainty surrounding an investment climate and the nation's economy. To achieve a comparatively stable market environment, foreign businesses frequently have to invest more time and money. Examples of this include paying authorities to alter legislation or incurring significant costs to enter the local market. Furthermore, future economic activity will not reimburse these expenses, and corruption may always alter policy in the future. This indicates that investing in nations with high corruption indices is expensive, as numerous academic studies have demonstrated. S. Wei and A. Shleifer (2000) used a more rigorous method to confirm that the increase in the tax rate of multinational corporations or the increase in the corruption level of host countries will reduce foreign direct investment. Using a sample that covers bilateral investment from 12 sources to 45 host countries, he empirically shows that corruption deters foreign direct investment, using Transparency International's Corruption Perceptions Index.

B. FDI is encouraged by corruption. Despite the argument's counterintuitive nature, instances can be found in China throughout the 1980s and 1990s and in Russia during the early Soviet Union. P. Egger and H. Wineer (2005) examined samples of 73 rich and developing nations between 1995 and 1999 and concluded that corruption had a favorable short-term effect on foreign direct investment. Leff (1964) also suggested that corruption could stimulate foreign direct investment (FDI) in the presence of rules and other administrative restrictions. However, research demonstrating a favorable relationship between foreign direct investment and corruption is uncommon, and studies typically highlight the detrimental effects of corruption on FDI over time.

C. Corruption does not have a direct impact on FDI. V. Kolnes (2016) used the compiled data from 1995 to 2012 and reached relevant conclusions through a relatively novel measurement method, that is, the impact of corruption level on FDI largely depends on the environment, rather than directly acting on FDI.

However, due to the limitation of data, it cannot be further analyzed and estimated. Combined with papers on related lines of research in the last century, the authors point out that the debate in the field is due to systematic differences arising from different estimation techniques, as well as an oversimplified view of corruption. In other words, it cannot be ruled out that the above research conclusions may be due to the lack of reliable data and models and there is no way to directly prove the impact of corruption on FDI, so it cannot be directly concluded that corruption has no direct impact on foreign investment.

1.3 The mechanism of corruption inhibiting FDI

The purpose of enterprises participating in foreign direct investment is usually to obtain more benefits. When making foreign investments, enterprises will consider the relationship between the economic benefits brought by investment and the investment cost, that is, when the marginal benefits are greater than the marginal costs, they will choose to operate and produce activities here. Businesses involved in foreign direct investment (FDI) can be broadly classified into two groups: FDI by enterprises from corrupt countries and FDI by enterprises from noncorrupt countries.

A model of business behavior was created using the literature review conducted in earlier chapters. The specific relationship between FDI and corruption state is shown in Figure 1.

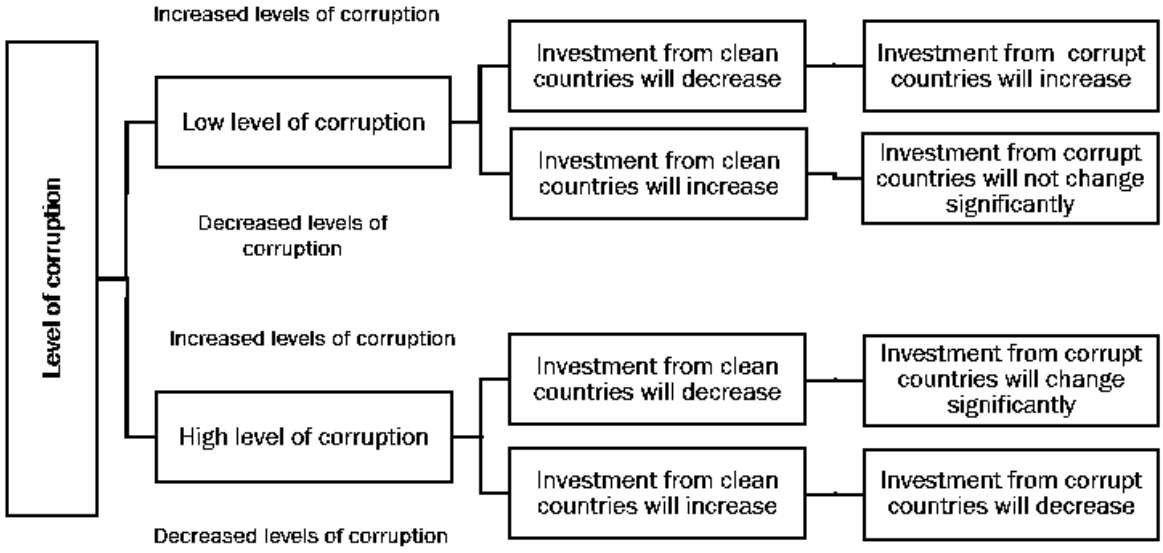

Figure 1: Relationship between changes in different levels of corruption and FDI.

Source: Own compilation based on literature review

For firms in clean countries, foreign firms in such countries are often unwilling to pay extra costs for other factors, such as gaining access to more resources or better competitive positions in the market by bribing officials to gain connections. They tend to invest in clean countries. In a more corrupt country, these enterprises may change their investment strategies or withdraw from the country's market due to market policies and other factors.

For enterprises in corrupt countries, foreign enterprises in such countries prefer to pay rent-seeking costs to obtain better conditions for operating and producing activities, gain advantages in market competition, and make more profits. These firms may prefer to invest in a relatively corrupt environment. (The underlying assumption is that the level of corruption in this nation won't be severe enough to undermine political stability and the equilibrium of the market; on the other hand, an overly corrupt climate could cause rent-seeking expenses to skyrocket and force businesses out of the market.)

In conclusion, if corruption is widespread in a country or region, the amount of foreign investment in clean countries decreases, and the amount of foreign investment in corrupt countries fluctuates greatly.

There is a threshold for corruption, and once it reaches that level, more corruption draws foreign direct investment. FDI is significantly reduced by an increase in corruption if the threshold is crossed. However, in cases of low corruption, the amount of foreign investment in clean countries increases while the amount of foreign investment in corrupt countries fluctuates in a small range. That is, an increase in corruption will inhibit foreign direct investment.

2. RESEARCH DESIGN

This paper uses Transparency International's Bribe Payers Index Survey data as the sample frame, from which 28 major global economies are selected as the sample source countries (List of countries attached - Transparency International, 2011).

These countries were chosen as samples because, on the one hand, they have sizable markets and have drawn a lot of foreign direct investment over the past 30 years. This makes it possible to gather comprehensive research data, and many samples can significantly reflect the investment tendency of businesses. On the other hand, most of these countries or regions have experienced major political and economic changes, and the original politics and economy have been affected by the wave of globalization, providing many research topics for academic research. Some of these nations or regions have recently undergone significant political and economic transformations, which have resulted in a proliferation of corruption or have historically been corrupted owing to the influence of their original political systems or cultures.

2.1 Data

In the data used in this paper, the corruption indices are derived from the Corruption Perception Index (CPI) published by Transparency International. Foreign direct investment and GDP are from the United Nations Commodity Trade Statistics Database (UNCTAD); data on other control variables are from the Human Development Index published by the United Nations Development Program (UNDP); State Fragility Index published by the Foundation for Peace (FFP); and labor cost (LC) is from the statistics of the International Labor Organization (ILO). By collecting the data from 28 countries or regions from 1995 to 2022, 784 samples are finally obtained. The impact of corruption on selected variables will be verified on a panel data set.

FDI: The paper uses Foreign Direct Investment inflows in each country to measure the amount of investment by firms. The stock and flow of foreign direct investment are taken as different explained variables respectively. (UNCTADstat, 2023a)

CPI: The Corruption Perception Index is based on the level of corruption of public officials and politicians in each country evaluated by businessmen, academics, and country analysts on a ten-point scale, with higher scores indicating lower levels of perceived corruption. Since 2012, the corruption perception index has changed from a ten-point scale to a hundred-point scale. (Transparency International, 2023)

GDP: The Gross Domestic Product is the core indicator of national economic accounts and is also of great importance in measuring the economic situation and development level of a country or region. GDP is largely a factor that directly affects the investment consideration of foreign enterprises, and it plays a positive role in promoting FDI. Similarly, the logarithm of GDP is taken for calculation due to the large value. (UNCTADstat 2023b)

HDI: The Human Development Index is a measure of the socio-economic development of countries. It is calculated based on average life at birth, years of schooling (including average years of schooling and expected years of schooling), and gross national income per capita, also on a ten-point scale, with higher scores indicating higher levels of social development. Many existing studies have shown that HDI will have an important impact on FDI. A developed society and perfect infrastructure can reduce the cost of business investment and operation. (UNDP, 2022).

FSI: The Fragile States Index common indicators include a country with a very weak or powerless central government that does not have effective control over much of its territory, a failure to provide public services, widespread corruption and crime, refugees and involuntary migration, and a sharp economic decline. Scores above 90 indicate social unrest, political instability, and economic decline. These issues will affect the decisions of corporate investors. The Fragile States Index began in 2005, so the paper covers the data from 1995 to 2004 with an average. (The Fund for Peace, 2023)

LC: As a key production factor, labor cost is often valued in enterprise investment. In general, lower labor costs are more attractive to foreign direct investment. Although most scholars generally agree that there is a negative relationship between labor costs and FDI, some studies have not reached significant conclusions. (ILOstat, 2023).

Table 1 gives a statistical description of the relevant data.

Table 1. Variables used

Types of variables	*Variable name*	*Variable symbol*	*Meaning of variable*
Explained variable	The logarithm of the stock of foreign direct investment	$\ln FDI_{stock}$	The cumulative value of foreign capital invested in the country
Explained variable	The logarithm of the flow of foreign direct investment	$\ln FDI_{flow}$	The change in the value of the country's foreign capital over time
Explaining variable	Corruption Perception Index	CPI	It is used to assess the perceived level of corruption in countries and regions around the world
Controlled variable	Logarithm of Gross Domestic Product	lnGDP	It is used to measure the market value of all results produced in the economic activities of a region in a certain period
Controlled variable	Human Development Index	HDI	It is used to measure the comprehensive development level of a country, focusing on human longevity, education, and living standards
Controlled variable	Fragile States Index	FSI	It aims to assess and rank the political, social, and economic stability of countries across the globe
Controlled variable	Labor cost	LC	The costs paid by firms for the employment of social labor are part of the factors of production

Source: Own compilation

2.2 Model design

According to the content of the above research, to verify the accuracy of the hypotheses mentioned above, that is:

H1: Regardless of the level of corruption, an increase in the level of corruption inhibits FDI.

H2: In the case of low corruption level, an increase in corruption level will inhibit FDI; At high levels of corruption, an increase in the level of corruption attracts FDI.

H3: In the case of low corruption level, the increase of corruption level will inhibit FDI; At high levels of corruption, an increase in the level of corruption does not have a significant effect on FDI.

A panel data set consisting of observations from selected 28 countries for the years 1995–2022 was assembled. Due to the fixed number of observed units (countries) in time, the resulting panel data set is balanced, and it is possible to use classic tools for estimating models with panel data (Baltagi, 2005). Greene (2003) considers the basic regression model of panel data to be the model:

$$y_{it} = \beta_1 x_{it1} + \beta_2 x_{it2} + \ldots + \beta_k x_{itk} + \alpha_1 z_{i1} + \alpha_2 z_{i2}\, \alpha_3 + \ldots + \alpha_q z_{iq} + u_{it} \quad (1)$$

where the index i denotes the cross-sectional dimension i = 1,..., n, the index t the time dimension t = 1,..., t, the variables x1 to xk are explanatory variables not including the vector of units and the variables z1 to

zq represent individual effects - diversity that can distinguish an individual or a whole group from other entities - a possible vector of units is included here. Individual effects do not change over time.

Based on the framework above, three regression cases can be estimated: *Ordinary Least Squares regression (OLS)*, *Random Effects Model (RE),* and *Fixed Effects Model (FE)* - (Baltagi, 2005; Hsiao, 2014).

3. RESULTS AND DISCUSSION

3.1 Descriptive statistics and correlation analysis

Table 2 shows the descriptive statistical results of the main variables.

Table 2. Results of descriptive statistics of main variables

Variable	*Mean*	*Median*	*SD*	*Min*	*Max*
$lnFDI_{stock}$	12.31	12.35	1.438	6.975	16.39
$lnFDI_{flow}$	9.690	9.848	1.442	3.725	13.05
CPI	5.873	5.900	2.098	1.700	9.400
lnGDP	13.68	13.60	1.175	11.11	17.06
HDI	0.824	0.859	0.106	0.458	0.962
FSI	49.32	49.50	19.88	18.70	83.40
LC	26.01	26.51	17.84	0.030	73.18

Source: Own compilation

We should first determine whether there is a significant collinearity issue among the variables before testing hypothesis 1. To this end, we use the VIF method to analyze the relevant variables. If VIF is greater than 5, it indicates that there is collinearity among the variables. If VIF exceeds 10, it means that there is severe collinearity. It can be found from Table 3 that the largest value of each variable is 4.9, indicating that there is no serious collinearity among the variables in the model.

Table 3. Diagnosis of collinearity of relevant variables

Variable	*VIF*	*1/VIF*
CPI	4.900	0.204
FSI	3.520	0.284
LC	3.010	0.333
HDI	2.850	0.350
lnGDP	1.130	0.883

Source: Own compilation

Table 4 shows the correlation coefficient of each variable. The correlation coefficient between the stock of foreign inward direct investment and the corruption perception index is 0.572, which is significant. This provides a preliminary basis for **H1**. Gross domestic product, human development index, and labor cost are positively correlated with the stock of foreign inward FDI, while the fragile state index and the stock of foreign inward FDI are negatively correlated, basically as expected.

Table 4. Variable correlation analysis

	lnFDIstock	*CPI*	*lnGDP*	*HDI*	*FSI*	*LC*
lnFDIstock	1					
CPI	0.572***	1				
lnGDP	0.635***	0.125***	1			
HDI	0.531***	0.613***	0.250***	1		
FSI	-0.267***	-0.770***	-0.096***	-0.698***	1	
LC	0.374***	0.708***	0.124***	0.684***	-0.757***	1

Standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Own compilation

3.2 Panel Data Regression analysis

The purpose of the analysis that follows is to use empirical research to confirm the hypotheses and delve further into the impact of corruption on business investment decisions. To achieve this goal, we adopted the multiple linear regression model and obtained the regression results of pooled OLS, FE, and RE respectively, as shown in Table 5. After that, the 28 sample countries are classified, and the data are divided into two categories: the corruption perception index is greater than or equal to 6 and the corruption perception index is less than 6. The two types of data are regressed separately, and Table 6 is finally obtained.

Table 5. Results of model regression

	(1)	*(2)*	*(3)*
	OLS	*FE*	*RE*
CPI	0.631***	0.518***	0.328***
	(0.058)	(0.102)	(0.092)
lnGDP	0.632***	0.708***	0.768***
	(0.029)	(0.062)	(0.056)
HDI	2.960***	12.639***	11.117***
	(0.566)	(0.802)	(0.720)
FSI	0.031***	-0.011	0.029***
	(0.003)	(0.011)	(0.007)
LC	0.012***	0.026***	0.011*
	(0.003)	(0.007)	(0.006)
_cons	-0.998*	-8.524***	-9.335***
	(0.520)	(0.567)	(0.531)
N	728.000	728.000	728.000
	(1)	*(2)*	*(3)*
	OLS	*FE*	*RE*
R^2	0.626	0.818	0.786
R^2_a	0.623	0.810	0.779

Standard errors in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Source: Own compilation

Table 5 shows the test results of H1. It can be found that the three regression results of the independent variable CPI are 0.631, 0.518, and 0.328 respectively, which are significant at the 1% confidence level. This means that as the level of regional corruption decreases, the stock of foreign direct investment increases, that is, the possibility of foreign direct investment increases. After other control variables are added, the regression coefficient and significance level of the core variable CPI do not change substantially. The regression coefficients of GDP and human development index are positively correlated with the dependent variable, and the results are significant, indicating that the economic situation and social development level of a country or region have a significant impact on corporate investment decisions. In addition, the OLS and RE results of the fragile country index also have a significantly positive relationship with FDI. There is a significant positive correlation between labor cost and foreign direct investment, which means that labor cost is an important factor affecting corporate investment, and the knowledge level of labor may also determine the value of labor cost and production factors. After that, we classify the 28 sample countries and divide the data into two categories:

– the corruption perception index is greater than or equal to 6 – *"Clean country"*.
– the corruption perception index is less than 6 – *"Corrupted country"*.

Table 6: Grouped regression results.

	(1)	*(2)*	*(3)*
	Full sample	*Clean country*	*Corrupted country*
CPI	0.518***	0.503***	0.229
	(0.102)	(0.105)	(0.190)
lnGDP	0.708***	0.975***	0.755***
	(0.062)	(0.077)	(0.098)
HDI	12.639***	14.149***	8.720***
	(0.802)	(0.869)	(1.366)
FSI	-0.011	-0.025**	-0.001
	(0.011)	(0.011)	(0.018)
LC	0.026***	0.014**	0.013
	(0.007)	(0.006)	(0.031)
_cons	-8.524***	-13.820***	-4.841***
	(0.567)	(0.628)	(1.151)
N	728.000	448.000	280.000
R^2	0.818	0.867	0.809
R^2_a	0.810	0.861	0.799

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Own compilation

Table 6 shows the test results of H2. It can be seen from the table that the fixed effect regression result of the independent variable CPI in the whole sample is 0.518, and the result obtained by using the sample data of clean countries is 0.503, and both results are significant at the 1% confidence level. However, the result obtained by using the sample data of corrupt countries is 0.229, which is not significant, which *rejects* H2 and provides *supporting evidence for* H3. In addition, compared with the full sample, the sample data of clean countries show a significant negative impact of the fragile state index. Other results are much the same.

3.3 Robustness test

To enhance the reliability of the results, the robustness test of the above model is needed. This paper adopts the Variable substitution method to ensure the accuracy of the empirical results. The measure of the dependent variable foreign direct investment is replaced by the stock of inward foreign investment and the flow of inward foreign investment, The model is tested, and the results are shown in Table 7.

It can be found that after the measurement of foreign investment is changed, except that the HDI value in the OLS regression results in changes to − 0.113, which is not explained here because the value of HDI is not significant. In addition, other results are roughly the same, and the empirical results have not changed significantly.

Table 7. Regression results of the model with replacement variables

	(1)	*(2)*	*(3)*
	OLS	*FE*	*RE*
CPI	0.998***	1.318***	1.091***
	(0.094)	(0.219)	(0.184)
lnGDP	0.638***	0.726***	0.756***
	(0.036)	(0.129)	(0.093)
HDI	-0.113	6.115***	5.105***
	(0.721)	(1.630)	(1.241)
FSI	0.015***	0.001	0.024*
	(0.004)	(0.035)	(0.014)
LC	0.010**	0.030**	0.012
	(0.004)	(0.014)	(0.010)
_cons	6.231***	-7.230***	3.086
	(1.242)	(1.925)	(3.557)
N	692.000	692.000	692.000
R^2	0.438	0.376	
R^2_a	0.433	0.347	

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Own compilation

Similarly, we replace the dependent variable of the group-based regression with the flow of inward foreign investment. The results beyond this are consistent with those discussed in the groups above.

Table 8: Results of grouped regression with replacement variables

	(1)	*(2)*	*(3)*
	Full sample	*Clean country*	*Corruption country*
CPI	0.846**	0.685**	2.519***
	(0.409)	(0.272)	(0.352)
lnGDP	0.693**	0.405**	1.232***
	(0.290)	(0.186)	(0.184)
HDI	0.252	10.140***	-0.086
	(3.137)	(2.109)	(2.512)
FSI	0.027	0.028	-0.058*
	(0.022)	(0.029)	(0.033)
LC	0.006	0.036**	-0.058
	(0.021)	(0.015)	(0.056)
_cons	-1.941	-8.037***	-2.489
	(3.078)	(1.606)	(2.131)
N	344.000	421.000	271.000
R^2	0.060	0.322	0.507
R^2_a	-0.030	0.289	0.480

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Own compilation

To sum up, we can get the conclusion that the above model is robust, and the measurement results are reliable.

CONCLUSIONS

Using data from 28 countries from 1995 to 2022, this paper explores in detail the impact of the growth of the corruption perception index and other related factors on the investment strategies of firms at different levels of corruption.

The first hypothesis was verified since FDI is hindered by rising levels of corruption.

The second hypothesis, according to which nations with high levels of corruption are drawn to invest in nations with rising levels of corruption, was not confirmed.

Additionally, the third hypothesis was verified. An increase in corruption will deter prospective investors in nations with low levels of corruption, which will discourage foreign direct investment. Furthermore, an increase in corruption has no discernible impact on FDI in nations with high levels of corruption.

There is a strong positive link between labor costs and foreign direct investment FDI, indicating that labor costs do not exclusively influence company investment. Rather, labor knowledge levels can also influence the relationship between labor costs and production parameters.

According to the above conclusions, firms should give priority to investing in clean countries to reduce the instability of operations and rent-seeking costs. At the same time, corruption is not only a threat to corporate investment decisions but also a potential turnaround. Companies that are committed to the principles of business ethics, train and supervise management, strengthen risk management capabilities,

and build transparent and trusting relationships with stakeholders can find a robust path to growth in a corrupt environment.

Due to the limitation of ability and time, there are still many deficiencies and problems in this paper, which need to be improved and improved in future research.

The method of measuring corruption has always been a controversial topic, and the perception of corruption is subjective and lags. Limited by data and capacity, only the CPI is used in this paper, so there will be some deviations from the actual situation. The sample itself has endogeneity, which has always been an inevitable problem in econometrics.

With the continuous development of the global economy and the increasingly close international cooperation, governments and enterprises will face new opportunities and challenges when facing the problems brought by corruption. At present, the research on corruption is still in the initial stage.

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Appendix: List of countries

No	*Country*	*OECD Anti-Bribery Convention*	*UN Convention against Corruption*
1	Netherlands	Yes	Yes
2	Switzerland	Yes	Yes
3	Belgium	Yes	Yes
4	Germany	Yes	No
5	Japan	Yes	No
6	Australia	Yes	Yes
7	Canada	Yes	Yes
8	Singapore	No	Yes
9	United Kingdom	Yes	Yes
10	United States	Yes	Yes
11	France	Yes	Yes
12	Spain	Yes	Yes
13	South Korea	Yes	Yes
14	Brazil	Yes	Yes
15	Hong Kong	No	Yes
16	Italy	Yes	Yes
17	Malaysia	No	Yes
18	South Africa	Yes	Yes
19	Taiwan	No	No
20	India	No	Yes
21	Turkey	Yes	Yes
22	Saudi Arabia	No	No
23	Argentina	Yes	Yes
24	United Arab Emirates	No	Yes
25	Indonesia	Yes	Yes
26	Mexico	Yes	Yes
27	China	No	Yes
28	Russia	No	Yes

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Moderating Effects of Debt and Dividend Policy on the Relationships between Ownership Structure Variation and Firm Investment Inefficiency in Indonesia

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ABSTRACT

This article investigates the moderated-interaction effects of dividend and debt policies on the association between ownership structure and firm investment inefficiency in the Indonesian stock market. The study employs Panel Moderated Regression Analysis to analyze 605 firm-year observations spanning from 2009 to 2019. The findings of this study showed that both the ownership structure of the largest shareholders and the second-largest shareholders have a notable positive impact on firm investment inefficiency. In addition, the moderated-interaction effect of debt policy weakened the correlation between the ownership structure of the largest shareholders and firm investment inefficiency. Meanwhile, the study reveals that the dividend policy has an insignificant moderated-interaction effect on the relationship between the ownership structure of the largest shareholders and firm investment inefficiency. On the other hand, debt policy is identified as an effective control mechanism for mitigating agency conflicts in Indonesia. These findings emphasize the importance of debt policy to be considered by the firms' managers when designing the investment policy in the Indonesian stock market.

INTRODUCTION

Agency conflict is an important problem in modern companies because of the distinct division between ownership and control in managing the company. This conflict occurs because there is a tendency for managers or principals within the company to benefit themselves through the sacrifice of other parties (Jensen and Meckling, 1976). In a structure where ownership is centralized, large shareholders are expected to take action to monitor management, but with increased ownership, they can take actions that are not optimal by carrying out the problem of over-investing or under-investing thereby increasing inefficient investment in the company. Numerous prior studies have examined the correlation between various ownership structures and investment policies. For example, Faisal et al. (2021) discovered that a centralized ownership structure positively influences inefficient investment policies in Indonesia. This positive effect occurs because of enlarged agency costs triggered by agency conflicts that occur within the company originating from opportunistic actions carried out by various interested parties in the company, consequently a negative impact on the company's investment. A similar finding is found by Luo et al. (2011) for the cases of the stock markets in China and emerging economies. The collusion between bank managers and companies has caused the agency costs to be greater than the benefits causing a negative effect on firm value in developing country markets.

Previous studies have investigated the relationship between concentrated ownership structures on inefficient investment (Faisal et al., 2021) and the moderating effect of existing bank ownership structures in non-financial companies to reduce inefficient investments in companies (Wang et al., 2020). However, those studies have yet to consider the potentiality of corporate governance to reduce a company's agency problems through debt policy and dividend policy mechanisms to prevent the emergence of the issues of over-investment or under-investment. The current study aims to address the gaps present in previous research, building upon the groundwork laid by Faisal et al. (2021), who only examined the effect of concentrated ownership structures on inefficient investment policies in Indonesia by incorporating moderating variables debt policy and dividend policy into our proposed model. Additionally, in contrast to Wang et al. (2020), who only considered a bank ownership structure to control agency conflicts, this study offers a mechanism for corporate governance through debt policy and dividend policy to reduce the company's agency problems. These two elements of effective corporate governance are anticipated to mitigate the impact of concentrated ownership structures on the inefficient allocation of funds within public companies listed on the Indonesian stock exchange. Thus, this research aims to empirically examine how dividend and debt policies interact to moderate the relationship between ownership structure and inefficiencies in firm investment within the Indonesian stock market.

The outcomes of our study are expected to offer valuable insights to assist investors in making informed decisions when considering investments in publicly traded companies in Indonesia. The results of this study also hope to provide necessary policy references for regulators to design appropriate policies to minimize the agency problems that occur within the Indonesian stock market's publicly traded companies. The results of the present research are positioned to enhance the existing empirical knowledge, specifically in comprehending the moderating influences of dividend and debt policies in alleviating the effects of ownership structure on inefficiencies in firm investment.

The rest of the research is structured as follows: Section 2 presents reviews of relevant prior studies, forming the basis for hypothesis development. Section 3 furnishes details on data and analysis methods, succeeded by the examination of empirical findings in Section 4. Ultimately, Section 5 offers the study's conclusion.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The nature or behavior of large shareholders in a concentrated ownership structure plays an important role in making corporate investment decisions. According to Hasan et al. (2014), ownership structure influences the company's decision-making process, thus resulting in a substantial impact on the investment of the company. For instance, the prevailing ownership structure among major shareholders will influence the decision-making process related to the company's capital structure financing. Then, this capital structure policy will affect investment behavior and company growth. Various studies have shown that the

concentrated ownership structure has major implications for company efficiency and the development of company strategy (Su and He, 2012). According to Type II agency theory developed by Shleifer and Vishny (1986) and Mohammed (2018), A concentrated ownership structure, spearheaded by the largest shareholder, detrimentally impacts the value of a firm. This negative consequence arises from the majority shareholder appropriating benefits to the detriment of minority shareholders within the company. The same thing was found by Faisal et al. (2020) found the same thing at a certain level of ownership there are positive effects and negative effects after passing certain ownership limits.

Furthermore, Su and He (2012), examining the Chinese capital market, the research discovered that the influence of the ownership structure on company efficiency exhibits a U-shaped pattern, which indicates tunneling activities within the company. Wang et al. (2020) found an adverse effect of the ownership structure of banks on investment policies. Conversely, Faisal et al. (2021) discovered that a concentrated ownership structure led by the largest shareholders negatively influences corporate investment. Specifically, the results of his research suggested that a prevalent ownership structure has a positive effect on inefficient investment policies. This suggests that with an increase in the concentration of ownership structure, there is a greater likelihood of agency conflicts, resulting in suboptimal investment decisions in publicly traded companies in Indonesia. Based on this premise, the study presents the initial hypothesis as follows:

H1**:** *The concentrated ownership structure of the largest shareholder influences the firm inefficient investment policy.*

To minimize agency conflict within a company, several studies have used a variety of approaches. Various researchers examined the direct influence of corporate governance variables on the effectiveness of investments, such as concentrated ownership structure (Chen et al., 2017), board of commissioners, audit committee size, institutional ownership, and managerial ownership (Houcine, 2013), The type of bank ownership and opportunities for company growth (Wang et al., 2020), the type of foreign ownership (Chen et al., 2017), the type of government ownership (Vo, 2019). However, other researchers found different results. Iannotta et al. (2007) tested the effect of the type of concentration of ownership consisting of privately owned banks, government-owned banks, and mutual banks found an insignificant effect of the concentration of ownership on company profitability. Likewise, Altunbas et al. (2001) showed that the type of ownership in financial markets in Germany has no effect on company profitability. Furthermore, government-owned banks have no effect on investment efficiency.

This study offers good corporate governance to control agency problems within public companies in Indonesia, including the problem of over-investment and under-investment, by integrating various financial theories, specifically agency theory (Jensen and Meckling, 1976), through the framework of concentrated ownership led by the largest shareholder, agency theory of free cash flow through dividend policy (Gugler and Yurtoglu, 2003), through monitoring and bonding mechanisms, namely debt policy (Faisal et al., 2020), and monitoring by block shareholders (Edmans and Holderness, 2017), specifically, a concentrated ownership arrangement by the second-largest block shareholder with a minimum ownership stake of 5% or higher. Furthermore, Gugler and Yurtoglu (2003) and Faccio et al. (2001) found that the existence of the second-largest block shareholder in a company can deter entrenchment or expropriation by the majority shareholder at the expense of the minority shareholder. Faisal et al. (2021) discovered that the presence of a concentrated ownership structure led by the second-largest shareholder has a favorable influence on inefficient investment decisions in publicly traded companies in the Indonesian stock market. Based on this rationale, the study formulates the second hypothesis as follows:

H2**:** *The concentrated ownership structure of the second largest shareholder influence the firm inefficient investment policy.*

Furthermore, this research develops the research of Faisal et al. (2021) by incorporating dividend policy and debt policy as moderating variables in the relationship between the ownership structure led by the largest shareholder and inefficient investment. Thus, this research offers a more comprehensive mechanism for controlling agency conflicts in the correlation between concentrated ownership structures and inefficient investments. Both dividend and debt policies are used as corporate governance mechanisms to lessen agency conflicts between large and small stockholders and control agency problems in public companies in Indonesia. Dividend payments can reduce free cash flow (FCF) agency conflicts, which are under the control of managers. According to Jensen (1986), dividend payments can diminish free cash flow,

preventing managers from using it for personal interests or financing less lucrative projects. These payments can also function as a monitoring mechanism, protecting the interests of minority shareholders (La Porta et al., 2000). According to Faccio et al. (2001), the study demonstrated that dividend payments could alleviate the expropriation of rights by the majority shareholder at the expense of the minority. Similarly, in the rent extraction hypothesis (Gugler and Yurtoglu, 2003), dividend payments will decrease Free Cash Flow (FCF) under the influence of majority stockholders through company managers, communicating to the public that majority stockholders are not using FCF for their advantage. Nevertheless, Free Cash Flow (FCF) will be allocated to all shareholders equally.

Besides, an increase in dividend payments indicates that they are unable to extract leases from the rights of minority shareholders. Along with Rozeff (1982), dividends are generally seen as a control mechanism to restrict managerial discretion, and these measures are considered essential for the effective monitoring efforts of the company (bonding package). According to Rozeff (1982), higher dividend payouts work to minimize agency costs by motivating management to explore external funding sources, resulting in improved market control over companies. Hence, dividend policy is anticipated to alleviate agency problems and diminish inefficient investment. In this study, the anticipation is that dividend policy can act as a moderating factor, influencing the effect of majority shareholder ownership on inefficient investment policies. Based on this premise, the study articulates the third hypothesis as follows:

H3: *Dividend policy moderates the effect of the ownership structure of the largest shareholder on the firm inefficient investment policy.*

According to Jensen and Meckling (1976) and Faccio et al. (2001), debt can be employed as an agency conflict control mechanism. Because it results in external monitoring, the largest stockholders have to demonstrate good performance, which is recognized as the control hypothesis (Jensen, 1986). Debt policy encourages companies to reduce unnecessary cash expenditures, thereby increasing firm efficiency (Grossman and Hart, 1982). Thus, the debt policy will reduce inefficient investment policies. In addition, increasing debt will decrease FCF conflicts and demonstrate to the public that the largest stockholders do not employ FCF for their interests, nonetheless to pay off principal and interest on the period debt. Debt policy can shift the supervision exercised by management from supervision by stockholders to creditors (Rozeff, 1982; Jensen and Meckling, 1976; Jensen, 1986). Thomsen (2005) suggests a connection between debt and the correlation between ownership concentration and firm value. This study estimates that debt policy can moderate the effect of the majority stockholder ownership structure on inefficient investment policies. Based on this rationale, the study presents the ultimate hypothesis as follows:

H4: *Debt policy moderates the effect of the ownership structure of the largest shareholder on the firm inefficient investment policy.*

2. RESEARCH METHODS

2.1 Research Data and Sample

This research gathers secondary data from the financial statements of non-financial public companies listed on the Indonesian Stock Exchange. The research sample excluded financial companies to avoid introducing bias related to their unique characteristics. Furthermore, the research sample was selected using specific criteria according to the purposive sampling method (Cooper and Schindler, 2018). The selected companies have annual financial reports for the 2009-2019 period and possess comprehensive data about the research variables employed (the concentrated ownership structure of the first-largest and second-largest shareholders, debt policy, and dividend policy), in addition to information on control variables.

2.2 Data Analysis Method

This research builds upon the previous study conducted by Faisal et al. (2021) regarding the influence of concentrated ownership structures on inefficient investment by integrating moderating variables such

as dividend and debt policy into our proposed model. Since the study uses panel data, a panel moderating regression model is applied to evaluate the formulated hypotheses, as outlined below:

Model 1: Main Effect

$$IEFI_{it} = \beta_0 + \beta_1 C1_{it} + \beta_2 C2_{it} + \beta_3 LOGTA_{it-1} + \beta_4 ROA_{it-1} + \beta_5 TATO_{it-1} + \varepsilon_{it} \quad (1)$$

$IEFI_{it}$ is an inefficient investment resulting from deviations from optimal investment spending levels, triggered by frictions, for instance, financial restrictions or agency conflicts. The following regression equation is employed to calculate the absolute residual value, in line with the approach adopted by Richardson (2006), Wang et al. (2020), and Faisal et al. (2021).

$$INV_{i,t} = \beta_0 + \beta_1 TOBINSQ_{i,t-1} + \beta_2 INV_{i,t-1} + \beta_3 RETURN_{i,t-1} + \beta_4 CAHOL_{i,t-1} + \beta_5 SIZE_{i,t-1} + \beta_6 AGE_{i,t-1} + \beta_7 LEV_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

The variables in Equation (2) consis t of company *i* variables in year *t*, namely company investment (INV_{it}), the variables for company i in the preceding year t-1 encompass company growth opportunities ($TOBINSQ_{it-1}$), company investment ($INV_{i,t-1}$), company stock return ($RETURN_{i,t-1}$), cash holding company ($CAHOL_{i,t-1}$), company size ($SIZE_{i,t-1}$), company age (AGE_{it-1}), and company debt (LEV_{it-1}).

Model 2: Moderating Effect

$$IEFI_{it} = \beta_0 + \beta_1 C1_{it} + \beta_2 C2_{it} + \beta_3 DPR_{it} + \beta_4 LEV_{it-1} + \beta_5 LOGTA_{it-1} + \beta_6 ROA_{it-1} + \beta_7 TATO_{it} + \varepsilon_{it} \quad (3)$$

Model 3: Interaction Effect

$$IEFI_{it} = \beta_0 + \beta_1 C1_{it} + \beta_2 C2_{it} + \beta_3 DPR_{it} + \beta_4 LEV_{it-1} + \beta_5 C1*DPR_{it} + \beta_8 C1*LEV_{it-1} + \beta_9 LOGTA_{it-1} + \beta_{10} ROA_{it-1} + \beta_{11} TATO_{it} + \varepsilon_{it} \quad (4)$$

The variables in Equations (3) and (4) consist of the company *i* variables in year *t*, specifically, the concentrated ownership structure of the largest stockholder ($C1_{it}$), the concentrated ownership arrangement of the second-largest shareholder ($C2_{it}$), the dividend policy, quantified by the dividend payout ratio (DPR_{it}), then the variables for company i in the preceding year, namely debt policy as measured by the debt ratio (LEV_{it-1}). The company's size is measured by the natural logarithm of market capitalization ($LOGTA_{it-1}$) (Kim et al., 2010), firm profitability (ROA_{it-1}), Asset turnover is computed as the ratio of sales to total assets ($TATO_{it-1}$). This ratio reflects the effectiveness of using all company assets to generate sales (Lumapow and Tumiwa, 2017). The moderating variables of DPR and LEV will be retested before being included in the moderating regression model. If it does not qualify as a moderating variable, it will be treated as an ordinary predictor variable in the moderating regression model.

Additionally, the Chow test, Hausman test, and Lagrange Multiplier test are employed to identify the most appropriate model among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).

2.3 Measurements of Variables

This study includes the subsequent dependent, independent, and control variables. First, the dependent variable is the inefficient investment variable (INEFIi,t), quantified by the absolute residual value obtained from Equation (1). The issue of over-investment or under-investment is indicated by a positive or negative residual value.

Second, the independent variables include the concentrated structure of ownership, which is assessed through two proxies. Initially, the concentrated structure of the primary largest shareholder ($C1_{it}$) (Gonzalez, 2017; Heugens et al., 2009). The size of the concentrated ownership structure varies between countries. Some researchers use ownership of 5% or more as a criterion for identifying ownership concentration (Earle et al., 2005; Gugler and Yurtoglu, 2003). This study defines the limit of $C1_{it}$ is defined as the percentage of ownership held by the principal largest shareholder, including individuals and institutions, with a minimum ownership threshold of 20% or more. Secondly, there is the concentrated ownership structure of the

second-largest shareholder, whether owned by individuals or institutions with a minimum total ownership of 5% or more ($C2_{it}$).

Third, control variables representing the financial characteristics of firms include company-specific variables from the previous year, specifically firm size ($LOGTAi_{t-1}$) (Kim et al., 2010), firm profit (ROA_{it-1}) (Kim and Kwon, 2015), and total assets turn over ($TATO_{it-1}$), the age of the company ($LOGAGE_{it-1}$) (Kim and Kwon, 2015). The control variable will be selected which has the strongest effect on the dependent variable in each research model.

3. RESULTS AND DISCUSSION

3.1 Descriptive Statistics

Table 1 displays the descriptive statistics of the sample for all the key variables analyzed in this study. $INEFI_{it}$ has an average value of 4,518, which identifies that the absolute residual value of inefficient investments generated by companies in Indonesia for every IDR of their assets is 4,518 percent. C1 has an average value of 48,015 percent, which shows that the ownership composition of the first biggest companies in Indonesia is characterized by significant concentration. C2 has an average value of 17,805 percent, suggesting that the concentrated ownership structure of the largest shareholders in Indonesian public companies is still relatively modest.

Table 1. Descriptive Statistics of Research Variables (N= 605)

Variable	*Minimum*	*Maximum*	*Mean*	*Std. Dev*
$INEFI_{it}$	0.007	81.787	4.518	7.061
$C1_{it}$	20.510	93.060	48.015	16.538
$C2_{it}$	5.000	44.650	17.805	9.895
DPR_{it}	0.070	944.990	43.647	73.302
LEV_{it-1}	0.025	93.592	42.841	19.322
$LOGTA_{it-1}$	4.792	8.314	6.425	0.615
$OROA_{it-1}$	-6.562	84.350	12.328	9.852
$LOGAGE_{it-1}$	0.000	3.305	1.107	0.310

Source: Secondary data analyzed (2022) using E-views statistical software.

As shown in Table 1, the DPR has an average value of 43.647 percent, indicating that the dividend per share generated by a public company in Indonesia is 43,647 times the earnings per share. LEV has an average of 42,886 percent, which means that total debt is used to finance total assets of 42,886 percent. LOGTA, indicating that the company's size, as measured by the natural logarithm of total assets, averages 6.425 percent. The OROA has an average value of 12,328 percent, indicating that the operating income generated from each IDR of the total assets used is IDR12,328.

3.2 Empirical Results

Before calculating the moderated interaction effect of dividend and debt policies on the relationship between ownership structure and firm investment inefficiency in the Indonesian stock market, the research initially conducted classical assumption tests, including multicollinearity, heteroscedasticity, and autocorrelation. Tables 2, 3, and 4 report the findings of the tests. As observed from the findings of multicollinearity in Table 2, our research model is free from violation of multicollinearity because the decision was informed due to the correlation coefficient between the independent variables being less than 0.90 (Hair et al., 2014).

Table 2. The Multicollinearity Test

	C1	*C2*	*DPR*	*LEV*	*LOGTA*	*OROA*	*LOGAGE*
C1	1.000	-0.337	0.121	-0.078	-0.018	0.154	0.024
C2	-	1.000	0.031	-0.044	-0.071	-0.029	-0.027
DPR	-	-	1.000	-0.061	0.003	-0.004	0.019
LEV	-	-	-	1.000	0.119	-0.134	-0.042
LOGTA	-	-	-	-	1.000	-0.056	-0.017
OROA	-	-	-	-	-	1.000	-0.022
LOGAGE	-	-	-	-	-	-	1.000

Source: Secondary data analyzed (2022) using E-views statistical software.

Additionally, Table 3 displays the results of heteroscedasticity testing conducted through the Glejser method, which found the existence of heteroscedasticity in the research model. This is indicated by the significance level of the concentrated ownership structure by the first biggest shareholder, which is less than the level of 0.05. Likewise, the results of the autocorrelation test, as illustrated in Table 4, revealed that the research model is not exempt from the issue of autocorrelation since the Durbin-Watson value was outside the range between -2 to 2.

Table 3. The Heteroscedasticity Test (N = 605)

Variable	*Dependent Variable: Resabs*		
	Direct Effect (REM)		*Moderating Effect (REM)*
	Model 1: Main Effect	*Model 2: Moderating Effect*	*Model 3: Interaction Effect*
Constant	9.815* (0.094)	9.467 (0.111)	5.598 (0.410)
C1	0.086*** (0.005)	0.090*** (0.004)	0.166** (0.020)
C2	-0.072 (0.162)	-0.068 (0.190)	-0.067 (0.196)
DPRC1	-	-	-0.0001 (0.618)
LEVC1	-	-	-0.002* (0.266)
DPR	-	-0.004 (0.529)	0.005 (0.796)
LEV	-	0.009 (0.732)	0.087 (0.243)
LOGTA	-1.476* (0.059)	-1.496* (0.059)	-1.461* (0.065)
OROA	-0.089* (0.066)	-0.088* (0.073)	-0.090* (0.066)
LOGAGE	2.678* (0.080)	2.713* (0.078)	2.572* (0.095)

Source: Secondary data analyzed (2022) using E-views statistical software.

Note: ***, **, and * show the 1%, 5%, and 10% significance levels.

Since our research model contains problems of autocorrelation and heteroscedasticity, the proper model used to test the hypothesis in this study is a panel regression model using the Generalized Least Squares (GLS) approach method of estimation technique. The Hausman test was utilized to select between the Fixed Effect Model (FEM) and the Random Effect Model (REM) (null hypothesis being REM) (Anton, 2016). As reported In Tables 4 and 5, the null hypothesis is not rejected, indicating that the data fit is more favorable when considering the random effect panel model. Thus, the outcomes of testing Hypotheses 1, 2, 3, and 4 in the research are presented in Model 4a from Table 4 and Model 4c from Table 5, estimated based on Panel Least Square (PLS) and Estimated General Least Square (EGLS) models.

Table 4. Findings of PLS and EGLS for the Main Effect (N = 605)

Variables	*PLS*			*EGLS*
	Model 1a: CEM	*Model 2a: FEM*	*Model 3a: REM*	*Model 4a: EGLS*
Constant	3.435 (0.332)	22.069 (0.130)	5.273 (0.255)	1.979* (0.071)
C1	-0.005 (0.790)	0.006 (0.949)	-0.007 (0.761)	0.018*** (0.003)
C2	0.0100 (0.753)	-0.033 (0.771)	0.001 (0.978)	0.035*** (0.000)
LOGTATS	0.157 (0.738)	-3.322 (0.158)	-0.032 (0.960)	0.209 (0.113)
OROATS	0.001 (0.969)	0.016 (0.722)	0.011 (0.723)	0.019*** (0.019)
LOGAGETS	0.111 (0.905)	3.491 (0.198)	-0.144 (0.898)	-1.312*** (0.000)
Adjusted R^2	-0.007	0.225	-0.008	0.136
F-Statistic	0.07 (0.996)	2.056*** (0.000)	0.047 (0.998)	20.003*** (0.000)
DW Statistic	1.122	1.980	1.447	1.497
Chow test-FEM: Chi-square statistic	-	348.233*** (0.000)	-	-
Hausman test-REM: Chi-square statistic	-		2.788 (0.732)	-

Source: Secondary data analyzed (2022) using E-views statistical software.

Note: ***, **, and * show the 1%, 5%, and 10% significance levels. Values within parentheses represent p-values.

As observed from Table 4, the study observed a significant impact of the concentrated ownership structure by the first largest shareholder on inefficient investment ($\beta 1 = 0.018$; P-value < 0.01, in Model 4a from Table 4), supporting the first hypothesis of this study. The results of this study are consistent with the predictions of Type II agency theory and align with the findings of previous research (Mohammed et al., 2018; Gonzalez et al., 2017; Faisal et al., 2020; Jensen and Meckling, 1976) that when ownership by shareholders is greater in the company, it can lead to expropriation behaviour by the largest shareholder towards the company's financial decisions which will adversely affect firm value. The positive effect of the ownership structure by the primary largest shareholder on this inefficient investment policy implies that as the ownership concentration by the largest shareholder rises in a company, the more inefficient investment also increases. In other words, the increase in agency conflict is linked to a greater concentration of ownership structure by the primary largest shareholder, Increasing inefficient investments within public companies in Indonesia. The results of this study are consistent with the research conducted by Faisal et al. (2021). Furthermore, the concentrated ownership arrangement by the second-largest shareholder is also determined to have a notable impact on inefficient investment policies ($\beta_2 = 0.035$; P-value <0.01, in Model 4a from Table 4), so the second research hypothesis is also accepted. However, the positive direction of influence suggests that the engagement of the second-largest shareholder does not contribute to overseeing the company, consequently leading to an increase in inefficient investment.

The outcomes of this study diverge from those reported by Faccio et al. (2001) and Gugler and Yurtoglu (2003), where they observed that the presence of the second-largest block shareholder in a company could prevent entrenchment or expropriation by the majority shareholder against minority shareholders. This happens because the second largest shareholder's ownership in Indonesia is relatively small, namely 17.805% (Refer to Table 1 for the findings of Descriptive Statistics). When shareholder ownership is small, they tend to be free riders and are reluctant to exercise oversight. Because the cost of conducting supervision will be greater than the benefits they will receive. The results of this study are consistent with those of Faisal et al. (2021), suggesting that the concentrated ownership structure by the second-largest shareholder positively influences inefficient investment decisions in public companies in Indonesia. Furthermore, Table 5 displays the outcomes of examining the moderating effect of dividend policy on the influence of the ownership structure by the largest shareholder on inefficient investment

policies. The test results from the moderated regression model, as shown in Model 4c of Table 5, are employed to assess the research hypothesis (H3). It was found that Hypothesis 3 was not supported (β_3 = -0.00006; P-value > 0.05). These results suggest that dividend policy does not act as a moderator in influencing the influence of the ownership structure by the largest shareholder on inefficient investment policies. The reason is that dividend policy in Indonesia is determined by the largest shareholder during the shareholders' general meeting. Therefore, when there is an increase in the concentrated ownership structure of the primary major shareholder within the company, the dividend policy is ineffective as a monitoring tool to regulate agency conflicts between majority and minority shareholders. This result is noteworthy as it indicates that dividends lack the capacity to serve as a supervisory mechanism for safeguarding against takeovers by majority shareholders in highly concentrated ownership structures. This finding does not support the bonding package or market monitoring (Rozeff, 1982; Sulong and Nor, 2010) and the Free Cash Flow (FCF) theory (Jensen, 1986).

Finally, the results of the moderated regression model, as illustrated in Model 4c of Table 5 and applied to investigate the research hypothesis (H4), found that Hypothesis 4 was supported (β_4 = 0.0006; P-value < 0.05). The findings of this study indicate that debt policy serves as a moderating variable. These findings suggest that debt plays a crucial role in mitigating agency conflicts between majority and minority shareholders in Indonesia. This discovery aligns with prior empirical studies that endorse the idea of bonding packages and market monitoring (Rozeff, 1982), FCF theory, and hypothetical control (Jensen, 1986).

Table 5. Findings of PLS and EGLS Estimations for Moderating and Interaction Effects (N = 605)

Variable	*Direct Effect*				*Moderating Effect*			
	Main Effect and Moderating Variable				*Main Effect. Moderating Variable. and Interaction Effect*			
	PLS			*EGLS*	*PLS*			*EGLS*
	Model 1b: CEM	*Model 2b: FEM*	*Model 3b: REM*	*Model 4b: EGLS*	*Model 1c: CEM*	*Model 2c: FEM*	*Model 3c: REM*	*Model 4c: EGLS*
Constant	2.461 (0.491)	20.262 (0.165)	4.326 (0.356)	2.950*** (0.000)	4.670 (0.255)	23.893 (0.114)	6.637 (0.212)	3.857*** (0.000)
C1	-0.002 (0..921)	0.018 (0.861)	-0.004 (0.871)	0.005 (0.229)	-0.044 (0.310)	-0.079 (0.574)	-0.047 (0.367)	-0.023** (0.041)
C2	0.014 (0.654)	-0.0254 (0.822)	-0.006 (0.881)	0.027*** (0.007)	0.012 (0.703)	-0.021 (0.856)	0.006 (0.886)	0.020** (0.049)
DPRC1	-	-	-	-	-0.00001 (0.927)	0.0001 (0.532)	-0.00006 (0.700)	-0.00006 (0.301)
LEVtsC1	-	-	-	-	0.00099 (0.263)	-0.002 (0.323)	0.0009 (0.370)	0.0006** (0.013)
DPR	-0.0007 (0.859)	-0.001 (0.783)	-0.001 (0.765)	0.001 (0.125)	0.0002 (0.986)	-0.008 (0.491)	-0.005 (0.640)	0.006 (0.119)
LEVts	0.028* (0.064)	0.041 (0.149)	0.026 (0.142)	0.014*** (0.000)	-0.020 (0.664)	-0.035 (0.667)	-0.018 (0.727)	-0.019 (0.158)
LOGTAts	0.065 (0.891)	-3.525 (0.135)	-0.116 (0.856)	-0.034 (0.792)	0.032 (0.947)	-0.375 (0.153)	-0.161 (0.804)	0.0003 (0.998)
OROAts	0.008 (0.799)	0.009 (0.847)	0.013 (0.687)	-0.003 (0.681)	0.008 (0.780)	0.008 (0.868)	0.014 (0.667)	0.004*** (0.660)
LOGAGETS	0.188 (0.839)	4.216 (0.126)	-0.023 (0.984)	-0.632** (0.004)	0.275 (0.768)	4.052 (0.143)	0.043 (0.970)	-0.465* (0.082)
Adjusted R^2	-0.005	0.225	-0.007	0.033	-0.006	0.224	-0.009	0.040
F-Statistic	0.554 (0.793)	2.045*** (0.049)	0.359 (0.925)	3.990*** (0.000)	0.571 (00.821)	2.027*** (0.000)	0.383 (0.943)	3.662** (0.000)
DW Statistic	1.125	1.983	1.449	1.638	1.127	1.979	1.448	1.711
Chow test-Fixed effect: Cross-section Chi-square	-	347.680*** (0.000)	-	-	-	348.341*** (0.000)	-	-
Hausman test-Random effect: Chi-Sq. Statistic	-	-	3.399 (0.846)	-	-	-	4.347 (0.887)	-

Source: Secondary data analyzed (2022) using E-views statistical software.

Note: ***, **, and * show the 1%, 5%, and 10% significance levels. Values within parentheses represent p-values.

Overall, the findings provide the following implications. First, our findings support the Type II agency theory. The existence of the primary largest shareholder and a rise in debt within the company can heighten agency conflicts between majority and minority shareholders. When the ownership of the largest stockholders increases, they take expropriation actions that harm other shareholders through making financial decisions, such as suboptimal investment decisions, thus increasing inefficient investments.

Second, the engagement of the second-largest shareholder does not take on a supervisory role within the company. The second largest shareholder ownership in public companies in Indonesia is comparatively limited. Hence, they tend to act as free riders since the costs of conducting supervision are greater than the benefits they receive, thus increasing inefficiency in investments.

Third, the dividend policy in public companies in Indonesia does not play a role in alleviating agency conflicts within these companies. This is partly due to the fact that the dividend policy in Indonesia is determined by the largest shareholder at a general meeting of shareholders. Therefore, when there is an increase in the ownership concentration of the first shareholder in the company, the dividend policy is ineffective as a monitoring tool to regulate agency conflicts between majority and minority shareholders.

Finally, the results of this study highlight the substantial role of debt policy as a moderating variable in influencing inefficiencies in firm investment. This variable contributes to the control mechanisms to address the agency problem in Indonesia. This empirical discovery is consistent with the rent extraction hypothesis, market monitoring, control hypothesis, and free cash flow agency theory.

CONCLUSIONS

This study empirically analyzed the moderated interaction effect of dividend and debt policies regarding the relationship between ownership structure and firm investment inefficiency. The research utilized 605 firm-year observations covering the period from 2009 to 2019 in the Indonesian stock market through Panel Moderated Regression Analysis. The study noted that the ownership structure of the primary and second-largest shareholders substantially positively impacts firm investment inefficiency. The moderating impact of debt policy is observed to diminish the connection between the ownership structure of the primary largest shareholders and firm investment inefficiency. Conversely, the dividend policy shows an insignificant moderating interaction effect on the relationship between the ownership structure of the primary largest shareholders and firm investment inefficiency.

Our results suggest that the dividend policy in public companies in Indonesia does not play a substantial role in mitigating agency conflicts within these companies. This is partly due to the fact that the dividend policy in Indonesia is determined by the largest shareholder at a general meeting of shareholders. Therefore, as the ownership concentration by the primary shareholder in the company rises, the dividend policy is ineffective as a monitoring tool for regulating agency conflicts between majority and minority shareholders. Conversely, our results suggest that debt policy effectively acted as a control mechanism for addressing agency conflicts in the Indonesian stock market. These findings further imply the importance of debt policy to be considered by the firms' managers when designing the investment policy in the Indonesian stock market. These empirical findings are in harmony with the rent extraction hypothesis, market monitoring, control hypothesis, and free cash flow agency theory.

The results of this study have important implications for regulators and investors in the Indonesian Stock Exchange. For regulators, it is hoped that they will be able to establish appropriate policies in minimizing the agency problems that occur in public companies in Indonesia, among others by reviewing the ideal ownership limits for the largest shareholder in public companies in Indonesia. Limiting the number of owners within certain limits can prevent expropriation behavior carried out by the majority shareholder in making company financial decisions. This is to ensure that adverse effects on the company's investment policy can be mitigated while also addressing the rise in the ownership of the primary shareholder in the company.

Moreover, it is anticipated that the findings of this study will offer guidance for investors when deciding on investments in public companies within Indonesia. The existence of a moderating effect of debt on the relationship between the concentrated ownership structure of the primary largest shareholders and

inefficient investment policies suggests that companies with an optimal level of debt can mitigate Type II agency conflicts within the company, so this is a guide for investors in choosing companies that right in the placement of their investment in the company. The existence of agency conflicts also requires investors to increase supervision when investing in public companies in Indonesia.

Future researchers are expected to be able to develop this research by expanding the research sample not only to examine the sample companies as a whole but also to divide the sub-group analysis into companies that have high agency conflicts. For instance, categorizing sub-groups based on companies with high free cash flow but limited investment opportunities. The analysis from this study can be extended by partitioning the sub-samples into companies experiencing issues with either overinvestment or underinvestment. By examining these various problems in depth, it is expected that the results of future research can make a significant contribution to minimizing agency problems in public companies in Indonesia, thereby reducing inefficient investment policy-making.

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The Assessment of Employees' Competences on the Labour Market in the Context of the Development of Artificial Intelligence Systems

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ABSTRACT

The rapid development of artificial intelligence has led to major changes in all areas of activity, particularly influencing the content of socio-economic activities and the profile of the labour market. In these circumstances, it is necessary to assess the competencies of employees in order to determine the extent to which organisations are acting and/or are prepared to meet the new challenges generated by the development of artificial intelligence systems. In this context, the present research aims to analyse the level of appreciation of employees' competencies from an organisational perspective, identifying three sets of competencies by employee category: workers, specialists, and managers. The competencies included in the research were adapted from the Continuing Professional Development Survey applied in organisations in EU Member States. The observation method used in the research was the survey, which included 350 organisations, and the respondents were HR managers or managers of organisations, depending on their size. In addition to the bibliometric analysis of the field, a set of statistical methods was applied in processing, analysing, and interpreting the respondents' answers: ANOVA analysis, association analysis, rank method and text analysis. The results show some differences in the assessment of the required competencies across different categories of employees, as well as according to the size and scope of the organisation. The results reflecting the opinion on the appreciation of employees' competencies are interpretable also according to the way each manager understands IT development as a promoter of the promotion of artificial intelligence. The results obtained show that IT skills were rated at the lowest level compared to other categories of skills. The research highlights those areas of work where some employee skills are valued at a lower level compared to other areas of work.

INTRODUCTION

Artificial intelligence (AI) has penetrated all spheres of life, including working life, leading to a shift in the work paradigm and the demands on employees' professional skills. Depending on the field of work and the content of the job, AI is being applied differently at the current stage, but with big implications for the future need for skills in human resources. The relationship and impact of AI on the labour market and skills needs have been of concern to several researchers (Acemoglu & Autor, 2011; Arup et al., 2023).

In addition, many researchers have analysed the implications of AI on different areas of activity. Thus, the impact of using AI in the following domains has been researched: retail (Purcărea et al., 2021; Stanciu & Rândașu, 2021); finance and banking (Weber, 2023); industry (Borboni et al., 2023); agriculture (Ganeshkumar et al, 2023). In order to adapt to the new changes, organisations need, on the one hand, to adjust new work and organisational models (Jaiswal et al., 2022) and, on the other hand, to reassess the required skills of employees, as the automation of certain work tasks, which may lead to retraining or the development of new skills (Hancock et al., 2020).

Although AI is substantially changing the profile of activities and jobs, Autor (2015) believes that a significant category of medium-skilled jobs that combine specific job skills with literacy, numeracy, adaptability, problem-solving and common-sense skills will persist for decades to come. The researcher's argument is based on the idea that many of the future medium-skilled jobs will combine routine technical tasks with non-routine ones, where employees have comparative advantages: interpersonal interaction, flexibility, adaptability and problem-solving.

The rapid development of AI has led to a drastic increase in the demand for IT professionals, and the lack of skills in AI and IT, respectively, poses a significant challenge to the labour market, including academia (Bawack et al., 2021). Thus, both academia and business need to react quickly by designing and expanding academic and continuing education programmes in line with labour market needs to train new generations of IT and AI professionals (Zhang et al., 2022). Labour shortages have also been analysed in Romania, including in the IT&C sector (Chivu et al., 2019). The authors of the research argue that even though the IT&C sector has been declared a strategic priority by policy makers at the national level, with several measures being promoted to support the sector, the labour shortage is still high and has increasing trends. In the same vein, Bîrcă et al. (2023) analysed skills in the labour market in the Republic of Moldova.

Based on the above, this paper aims to determine how businesses (organizations) assess the competencies of their employees, especially in IT, in the scope of the development of AI systems. The orientation of this research is driven by the fact that economic agents need to be aware of the relevance of continuous training of employees' competencies for the achievement of organizational goals, but also of the need for investment in training new IT competencies for employees, as a result of changing work content and work processes. Moreover, the development and upgrading of employee skills can take place through the initiation of training programmes by organisations in the context of lifelong learning, building on the current skill level of employees in organisations. This directly involves the regular development of digital skills in the use of information technology as a tool for knowledge and lifelong learning.

This paper is structured in three sections. The first part reviews the literature on managers' assessment of employee competencies in their organisations from the perspective of IT development and artificial intelligence. In the second part, the applied research methodology is presented, highlighting the assessment of competencies included in the research, followed by the main results obtained. The paper concludes with the presentation of the main conclusions and managerial implications on the training and upgrading of employees' skills in the context of accelerated AI development.

1. LITERATURE REVIEW

Broadly, AI encompasses systems that are capable of mimicking intelligent human behaviour (Kok et al., 2009) and refers to the study and development of "intelligent agents" (machines, software or algorithms) that act intelligently by recognising and responding to their environment (Agrawal et al., 2018). In another approach, AI consists of systems that can process data and information, similar to intelligent

behaviour, including aspects related to reasoning, learning, perception, prediction, planning or control (UNESCO, 2021).

AI leads to the automation of certain processes and work tasks, allowing employees to focus more on tasks of greater complexity. According to Morandini et al. (2023), this can lead to the development of new skills and the optimization of existing skills, allowing employees to be more productive and innovative. While Morandini et al., (2023) view AI as a source of motivation for learning, Georgieff & Hyee (2022) view it as a substitute for the workplace.

OECD (2018) classifies competencies into: cognitive and meta-cognitive competencies (critical thinking, creative thinking, learning to learn and self-management), non-cognitive competencies (empathy and collaboration) and digital competencies (use of digital devices). Non-cognitive skills include: open-mindedness, openness to learning and change, flexibility, curiosity, innovation, creativity, entrepreneurship, resilience, planning, organisation, responsibility, persistence, teamwork, communication, initiative, sociability, empathy, collaboration, emotional control and positivity (Kautz et al. 2014). In turn, digital skills can be defined as a set of core knowledge, skills and other characteristics that enable people to perform their work tasks effectively in a digital environment (Oberländer et al. 2020).

The integration of AI systems in organisations has led to a growing awareness of the importance of identifying and cultivating cross-functional competencies among employees. Cross-cutting competencies, also known as transferable or soft competencies, are those that can be applied in different areas of work and for performing different work tasks (Hart et al., 2021). According to the authors, cross-cutting competencies are necessary or valuable for effective action in any type of work, learning or life. They are considered "transversal" because they are not exclusively linked to a specific context and are becoming increasingly important in a society experiencing rapid technological and social change. In this context, Hart et al. (2021) propose a model for transversal competencies consisting of six main categories: basic skills, thinking skills, self-management skills, communication and interpersonal skills, physical and manual skills and life skills. In the context of AI development, basic skills refer to an individual's ability to understand, speak, read and write in one or more languages, as well as being able to work with numbers and use digital devices and applications. Thinking skills show the individual's ability to apply mental processes to collect, conceptualise, analyse, summarise and/or evaluate information obtained or generated through observation, experience, reflection, reasoning or communication (Morandini, 2023). Self-management skills are reflected in the individual's ability to carry out activities in a reflective, responsible and structured manner according to certain values, accepting feedback and identifying opportunities for personal and professional development (Hart et al., 2021). Communication and interpersonal skills refer to an individual's ability to interact positively and productively with others and can be demonstrated by: communicating ideas effectively and empathetically, aligning one's own goals and actions with those of others, seeking solutions to disagreements, building trust and resolving conflict, caring for the well-being and progress of others, managing activities through appropriate leadership (Morandini, 2023). Physical and manual skills show the individual's ability to perform tasks and activities that require manual dexterity, agility and/or physical strength. They can be performed in difficult or hazardous work environments requiring stamina or strength. (Morandini, 2023) According to Wamba-Taguimdje et al. (2020), improving physical and manual skills increases adaptability to new technologies and work environments, as workers skilled in the use of different types of machines or equipment can more easily adapt to new AI technologies that are introduced in the workplace. Life skills are skills that model adaptive and positive behaviour, enabling individuals to cope effectively with daily demands and challenges (Haug et al., 2021).

2. RESEARCH METHODOLOGY

In order to assess the level of skills among employees in organisations in the Republic of Moldova, we used the Continuing Professional Development Survey in organisations, applied in EU Member States and carried out every five years. It should be noted that in the Republic of Moldova this survey is not applied in domestic organizations. Also, the National Bureau of Statistics of the Republic of Moldova does not apply a survey that collects data on continuing vocational training and employees' skills, except for questions on vocational training included in the Labour Force Survey.

The Survey of Continuing Vocational Training in Organisations, applied at EU Member State level, includes 11 categories of competencies (Table 1).

Table 1. Professional competencies according to the European Commission

No.	*Competencies*	*Description of competence*
1.	General IT skills.	Use of computers, word processing, electronic diary, simple spreadsheets or internet.
2.	IT professional skills.	Specialist knowledge or understanding, such as producing web pages and developing complex programs.
3.	Management skills	Managing staff and planning the activities of others.
4.	Team working skills	Relations with colleagues, cooperation in work.
5.	Working with clients	Customer relations, persuading or influencing others.
6.	Problem solving	Identifying problems or shortcomings, establishing causes and considering solutions.
7.	Office administration skills	Billing, time management.
8.	Foreign language competencies	Reading, writing, listening and speaking in a foreign language.
9.	Job-specific competencies	Operation of machinery and plant; Sale of products or services.
10.	Oral and written communication	Making speeches or presentations. Reading long documents such as reports, manuals, articles or books.
11.	Numeracy and/or literacy competencies.	Simple arithmetic, calculations using decimals, percentages or fractions. Reading or writing information such as forms, notices, signs or short documents.

Source: European Commission EUROSTAT (2022).

Based on the competencies formulated by the European Commission (2022), they have been adapted to the situation in the Republic of Moldova, establishing sets of competencies by categories of human resources: workers, specialists and managers. Thus, a set of 8 competencies was established for workers, and 10 and 11 competencies - for specialists and managers (Table 2).

Table 2. Competences covered in the research by categories of employees

No.	*Workers*	*Specialists*	*Managers*
1.	Literacy skills	Literacy skills	Literacy skills
2.	Numeracy skills	Numeracy skills	Numeracy skills
3.	Oral and written communication skills	Oral and written communication skills	Oral and written communication skills
4.	Foreign language skills	Foreign language skills	Foreign language skills
5.	General IT skills	General IT skills	General IT skills
6.	Professional IT skills	Professional IT skills	Professional IT skills
7.	Job-specific skills	Job-specific skills	Job-specific skills
8.	Team working skills	Team working skills	Team working skills
9.		Interpersonal skills	Interpersonal skills
10.		Intercultural skills	Intercultural skills
11.			Management skills
Cronbach's Alpha	*0.880*	*0.917*	*0.939*

Source: Processed by authors in SPSS

In our research we have included intercultural competence for specialists and managers, taking into account the process of globalization of the labour market but also from the perspective of the penetration

of the internal market by labour force from outside the Republic of Moldova. In order to assess each competency by employee category, a questionnaire was developed that included the job competencies shown in Table 2. Respondents were asked to rate the competencies for each employee category on a Likert scale from "1" to "5", where "1" was the lowest rating and "5" - the highest rating. The respondents were HR managers - in the case of large and medium-sized enterprises, and in the case of small enterprises - their managers or HR managers. The data collection process took place online by filling in the questionnaire in Google Forms.

The collective for determining the sample was formed by economic agents from the Republic of Moldova. The sample consisted of 350 respondents (employers). The structure of respondents according to the number of employees is as follows: 62 respondents - micro enterprises (up to 9 employees), 100 respondents - enterprises with 10-49 employees, 105 respondents were part of the medium-sized enterprises category, and 83 respondents represented large enterprises. Table 3 also shows the structure of respondents according to a set of characteristics of organisations: size of organisation, location, type of ownership and field of activity.

Table 3. Profile of the sample of respondents by characteristics of organisations

Feature	*Categories*	*n= 350*	*%*
Size of the organisation	Up to 9 employees	62	17,7
	10- 49 employees	100	28,6
	50 - 249 employees	105	30,0
	Over 250 employees	83	23,7
Field of activity	Agriculture and forestry	41	11,7
	Trade	69	19,7
	Services	48	13,7
	Industry	56	16,0
	Hotels and restaurants	21	6,0
	Health and social care	13	3,7
	Transport and communications	23	6,6
	Financial activities	41	11,7
	IT	10	2,9
	Construction	16	4,6
	Other	12	3,4

Source: Processed by authors in SPSS

3. RESULTS AND DISCUSSION

Starting from the research objective of identifying the degree of appreciation of skills in the labour market in the view of employers in the context of the development of artificial intelligence systems, the authors set out to identify the level of appreciation of general and professional IT skills by top organizational management compared to other skills. From Figure 1, it can be easily observed that both at the level of workers, specialists and management, the level of appreciation of having general and professional IT skills is below the level of other skills. This suggests that decision-makers are aware of the need to develop IT skills in the context of the development of artificial intelligence systems.

For the in-depth analysis that we carried out further, we excluded the opinion of respondents from micro-enterprises in order to highlight the specific profile of larger organizations regarding the skills of employees in the context of AI development. The assessment of employee skill levels was carried out by statistical analysis using the ANOVA procedure (Jaba, 2002). For each employee category, the skill levels of managers, specialists and workers were compared between different categories of enterprises defined by the size of the organisation and their field of activity.

	Literacy skills	Numeracy skills	Oral and written communication skills	Foregn language skills	General IT skills	Professional IT skills	Job-specific skills	Team working skills	Relationship skills	Cross cultural skills	Management skills
Worker	3,8	3,6	3,8	2,8	2,7	2,5	4	4,2			
Specialist	4,5	4,5	4,6	4	4,1	3,7	4,5	4,5	4,4	4,2	
Manager	4,6	4,6	4,7	4,3	4,3	4	4,6	4,6	4,6	4,6	4,5

Figure 1. Competences assessment by categories of employees

Source: Processed by authors in SPSS

For managers, the skill level of this category of employees is higher in larger firms (Table 4). For seven of the 11 skills assessed, higher scores for managers are recorded for firms with more than 250 employees. Thus, there is a linear relationship between the level of competencies and firm size. However, managers in companies with 10-49 employees have higher skill levels in language skills, professional IT skills, teamwork and interpersonal skills. These differences observed by company category are not statistically significant (the probability associated with the Fisher test is above the chosen significance threshold of 10%, 5% and 1% respectively).

The competence level of specialists is higher in enterprises with more than 50 employees than in small enterprises with 10-49 employees (Table 4). For all ten competencies, the probability associated with the Fisher test is above the chosen significance threshold of 10%, 5% and 1%, respectively. For workers, higher skill levels are observed overall in enterprises with 10-49 employees and in those with more than 250 employees compared to medium-sized enterprises (Table 4). Thus, looking at the oral and written communication skills as well as the language skills of workers, the Fisher test indicates, at 10% and 5% risk respectively, a significantly lower level of skill appreciation for workers in medium-sized enterprises compared to the other two categories of enterprises. Similarly, in the case of job-specific skills, the Fisher test indicates a significantly higher level of competence among workers in large enterprises compared to medium-sized enterprises at 10% risk.

Table 4. Output of means and Fisher's test on the assessment of employees' skills by categories of firms differentiated by number of employees

Skills \ Company size		Manager		Specialist		Worker	
		Mean	*Fisher test*	*Mean*	*Fisher test*	*Mean*	*Fisher test*
Literacy skills	10 - 49 employees	4.66	0.250	4.55	1.036	3.92	1.254
	50 - 249 employees	4.55		4.72		3.71	
	Over 250 employees	4.72		4.60		3.96	
Numeracy skills	10 - 49 employees	4.63	1.082	4.47	0.973	3.77	2.317
	50 - 249 employees	4.47		4.63		3.47	
	Over 250 employees	4.63		4.60		3.75	
Oral and written communication skills	10 - 49 employees	4.57	1.065	4.56	1.025	3.91	2.854*
	50 - 249 employees	4.56		4.64		3.63	
	Over 250 employees	4.64		4.72		3.95	
Foreign language skills	10 - 49 employees	4.64	1.932	3.98	1.819	3.04	4.136**
	50 - 249 employees	3.98		3.91		2.49	
	Over 250 employees	3.91		4.23		2.83	
General IT skills	10 - 49 employees	4.03	1.100	4.06	1.326	2.73	.978
	50 - 249 employees	4.06		4.16		2.50	
	Over 250 employees	4.16		4.31		2.75	
Professional IT skills	10 - 49 employees	4.17	1.444	3.70	.084	2.55	1.408
	50 - 249 employees	3.70		3.76		2.28	
	Over 250 employees	3.76		3.70		2.24	
Job specific skills	10 - 49 employees	3.72	2.049	4.49	1.697	4.04	2.402*
	50 - 249 employees	4.49		4.57		3.91	
	Over 250 employees	4.57		4.71		4.25	
Team working skills	10 - 49 employees	4.58	1.420	4.48	.354	4.25	1.063
	50 - 249 employees	4.48		4.57		4.06	
	Over 250 employees	4.57		4.57		4.23	
Interpersonal skills	10 - 49 employees	4.54	1.922	4.39	.909		
	50 - 249 employees	4.39		4.51			
	Over 250 employees	4.51		4.54			
Intercultural skills	10 - 49 employees	4.48	.391	4.28	.070		
	50 - 249 employees	4.54		4.26			
	Over 250 employees	4.59		4.31			
Management skills	10 - 49 employees	4.48	1.297				
	50 - 249 employees	4.61					
	Over 250 employees	4.75					

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: Processed by authors in SPSS.

Comparative analysis of skills by employee category and by field of activity reveals significant differences in IT (professional) skills for managers (Table 5). Thus, for an assumed risk of 10%, hotel and restaurant managers have a significantly lower level of IT (professional) skills than managers in Commerce, Services, Industry, Transport and Communication, Financial Activities and IT. Managers in enterprises other than the 10 sectors covered by the study also have significantly higher IT (professional) skills for an assumed risk of 10% than managers in Agriculture and Forestry, Trade, Services, Industry, Hotels and restaurants, Health and social work and Construction.

Table 5. The output of means and Fisher's test on the assessment of the level of employees' skills according to the field of activity of the firms

Domain / Skills	Agriculture and forestry	Trade	Services	Industry	Hotels and restaurants	Health and social care	Transport and communica-	Financial activities	IT	Construction	Other	Fisher test
Manager												
Literacy skills	4.59	4.68	4.96	4.75	4.77	4.82	4.33	4.60	4.78	4.79	4.85	0.772
Numeracy skills	4.62	4.68	4.92	4.77	4.46	4.45	4.44	4.58	4.78	4.57	4.77	0.733
Oral and written communication	4.76	4.71	4.92	4.66	4.54	4.91	4.56	4.83	4.89	4.71	4.69	0.617
Foreign language skills	4.24	4.36	4.25	4.30	3.77	4.45	4.44	4.58	4.56	4.21	4.92	1.233
General IT skills	4.29	4.46	4.54	4.25	3.85	4.09	4.22	4.45	4.56	4.50	4.92	1.249
Professional IT skills	3.88	4.14	4.00	3.96	3.23	3.82	4.17	4.18	4.67	3.57	4.77	1.774*
Job specific skills	4.65	4.63	4.75	4.71	4.54	4.73	4.50	4.65	4.78	4.57	4.77	0.239
Team working skills	4.68	4.61	4.75	4.70	4.77	4.82	4.56	4.63	4.78	4.71	4.92	0.366
Interpersonal skills	4.59	4.63	4.83	4.68	4.46	4.82	4.56	4.63	4.67	4.50	4.92	0.610
Intercultural skills	4.35	4.52	4.54	4.54	4.46	4.36	4.61	4.55	4.78	4.64	4.85	0.494
Management skills	4.62	4.54	4.79	4.57	4.62	4.55	4.61	4.68	4.67	4.71	4.92	0.413
Specialist												
Literacy skills	4.56	4.66	4.96	4.71	4.62	4.82	4.17	4.50	4.89	4.64	4.38	1.224
Numeracy skills	4.44	4.55	4.92	4.64	4.23	4.09	4.50	4.55	4.78	4.71	4.54	1.163
Oral and written communication skills	4.62	4.59	4.92	4.59	4.62	5.00	4.39	4.65	4.78	4.57	4.54	0.860
Foreign language skills	3.74	3.93	4.25	3.80	4.15	4.00	4.17	4.50	4.44	3.64	4.15	1.552
General IT skills	4.00	4.09	4.42	4.18	4.23	4.00	4.17	4.28	4.44	3.79	4.46	0.669
Professional IT skills	3.65	3.75	3.71	3.52	3.38	3.91	3.89	3.93	4.33	3.36	4.00	0.824
Job specific skills	4.62	4.48	4.58	4.68	4.62	4.91	4.56	4.53	4.56	4.57	4.46	0.392
Team working skills	4.68	4.45	4.67	4.50	4.62	4.82	4.50	4.45	4.56	4.57	4.46	0.398
Interpersonal skills	4.59	4.41	4.58	4.43	4.31	4.55	4.56	4.48	4.67	4.36	4.54	0.308
Intercultural skills	4.29	4.27	4.50	4.09	4.46	4.18	4.50	4.30	4.78	4.00	4.23	0.763
Worker												
Literacy skills	3.65	3.82	4.08	3.91	4.08	3.73	3.67	3.80	4.33	3.57	4.23	0.679
Numeracy skills	3.56	3.75	3.67	3.57	3.62	3.55	3.56	3.83	3.78	3.43	3.69	0.278
Oral and written communication skills	3.85	3.68	4.13	3.68	3.85	4.27	3.56	3.88	3.67	3.50	4.62	1.706*
Foreign language skills	2.35	2.77	3.00	2.36	2.92	2.73	2.94	3.58	2.56	2.21	3.31	2.782***
General IT skills	2.24	2.66	2.75	2.27	2.69	2.82	2.50	3.33	2.67	2.43	3.38	2.303**

Professional IT skills	2.09	2.30	2.50	1.77	2.15	2.82	2.56	2.95	2.56	2.29	3.31	2.833***
Job specific skills	3.94	4.02	4.25	4.14	3.92	4.00	3.89	4.15	3.89	3.93	4.15	0.310
Team working skills	4.44	4.05	4.38	4.07	4.23	4.00	4.06	4.13	3.56	4.29	4.77	1.306

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01.

Source: Processed by authors in SPSS

In the case of specialists, the level of skills does not differ statistically significantly according to the field of activity of the companies (the probability associated with the Fisher test is higher than the chosen significance threshold of 10%).

For workers, there are significant differences by occupation in language skills, IT (professional) skills, general IT skills and communication skills (Table 5). Employees in organisations performing Financial Activities have a significantly higher level of general IT skills compared to employees in Agriculture and Forestry, Trade, Services, Industry, Transport and Communication and Construction. Workers in other industries also have a higher level of general IT skills than workers in Agriculture and Forestry, Trade, Industry, Transport and Communications and Construction. Workers in financial organisations have significantly higher levels of IT (professional) skills than those in Agriculture and Forestry, Trade, Industry and Hotels and Restaurants. At the same time, workers in other industries have higher IT (professional) skills than workers in Agriculture and Forestry, Trade, Industry, Hotels and Restaurants and Construction. The level of language skills is significantly higher among workers in organisations carrying out financial activities compared to those in Agriculture and Forestry, Commerce, Hotels and Restaurants, Healthcare, IT and Construction. In terms of written and oral communication skills, a significantly higher level of skills is identified for workers in Services compared to those in Commerce, Industry, Transport and Communication and Construction. Workers in Health and Social Care also have a higher level of communication skills than those in Trade, Transport and Communications and Construction.

In addition to assessing the competencies of employees, at the level of the companies observed, we aimed to identify the professional competencies that employees in the respondent organisations would like to develop. In this case, the research also included the responses provided by microenterprises to see what expectations they have in terms of professional skills. In this context, we started from Gallardo-Gallardo & Collings' (2021) statement that organisations should rely on competencies rather than job descriptions or traditional roles.

In this vein, from the previously assessed competencies, *"Literacy skills", "Numeracy skills", "Interpersonal skills"* and *"Intercultural skills" were* excluded, and for logical reasons, 4 other competencies were introduced, namely: "*Customer handing skills", "Time management skills", "New idea generation skills"* and *"Problem solving skills"* (Table 6).

From the analysis of the ranks of the professional competencies that should be developed in the employees of the studied organizations, they show different positions depending on the size of the organization (Table 6). The need to develop general IT skills is more evident in companies with 10-49 employees than in other companies.

Table 6. Hierarchy of professional competencies that should be developed in the employees of the studied organisations (rank method)

Size of the organisation / *Skills*	*The row*				
	Total	*Up to 9 employees*	*10- 49 employees*	*50 - 249 employees*	*Over 250 employees*
1. Oral and written communication skills	11	7	11	11	11
2. Foreign language skills	8	5	8	8	8
3. General IT skills	9	11	7	8	8
4. Professional IT skills	10	10	10	10	10
5. Job specific skills	1	2	3	1	3
6. Team working skills	3	3	2	3	1
7. Management skills	5	8	5	5	4
8. Customer handing skills	2	1	1	3	5
9. Time management skills	7	4	8	7	7
10. New idea generation skills	6	9	6	6	6
11. Problem solving skills	4	6	4	2	2

Source: Processed by authors.

From the set of skills analysed, by applying the association analysis and the χ test[2] (Jaba, 2002), a statistically significant association was obtained between the skills acquired and those required only for language skills (knowledge of a foreign language). Thus, respondents in organisations where workers have a higher level of language skills believe that these skills should be developed at the organisational level (χ^2 (4)= 10.931, p=0.027). At the same time, in the case of specialists, employers in organisations where there are specialists with a very high level of language skills consider these skills to be important for the organisation, while employers in organisations where specialists have no language skills or where the level of these skills is not very high consider these skills to be unimportant (χ^2 (4)= 9.073, p=0.059). Similarly, in organisations where managers have a very high level of language skills, there is a desire to develop these skills, whereas in organisations where managers have a low or medium level of skills, there is no desire to develop these skills (χ^2 (4)= 11.016, p=0.026).

For the other competencies studied, there was no significant association between the level of employee competencies and the organisation's intention to develop or not develop that competency.

CONCLUSION

This paper sought to highlight employers' perceptions of the competencies of employees within organisations in the context of the accelerating development of AI systems, and how employers relate to the different competencies needed in the future to achieve organisational goals. In this context, a set of employee competencies, considered relevant for the effective work of organisations, were assessed, but also in the perspective of the introduction of new technologies that imply the need to adjust current employee competencies.

The results obtained show that IT skills were rated at the lowest level compared to other categories of skills, which allows us to conclude that managers of organizations, regardless of their size and field of activity, have certain fears about the level of training of employees in the IT field and are increasingly aware of the relevance of this skill in the performance of job-related tasks. Similarly, language skills (communication in a foreign language) are valued at a lower level by respondents. This proves that in a globalised society, knowledge of a foreign language is imperative for the smooth running of business, regardless of the size or field of activity of the organisation.

Our research also highlights those areas of work where some employee skills are valued at a lower level compared to other areas of work, which could lead managers of these organisations to take concrete

steps in the future to help improve current skill levels and adapt them to the rigours dictated by the evolution of IT and AI systems.

Even if some authors argue that in the context of AI development, employee training should be oriented towards the development of soft skills (Hart et al, 2021; Morandini, 2023), the research results show that managers of domestic organizations are more inclined to develop technical, job-specific skills (57.3%), skills that are devaluing faster over time due to technological developments. Of the soft skills that managers of domestic organisations would most like to develop for their employees, the most important are those related to teamwork, working with customers and problem solving.

The original contribution of the paper lies in the fact that the aim was to evaluate professional competencies by categories of employees - workers, specialists and managers - in order to analyse their competencies in a differentiated way, which would allow senior managers in organisations to take decisions on the initiation and implementation of different training programmes for different categories of employees, oriented towards the development of certain competencies, based on their current development context.

From the perspective of involving managers in the process of developing the competencies of their organization's employees, our research provides them with the opportunity to objectively assess the level of competencies and make effective decisions related to continuing education programs that lead to increasing the value of employees' competencies. Likewise, the conducted study directs, to a certain extent, managers towards the need for soft skills development which becomes more relevant in the context of AI systems development.

This paper also has certain limitations. Firstly, it is a first attempt to assess the level of employee skills on the part of employers, which is why the results obtained cannot be compared with previous research showing the evolution of employee skills levels. Secondly, the level of representativeness of the respondent organisations does not fully correspond to the structure of the organisations by business area, which could influence to some extent the level of employee skills overall. Thirdly, the results reflecting employees' competencies are also interpretable according to each respondent manager's understanding of AI. Under these circumstances, respondents with different levels of knowledge in the field of IT and AI systems might have interpreted the level of employee skills differently.

As AI systems evolve, we aim to repeat this study to assess how employers' views of employee skill levels have changed. In the same way, we will try to analyse the extent to which AI systems have changed employers' perceptions of certain skills and, in particular, their assessment of the level of skills for different categories of employees.

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Effects of World Prices on Inflation. A Case Study in Vietnam

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ABSTRACT

Inflation and inflation control has been concerned by many countries around the world. In order to reduce inflation, it is necessary to know the causes of inflation. There are causes originating from within the economy, but external factors cannot be excluded. For open and integrated economies, an increase in prices on the world market will also have a certain effect on domestic commodity prices. This paper examines the effects of world prices such as oil prices, gold prices and rice prices on Vietnam's inflation, over the period from January 2010 to December 2022. To estimate the time series data, the method of vector autoregression (VAR) are also used to test the relationship between world commodity prices and inflation. Besides, the stationarity of the data series, the lag of variables, the impulse response functions the Granger causality test, and the variance decomposition of variables are also used to test and provide the level of relationship between variables in the research model. The findings of the study showed that oil prices, gold prices and rice prices are positively correlated with Vietnam's inflation rate. Thereby, managers need to monitor the evolution of world prices, in order to promptly respond, as well as minimize the effects, take advantage of opportunities to control inflation, stabilize and develop the economy.

INTRODUCTION

Inflation is one of the economic issues that are always of top concern in many countries around the world, because it directly affects all production and business sectors as well as all classes of society. Prices of goods and services fluctuate over time, and once prices change too quickly, it can be a shock to the economy. The consumer price index is a basic indicator that measures the prices of goods and services. Besides, this one indicates whether the economy is experiencing inflation or deflation.

In fact, not only in other countries in the world but also in Vietnam, commodity prices are influenced by the price level of goods on the world market, so they tend to increase, especially energy products such as gasoline, equipment, etc. as weak as the price of rice. Besides, changes in world gold prices also have certain effects on domestic gold prices. Therefore, the study of the influence of oil prices, rice prices, and world gold prices is a matter of increasing interest in research.

The rise of commodity prices poses the challenges to macroeconomic management. It also may create obstacles to economic recovery. In addition, higher commodity prices can feed into the core of inflation that creates expectations of a tighter monetary policy and increases the negative impact on aggregate demand (Kilian, 2008). From a monetary policy point of view, one of the main risks is the dynamics of inflation around commodity price shocks that could impact inflation.

There have been previous studies that mention the impact of world commodity prices on domestic inflation. In which, there are studies on world oil prices (Hamilton, 2004; Blanchard & Gali 2007; Choi S. et al., 2017; Anthony N.C 2019; Patricia R.M., 2019), the world gold price (Mahdavi & Zhou,1997; Capie et al., 2005; Kyrtsou & Labys, 2016; Shakil M.H. et al.,2017), or world rice price (Cheung et al., 2008; Ratnasari, 2009; Myint & Bauer, 2010; Abdoulaye et al., 2015; Belke & Awad, 2015, Tule M.K. et al., 2019). The influence of world commodity prices on domestic inflation varies depending on the specific characteristics of each country.

In Vietnam, there have also been domestic and foreign studies focusing on this issue such as Pham The Anh (2008), Vo Van Minh (2009), Nguyen Thi Hang Nga et al. 2016), Huynh Quoc Khiem and Nguyen Thi Chau Trinh (2017) mention oil prices; Pham Thi Thu Trang (2009) added the oil and rice prices; Than Thi Thu Thuy and Le Thi Thu Hong (2014) analyze the price of gold. However, most of the above studies consider the impact of each factor in oil price, gold price or rice price on Vietnam's inflation, but there have not been studies that combine the above factors. From the above reasons, this study examines the impact of world commodity prices including oil prices, gold prices and rice prices on Vietnam's inflation.

1. LITERATURE REVIEW

1.1 Theory of Commodity Price Fluctuations

This study mainly builds on the theoretical model of commodity price overshooting developed by Frankel (1986, 2008). Following Frankel (1986, 2008), the theory is derived from two assumptions. First, market participants who observe that the real commodity price today (rcpt) lies over its perceived long-run value expect the price to move back to its long-run equilibrium ($\overline{rcp}$) over time. As shown in Equation (1), the expected relative change in the real commodity price $E_t\Delta(cp_{t+1} - pm_{t+1})$, where cp_{t+1} is the nominal commodity price in t+1, pm_{t+1} the price of manufactured goods or the general price level in t+1, is expected to regresses back to equilibrium proportionally to the gap between real commodity price today and its long-run value. When the real price is high today, market participants expect a decrease until the long-run equilibrium is reached and vice versa.

$$E_t\Delta(cp_{t+1} - pm_{t+1}) = -\theta(rcp_t - \overline{rcp}) \quad (1)$$

Second, market participants base their decision to hold storable commodities on the arbitrage condition that the cost-adjusted expected rate of return of holding the commodity $E_t\Delta cp_{t+1} + c_t$ should equal the return on alternative assets or the interest rate it as illustrated in Equation (2). The cost of holding commodities ct includes the convenience yield, the storage costs and a risk premium.

$$E_t\Delta cp_{t+1} + c_t = i_t \quad (2)$$

Combining these two assumptions yields the commodity overshooting model represented by Equation (3).

$$(rcp_t - \overline{rcp}) = -\frac{1}{\theta}(i_t - E_t\Delta pm_{t+1} - c_t) \quad (3)$$

The real commodity price relative to its long-run equilibrium price is negatively related to the nominal interest rate, positively related to the expected price level and, thus, inversely related to the real interest rate $i_t - E_t \Delta pm_{t+1}$ relative to the cost of holding the commodity ct. A fall in the real interest rate induced by an expansion in money supply, increases the real commodity prices above its long-run equilibrium price, i.e. they overshoot, so that the expected increase in commodity prices equals the lower real interest rate and cost of holding commodities. Apparently, as the long-run real equilibrium price and the cost of holding commodities is not constant over time, the relationship between real interest rate and real commodity price does not hold precisely in practice (Frankel, 2008).

1.2 Literature review.

1.2.1 Impact of world oil prices on inflation.

According to modern economic theories, most countries go through the operation of the market to ensure the supply and demand of any commodity including energy. However, the oil and gas energy market often has political problems, monopoly, that's why there is always the intervention of the governments of countries around the world. In addition, oil and gas is an important source of energy and an indispensable input of economic activities, so the issue of selling prices, subsidies and taxes on petrol is always a concern of most governments. Therefore, when the world oil price fluctuates, it will affect other macro variables. The rising of world oil prices will affect domestic production costs, the general price level, and it will create inflation. Consequently, it negatively affect economic growth, and disrupt the market. Studies have found that oil price shocks affect output and inflation (Hamilton, 2004; Blanchard and Gali 2007; Choi S. et al., 2017; Anthony N.C 2019; Patricia R.M., 2019, Muhammad Z., 2021). In addition, rising oil prices increase input production costs that lead to higher prices of goods and services.

1.2.2 Impact of world gold price on inflation.

Mahdavi & Zhou (1997) test the performance of gold and commodity prices as leading indicators of inflation with cointegration and vector error-correction model (VECM) over 1958-1994. Their findings show that the stability of the gold price signalling inflation may vary depending on the time span being examined. Capie et al. (2005) apply Exponential generalized autoregressive conditional heteroskedasticity (EGARCH) technique to investigate the exchange rate hedge of gold price by using weekly data over the period 1971-2004. They find that the world gold prices can be a hedge against inflation depreciation and that there is a negative relationship between gold price and sterling-dollar and yen-dollar exchange rates but the strength of this relationship varies over time. Kyrtsou & Labys (2016) construct a noisy multivariate model describing the relationship between commodity price and inflation. They strongly confirm their argumentation about economic dynamics when a bi-directional non-linear relationship between U.S. inflation and commodity prices has been identified again. Shakil M.H. et al. (2017) also determined a relationship between gold prices in Saudi Arabia and the consumer price index (CPI) by applying an auto-recovery distributed lag (ARDL) model.

1.2.3 Impact of world rice price on inflation.

Cheung et al. (2008) looked into the effects of food commodity prices on inflation in several Asian countries in the 1962-2003 period. Results of analysis using the Philips Curve showed that food prices affected inflation. Ratnasari (2009) investigated factors affecting inflation in Sri Lanka in the period of 1980-2005, and reported that two main factors contributing to inflation were growing supply of money and increased prices of rice. Myint and Bauer (2010) examined markets integration and causal relationship between the prices of local rice and international rice (Thai rice), as well as the effect of the prices on consumer price index in Myanmar from 2001 to 2004. Monthly data were analyzed using the VAR analysis. Test results showed that while market integration was weakened in domestic market, a deficit in the prices of rice affected the consumer price index. Abdoulaye et al. (2015) examined the effect of the prices of

cereal commodities (rice, corn, and wheat) on inflation (which was proxied with the consumer price index) in Mali from 1993 to 2015. Results indicated that there was an effect of cereal prices on inflation in Mali in the long term, and there was none in the short term. Belke and Awad (2015) examined the effect of food prices on inflation in MENA, and reported that there were some long-term effects of the prices of food commodity on inflation. Tule M.K. et al. (2019) examine the predictability of agricultural commodity prices for twelve major agricultural commodities including rice prices in the inflation projections of Nigeria.

2. RESEARCH METHODOLOGY

This study uses the consumer price index (CPI) as a proxy for inflation. Data on Vietnam's CPI is reviewed for the period January 2010 to December 2022 from International Financial Statistics (IFS) of the International Monetary Fund (IMF).

This study based on the model used in the study of Oya C. et al. (2012), that builds a model to study the relationship between commodity prices and Vietnam's inflation as follows:

$$Y_t = \alpha_0 + \delta . OP_t + \theta . GP_t + \mu . RP_t + \sum_{t=1}^{n} \beta_i . MacroControls_{i,t} + \varepsilon_t$$

Where Y_t measures Vietnam's inflation through the monthly consumer price index. *OP, GP, RP* represent world oil price, world gold price, world rice price. $MacroControls_{i,t}$ is macroeconomic information consisting of exchange rate, industrial production index, interest rates, money supply.

There are many different approaches to analyze the factors affecting inflation, but after researching, the author found that the VAR model approach has the most advantages. Therefore, in this study, the author uses VAR model to implement the experimental model. In addition to the VAR model having advantages in analyzing shock transmission mechanism, that is, considering the impact of a shock on one dependent variable on other dependent variables in the system, it also has other advantages: (1) When using the VAR model, it is not necessary to distinguish which variables are endogenous and which are exogenous, but all variables will be considered as endogenous variables. The variables in the model all play the same role; (2) With a small number of variables in the model, the reliability of the obtained prediction is usually much better than a cumbersome system of equations model with many variables and many equations.

3. EMPERICAL RESULTS

3.1. Determine the stopping behavior of the variables included in the model

The descriptive data show that there is substantial difference in economic growth, inflation rate, exchange rate and interest rate across countries and over different time periods. Form the table it can be seen that, the mean of the stock index for the Asean countries stood at 7.2 points and the average exchange rate is 4.6 against the US dollar. The chage of inflation in Asean countries stood at a mean of 8.1779% and interest rate on loans was on average 11.35%. The standard deviation figures from Table 2, reveals that the most volatile data is of stock exhchange with a standard deviation of 5.235 and the least fluctuating data is interest rate with a standard deviation of 0.2076.

Table 1. Descriptive statistics the data of variables used in the model

	CPI	*OP*	*GP*	*RP*	*ER*	*IP*	*IR*	*MS*
Mean	4.949147	4.227899	7.222748	6.116836	9.976445	4.496857	2.220087	15.48167
Median	4.97571	4.22953	7.1755	6.087905	9.987705	4.47181	2.05923	15.52011
Maximum	5.14115	4.7689	7.58509	6.42203	10.05453	4.82615	2.89536	16.30959
Minimum	4.56379	3.04643	6.98076	5.87774	9.79484	4.04305	1.9373	14.48394
Std. Dev.	0.148294	0.375683	0.146759	0.144022	0.061104	0.159071	0.305219	0.530509
Skewness	-1.045971	-0.415407	0.645735	0.376107	-0.932723	-0.073556	0.859526	-0.249975
Kurtosis	3.400379	2.441232	2.401872	1.996893	3.565036	2.465823	2.296077	1.842218
Jarque-Bera	24.95091	5.513594	11.14107	8.646267	20.89536	1.688427	18.97858	8.747247
Probability	0.000004	0.063495	0.003808	0.013258	0.000029	0.429895	0.000076	0.012605
Sum	156	156	156	156	156	156	156	156

Source: Authors' analysis

3.2 Checking the stability of the data series

3.2.1 Determine the stopping behavior of the variables included in the model

To test the stopping behavior of the variables after the logarithmization, the research team performed Augmented Dickey Fuller test (ADF test). The research is based on the hypothesis H_0: the series of research variables has a unit root (non-stationary) and H1: the series of research variables has no unit root (stationary). If the absolute value of the statistical test value is greater than the critical value ($|tADF| > |t\alpha|$) or p-value < α with significance level α=5% or α=10% or α=1%. When considering the characteristics of time series data, use the ADF unit root test. The results from the above table show that there are 3 variables that stop at the original data (CPI, ER, IP), the remaining variables stop at the first difference (OP, GP, RP, IR, MS). Therefore, the above variables can be used for regression in the VAR model.

Table 2. Estimation result of stationary test.

Variable	*Unit Root Test at D_0*		*Unit Root Test at D_1*	
	t(ADF)	*P(value)*	*t(ADF)*	*P(value)*
CPI	-3.594390	0.0071		
OP	-1.578482	0.4907	-8.704471	0.0000
GP	-1.484064	0.5387	-8.756219	0.0000
RP	-2.185049	0.2128	-8.978771	0.0000
ER	-3.258182	0.0189		
IP	-4.278552	0.0007		
IR	-0.808666	0.8131	-10.68752	0.0000
MS	-1.72819	0.4147	-11.93176	0.0000

Source: Authors' analysis

3.2.2 Determine optimal latency

In order to obtain accurate results from the VAR model, beside considering stopping behavior of the variables, the research team determined the optimal latency of the model. According to the statistical standards LR, FPE, AIC, HQ the model has an optimal latency of 2 (Table 3).

Table 3. Determine optimal latency of the model.

VAR Lag Order Selection Criteria Sample: 2010M01 2022M12, Included Observation: 153						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	5246.605	NA	7.10e-41	-81.09465	-80.73994*	-80.95052
1	5353.645	200.8050	1.73e-41	-82.50613	-81.79672	-82.21788*
2	5201.046	-276.8089*	2.37e-40*	-79.89218*	-78.82806	-79.45981

Source: Author's analysis

3.3. Estimated results of VAR model

3.3.1 Estimated results

According to the results of the table 4, the variables that can explain the changes in expected inflation with the significance level of 5% are: CPI(-2), D(OP(-2)), D(GP(-2))), D(RP(-2)). The estimation results show that past inflation has a negative (-) influence on current inflation, with statistical significance of 10%. Oil price is positively correlated (+) with the inflation rate, at 1% significance level. Gold price is positively correlated (+) with inflation rate, at 5% significance level. Rice price is positively correlated (+) with inflation rate, at 5% significance level.

Table 4. Impact of macroeconomic factors on ASEAN' s stock markets

Variables	*CPI*
CPI(-1)	1.460454
	(0.08235)
	[7.7345]
CPI(-2)	-0.476674
	(0.08078)
	[-15.9016]
DOP(-1)	-0.010651
	(0.00433)
	[-2.48058]
DOP(-2)	0.065441
	(0.00429)
	[3.56332]
DGP(-1)	0.009646
	(0.01075)
	[0.89696]
DGP(-2)	0.015253
	(0.01109)
	[1.37489]
DRP(-1)	-0.000712
	(0.00914)
	[-0.07787]
DRP(-2)	0.031076
	(0.00912)
	[0.33716]
ER	0.009100
	(0.00303)
	[3.00364]
IP	-0.001660
	(0.00277)
	[-0.59940]
DIR	0.018014

	(0.01071)
	[1.68188]
DMS	-0.047629
	(0.02264)
	[-2.10366]
R-squared	0.999165
Adj. R-squared	0.999086

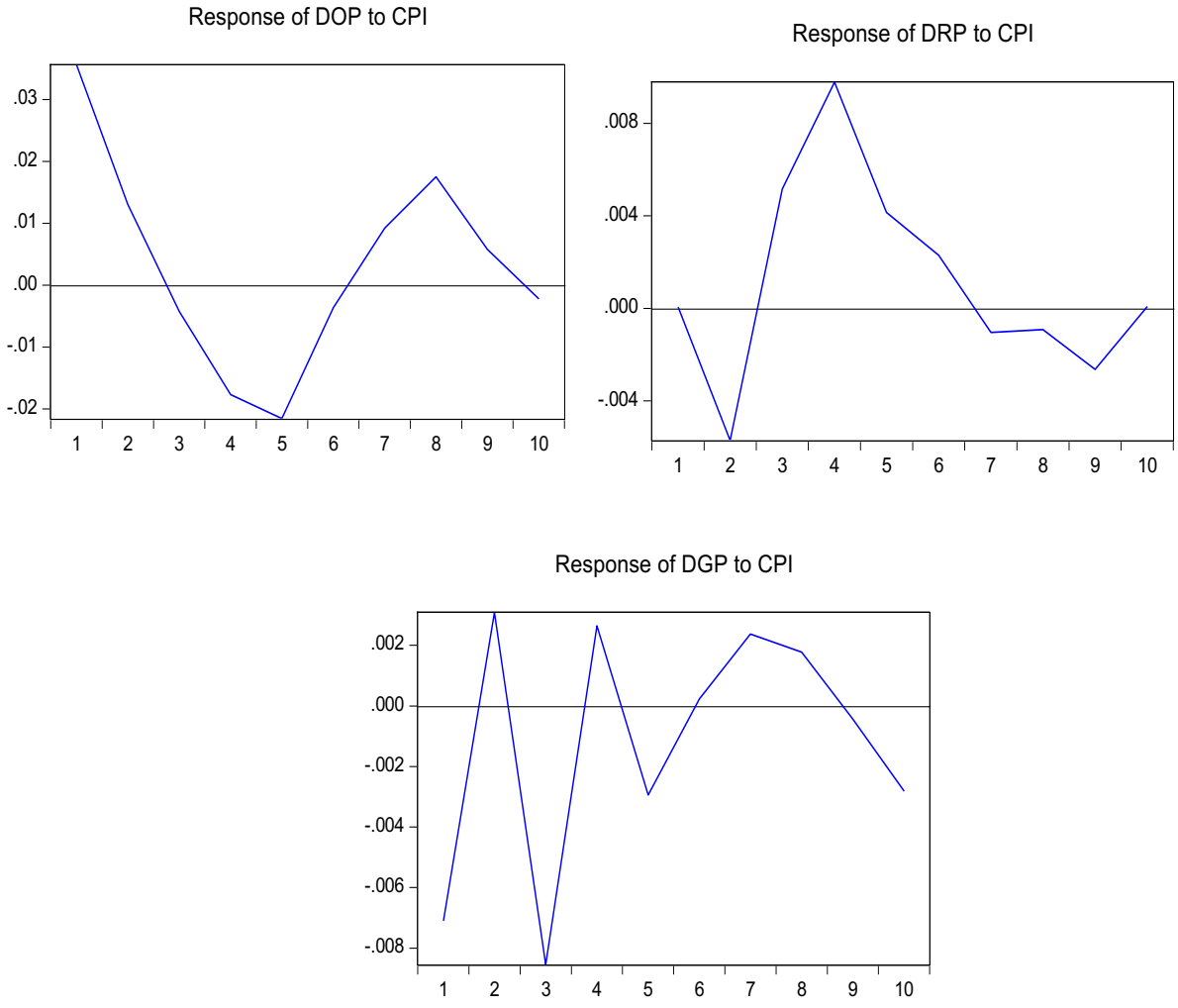
Note: (***), (**), (*) show that the results are statistical significance at 1%, 5% and 10% critical values.

Source: Authors' analysis

3.3.2 Reaction functions

From the results of estimating the VAR model, this study consider the result of the reaction function of Vietnam's inflation rate to world commodity price factors including oil price (OP), gold price (GP), rice price (RP). The result is shown in Fig. 1 as follows.

Figure 1. The reaction of Vietnam's inflation to oil price, gold price and rice price



Source: Authors' analysis

Figure 1 shows the response of Vietnam's inflation rate to world commodity price factors including oil price (OP), gold price (GP), rice price (RP). Specifically, when there is a change in oil prices, the inflation rate decreases rapidly until mid-March, decreases slightly in April, increases from early May to August and then decreases in the following months. Before the change in rice prices, the inflation rate decreases until mid-February, then increases again until mid-April, then adjusted downward from May onwards. When there is a change in the price of gold, the inflation rate increases from January to mid-February, decreases sharply until March, after increasing again in April, it continues to adjust downward until mid-May, then increase until the end of July and adjust downward in the following months.

3.3.3 Decomposition of variance

The decomposition of variance shows that CPI fluctuations are mainly explained by itself and the OP variable. The remaining variables GP, RP also explain the fluctuations of the inflation rate but not much.

Table 5. Decomposition of variance

Variance Decomposition of SP:

Stage	S.E.	CPI	DOP	DGP	DRP
1	0.004142	100.0000	0.000000	0.000000	0.000000
2	0.008260	95.09162	3.623992	0.502971	0.724580
3	0.011648	91.16133	5.593544	1.563400	1.428882
4	0.014015	90.78564	5.307384	1.987463	1.744575
5	0.015921	92.11609	4.468389	1.754390	1.525206
6	0.017417	93.13782	3.800144	1.536832	1.407076
7	0.018831	92.60646	3.375218	1.877350	1.871213
8	0.020515	90.89237	3.226088	2.826816	2.395972
9	0.022373	89.04842	3.211158	3.728030	2.752777
10	0.024098	87.66499	3.091060	4.323151	2.953634

Source: Authors' analysis

3.3.4 The Granger causality test

From Table 6, it can be concluded that world oil price has an effect to domestic inflation. Additionally, Vietnams' inflation is affected by world gold price and world rice price.

Table 6. Summary of Granger causality test results

Dependent variable: CPI			
Excluded	Chi-sq	df	Prob.
DOP	14.99229	6	0.0203
DGP	7.667099	6	0.0835
DRP	9.006381	6	0.0532
All	33.25588	18	0.0055

Source: Authors' analysis

CONCLUSION

This study examines the impact of world prices including oil prices, rice prices and gold prices on Vietnam's inflation. The result analyzes shows that the public tends to retain an impression of past inflation. This is the factor that governs the current level of inflation. The impression of a period of high inflation in the past usually only begins to fade after 2 months of continuous and stable inflation. This implies that to fight inflation, the Government must first keep inflation low for at least two months, thereby gradually regaining public confidence in a more stable price environment.

The research confirm that commodity prices and inflation have a positive relationship with each other. Inflation is most strongly influenced by world crude oil prices, a shock in oil prices leads to an increase in inflation. Inflation is also affected by the world price of gold and rice, a shock in gold and rice prices leads to an increase in inflation.

In the environment of integration and globalization, along with increasing import and export activities, domestic prices are more responsive to world commodity price shocks. Therefore, the supply and demand management of the domestic market should be closely monitored with the world commodity price movements.

Specifically, continue to closely monitor market price movements of essential commodities to promptly propose solutions to ensure the balance of supply and demand in order to stabilize domestic market prices, especially for commodities. goods whose supply is in short supply due to the impact of natural disasters, supply disruption due to the impact of Covid-19. When world price movements continue to be unfavorable for a long time, it is necessary to proactively propose a timely response plan to limit losses from inflation. In the short term, not to mention the increase in prices of goods under the management of the State to create favorable conditions for businesses to take advantage of the recovery opportunities of the economy. If world prices turn to decrease gradually in the coming time as expected, it is also necessary to quickly take advantage of this trend by stepping up demand-stimulating and growth-supporting programs to take advantage of rapid growth without too concerned about inflationary pressures.

It is necessary to focus on promoting information and propaganda on price management, publicizing and transparent information on prices to anchor inflation expectations; limit false information that causes confusion for consumers and destabilizes the market.

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Migration Processes in the Labor Market Associated with the Uncertainty of Behavior of the Employed Population During and After the Pandemic

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ABSTRACT

The study of this issue will allow us to more fully understand the dynamics of migration processes and their relationship with the labor market in conditions of uncertainty, which is important for the development of effective management and adaptation strategies during periods of crisis and after its completion. The purpose of the study is to develop recommendations for government and non-government organizations on managing migration processes in conditions of uncertainty in the labor market, aimed at ensuring sustainable development and social stability. Research hypothesis: During and after the COVID-19 pandemic, migration processes in the labor market will be characterized by changes in migration flows and preferences in choosing a place of work and place of residence due to increased uncertainty among the employed population. As a result of instability in the labor market during the pandemic and subsequent economic recovery, there may be an increase in internal migration between regions and countries, as well as changes in patterns of labor mobility, including an increase in remote work and a preference for work in industries that are resistant to crisis conditions. Research results: Based on the research results, recommendations can be developed for government and non-government organizations on managing migration processes in conditions of uncertainty in the labor market. This may include recommendations for the development of flexible forms of employment, support for labor mobi-

lity and the development of adaptation and social protection programs. Considering the situation in the Republic of Kazakhstan, the author examined the factors influencing the development of the labor market among the younger generation, and hypothesized that there is a connection between the indicators under consideration and factors considered in this study.

INTRODUCTION

As previous observations show, unlike past financial crises, the Covid pandemic has already caused serious political, economic and psychological consequences. It has already profoundly changed the global business environment, raising enormous barriers to the expansion of international businesses. We have witnessed the devastation that Covid has wreaked on industries as diverse as real estate, vocational training, professional sports, business travel and leisure, consulting, restaurants and bars, cinema, theaters and other entertainment venues, schools and universities, translation services, advertising agencies, casinos and gambling, hairdressers and much more. However, despite the major challenges just discussed, the post-coronavirus world is likely to present important opportunities for these businesses. In fact, many industries have experienced growth since Covid. Basically, analysts assess the consequences on an industrial scale or the transformation of professions, but few assess how the labor market behaved, what the state is from the point of view of the population, what consequences occurred among people. Behavior and reasons for this behavior. What risks and uncertainties could the actions of ordinary people lead to?

Population migration plays a key role in the redistribution of human capital between different labor markets in order to optimize the economic development of regions and increase the efficiency of their labor markets. In the context of globalization processes, migration increasingly influences the demographic, social and economic systems in both the countries of origin and the countries of arrival of migrants. The study of modern migration processes requires the use of a systematic approach, which allows us to consider migration as a complex system of interconnections and relationships between various social processes. The systematic approach is based on a comprehensive analysis of the connections and interactions occurring in countries, regions, societies and the level of individuals associated with migration processes.

Demographic changes potentially affect regional growth through a reduction in the labor force, which affects growth and largely depends on the level of education, labor productivity, and labor resources. The aging of the population leads to a significant increase in government spending, in particular on pensions and healthcare. Ensuring access to high-quality public services is a major challenge for European Member States and regions. Significant regional differences in demographic patterns cause significant asymmetric socio-economic impacts across the area. In fact, demographic change is a complex interaction of many different processes that entail not only increased density and population growth, but also population decline, changes in age and gender structure, migration movements and socio-economic changes. All of these processes can interact with each other and cause different impacts on biodiversity. A better understanding of these impacts of demographic change is therefore necessary to develop comprehensive biodiversity conservation strategies. The study of migration processes in the labor market associated with the uncertainty of the behavior of the employed population during and after the pandemic is extremely relevant for a number of reasons:

- The impact of the pandemic on the labor market. The COVID-19 pandemic has significantly altered labor market dynamics, causing business closures, layoffs, and job cuts across many industries. This led to changes in migration flows and the behavior of the employed population.
- Uncertainty during a pandemic. Uncertainty characterizes many aspects of life during the pandemic, including employment, income, career opportunities and job security. This can influence people's migration and employment decisions.

- Consequences of the post-pandemic period. Once the pandemic is over, there may be structural changes in the labor market, such as a shift to remote work, changing skill and qualification requirements, and a redistribution of jobs between different regions and sectors of the economy.
- Potential adaptation strategies. Studying migration processes and the behavior of the employed population can help develop adaptation strategies and support measures for those who are faced with instability in the labor market during and after the pandemic.

1. LITERATURE REVIEW

Migration processes have a multivariate and ambiguous impact on the demographic situation in countries that receive a significant number of migrants. First of all, migration leads to changes in the population in certain countries and regions, and also affects the distribution of labor resources across the territory. This leads to significant changes in the composition of the population, expressed in differences between migrants and native residents by gender, age, nationality, family, professional and religious affiliation.

Migration affects various complex social processes, such as population reproduction, fertility, mortality, reproductive behavior, morbidity and health, and life expectancy. Economists have expressed concern about pressure on economic growth from labor and capital shortages and lower asset prices in the future. This is due to the fact that the aging cohort of the population over one year old seeks to ensure their well-being by liquidating their investments. At the same time, fiscal stress arises as pension obligations and health care and long-term care costs rise due to the expected increase in morbidity and the spread of chronic diseases. The demographic transition occurs in different periods and at different speeds (Kashnitsky, 2021). While rapid population growth and high fertility rates remain problems in least developed countries (Bloom, 2011), governments in developed countries are more concerned about rapid population aging (Lutz et al., 2008), (Bloom et al. 2015) and associated social and economic problems for future generations. Population aging is becoming a central topic in the demographic debate as the demographic dividend, the period of low stress on the working population, has passed in most developed countries (Lloyd-Sherlock, 2000), (Skirbekk, 2008), (Christensen et al., 2009).

Internal migration plays a key role in the formation of subnational population structures. The difference in the rate of population aging between urban and rural areas is largely due to internal migration (Van Der Gaag & De Beer, 2015). Research demonstrates growing inequalities in local population structures (Czaika and de Haas, 2014). Regional paths of economic and demographic development are becoming increasingly diverse, as reflected in studies (Rees et al., 2017), (De Beer et al., 2012). There are many studies that document growing disparities in local population structures (Faggian et al., 2017), (Sabater et al., 2017), (Gutiérrez Posada et al., 2018). Regional paths of economic (Ballas et al., 2017) and demographic (Wolff and Wiechmann, 2018), (Gurrutxaga, 2020) development are becoming increasingly heterogeneous, as evidenced by the research of Danko and Hanink (2018).

Understanding potential trends in future population levels is critical to predicting and planning for changes in age structure, as well as resource, health, environmental and economic needs. However, future fertility patterns are subject to significant uncertainty and differences in estimation and forecasting methodologies, resulting in significant differences in global population projections. Changes in population size and age structure can have serious economic, social and geopolitical consequences for many countries (Vollset et al., 2020). The importance of migration processes for the economy of Kazakhstan is continuously growing, taking into account demographic trends and the need for national and borrowed labor resources. The successful use of the qualification potential of available labor resources, the effective organization of professional training and retraining of local personnel in accordance with the requirements of modern production and innovative technologies will have a significant impact on the future of the country and its position in the world hierarchy. In the context of the Republic of Kazakhstan, not only the migration policy itself is of great importance, but also the mechanisms for its practical implementation, transparency and ease of implementation of decisions taken, excluding corruption and other abuses.

2. ANALYSIS AND METHODOLOGY

Population migration is one of the most important socio-demographic processes, allowing for the redistribution of human capital between labor markets in order to optimize the development of regional economic systems and increase the efficiency of the functioning of regional labor markets. At the same time, due to the development of globalization processes, migration has an increasingly significant impact on the demographic and social systems of the places of departure and arrival of migrants, as well as on the economic state of regional and local labor markets. Population migration plays an important role in ensuring sustainable progressive development of the socio-economic system and is an important factor in the development of regional labor markets. Among the socio-economic factors influencing the formation of labor resources in the region, the following can be identified:

- level of average per capita income,
- availability of housing,
- quality of medical care,
- level and quality of educational services,
- level of employment of the population,
- level of environmental pollution,
- crime level.

The need to control migration processes is due to socio-economic threats associated with population migration, despite the importance of labor migration for the country's economy. In the second half of the 19th century, migration processes underwent significant changes in connection with scientific and technological progress, especially with the development of industry, transport and means of communication. Analysis of the current state and prospects for the development of labor mobility within the framework of the general strategy of the third modernization allows us to identify the following main goals for regulating these processes:

- Satisfying the needs of the economy for the necessary labor force, the priority direction of migration to achieve the medium and long-term goals of the country's socio-economic development.
- Creation of an optimal system for distributing the population across the territory of the Republic of Kazakhstan.
- Ensuring the country's national security, especially in the context of threats associated with migration.

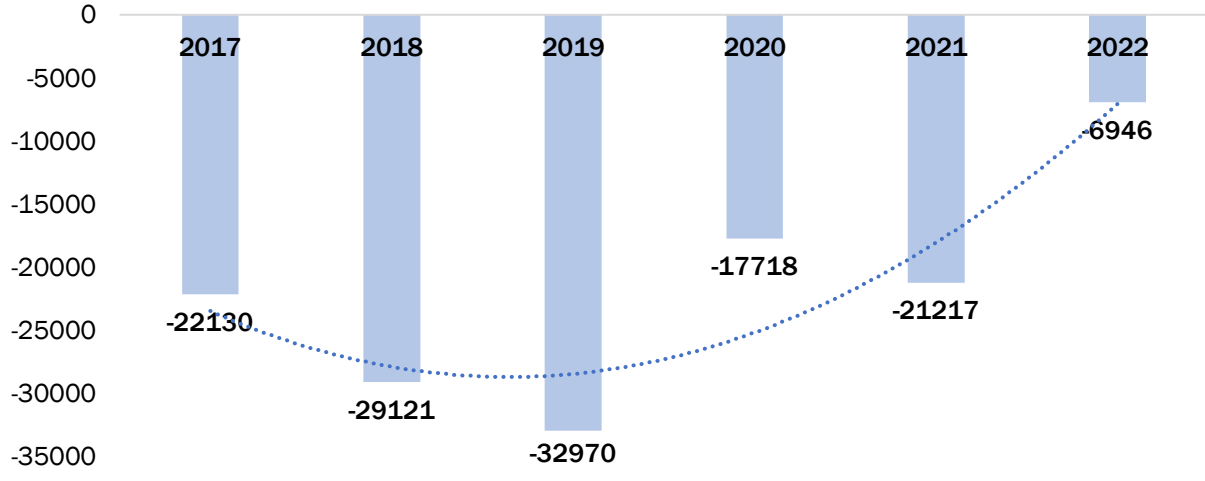

Figure 1. Dynamics of the balance of migration in Kazakhstan for 2017-2022, people

Source: Compiled by authors according to https://economy.kz/

If we look at employment statistics for the main sectors of the economy, we can notice structural changes both at the republican level and in the regions. The main countries from which labor migrants arrive are China - 3500, India - 1731, Turkey - 1642, Uzbekistan - 1344, Great Britain - 1112 people. The migration situation in Kazakhstan over the past 5 years is characterized by a decrease in the negative balance of population migration: if before 2019 the negative balance of migration increased and amounted to 32,970 people, then in 2022 it decreased to 6,946 people (Figure 1).

This situation may be due to the following factors:

- economic changes - an improvement in the economic situation in the country or opportunities for labor migration can lead to a reduction in population outflow and even the attraction of immigrants;
- improving political and social stability can make Kazakhstan a more attractive place to live and work, which can also reduce the level of emigration;
- changes in demographics, such as declining birth rates or increased availability of child care and education, may influence people's decisions to stay in the country;
- changes in migration policy, including more flexible rules for obtaining residence permits or citizenship, can stimulate the influx of migrants and reduce the outflow among citizens;
- the influence of global trends, such as changes in the global economic situation or conflicts in the region, can also have an impact on migration flows in the country.

These are just some of the possible factors that may be associated with the improvement in the migration situation in Kazakhstan over the past five years. The actual reasons may be more complex and may involve a combination of these and other factors. The state of the labor market can significantly influence people's decisions to move to another region or country in search of work and higher income. If there is a high demand for certain occupations in a certain region, this may attract migrants with relevant skills. On the other hand, in regions with high unemployment, local residents may look for work in other regions or countries.

The labor market situation may also have an impact on internal labor mobility in the country. For example, if one region is experiencing an economic crisis and another region is experiencing growth and prosperity, this may lead to population migration from the first region to the second. In addition, the labor market situation may influence the type of migration. For example, highly qualified specialists may have more employment opportunities in another region or country, which may lead to a brain drain from the first region. In general, the situation on the labor market plays an important role in migration processes and can significantly influence people's decisions to move to another region or country in search of work and better living conditions. Factors that influence the development of labor resources and, ultimately, the formation of labor income can be seen in accordance with the data presented in Table 1.

Table 1. Summary table of factors influencing the development of labor resources and the formation of labor income of the population

Year	*Population, thousand people*	*Number of births*	*Number of deaths*	*Natural increase*	*Crude birth rate per 1000 people*	*Overall mortality rate per 1000 people.*	*Natural increase per 1000 people.*	*Total fertility rate*
01.12	16 324	367 752	145 875	221 877	22,5	8,9	13,6	2,60
01.13	16 559	372 544	144 213	228 331	22,5	8,7	13,8	2,59
01.14	16 900	379 121	141 220	237 901	22,5	8,4	14,1	2,62
01.15	17 035	393 421	137 630	255 791	22,7	8,0	14,7	2,64
01.16	17 289	401 066	132 236	268 830	23,1	7,6	15,5	2,76
01.17	17 557	398 561	131 867	266 694	22,7	7,5	15,2	2,73
01.18	17 818	400 640	131 373	269 567	22,52	7,4	15,6	2,80
01.19	18 014	390 520	130 033	260 487	21,7	7,2	14,4	2,73

01.20	18 137	397 947	130 515	267 432	21,8	7,1	14,7	2,84
01.21	18 448	403 064	133 489	269 575	21,8	7,2	14,6	2,90
01.22	18 632	425 625	162 613	263 062	22,8	8,7	12,5	3,13

Source: Compiled by authors according to http://www.stat.gov.kz

The increase in population in the last 5 years would have been even greater (260–270 thousand people), if not for the increasing migration loss, which also affects the labor force and the formation of labor income (Table 2). In 2020, there was a decrease in population outflow, however, as is known, this is due to the situation related to COVID-19.

Table 2. Population growth

Year	*Population*	*Population growth*
01.2012	16 148 504	1,22 %
01.2013	16 372 451	1,39 %
01.2014	16 621 809	1,52 %
01.2015	16 889 949	1,61 %
01.2016	17 165 505	1,63 %
01.2017	17 438 422	1,59 %
01.2018	17 702 163	1,51 %
01.2019	17 956 486	1,44 %
01.2020	18 200 804	1,36 %
01.2021	18 436 475	1,29 %
01.2022	18 664 683	1,24 %

Source: Compiled by authors according to http://www.stat.gov.kz

According to the Ministry of Labor, in 2022, 7 million 934 thousand foreigners entered Kazakhstan (Figure 2), and 7 million 751 thousand left, taking into account repeated border crossings (Figure 3).

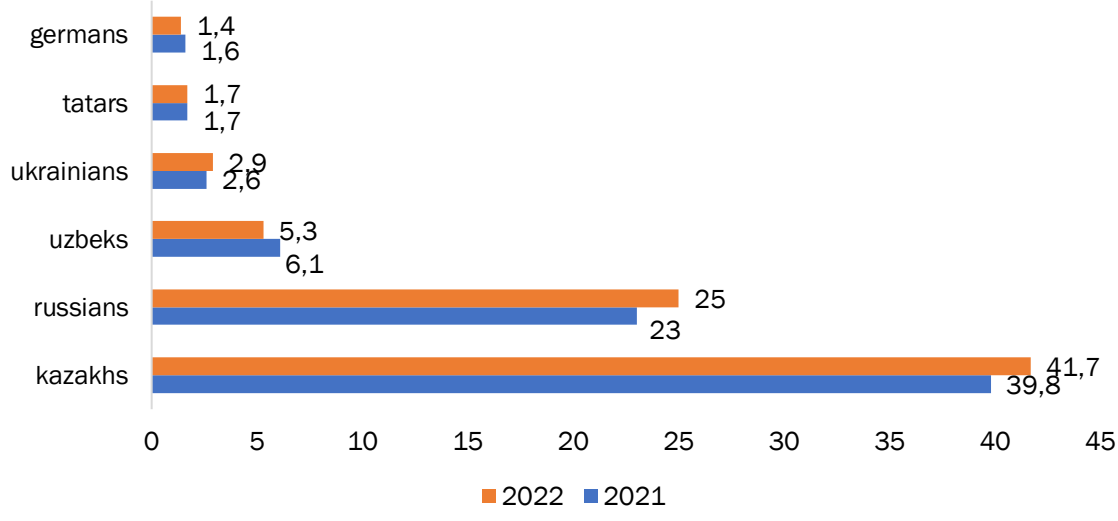

Figure 2. Arrivals in Kazakhstan, thousand people

Source: Compiled by authors according to https://economy.kz/

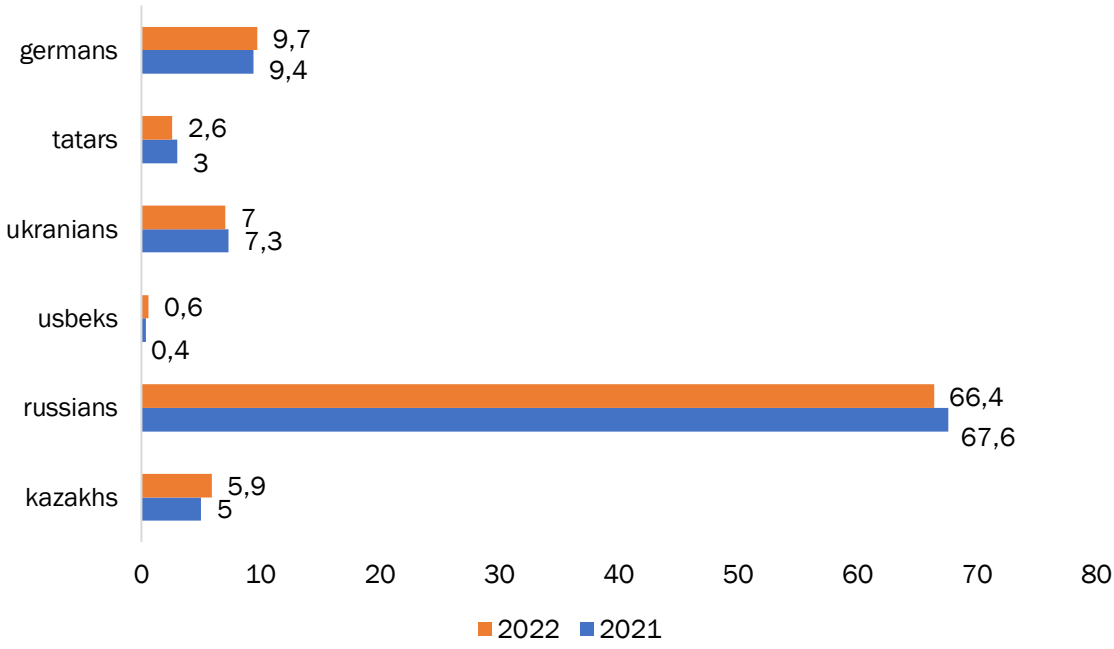

Figure 3. Departures from Kazakhstan, thousand people

Source: Compiled by authors according to https://economy.kz/

Compared to the previous period in 2021, there was an increase of 57.8% in the number of people arriving in Kazakhstan, and a decrease of 25.1% in the number of people leaving Kazakhstan. The main exchange of migrants in the country occurs with the CIS countries. The share of arrivals from the CIS countries was 86.1%, while the share of departures to these countries was 83.3% (Figure 4).

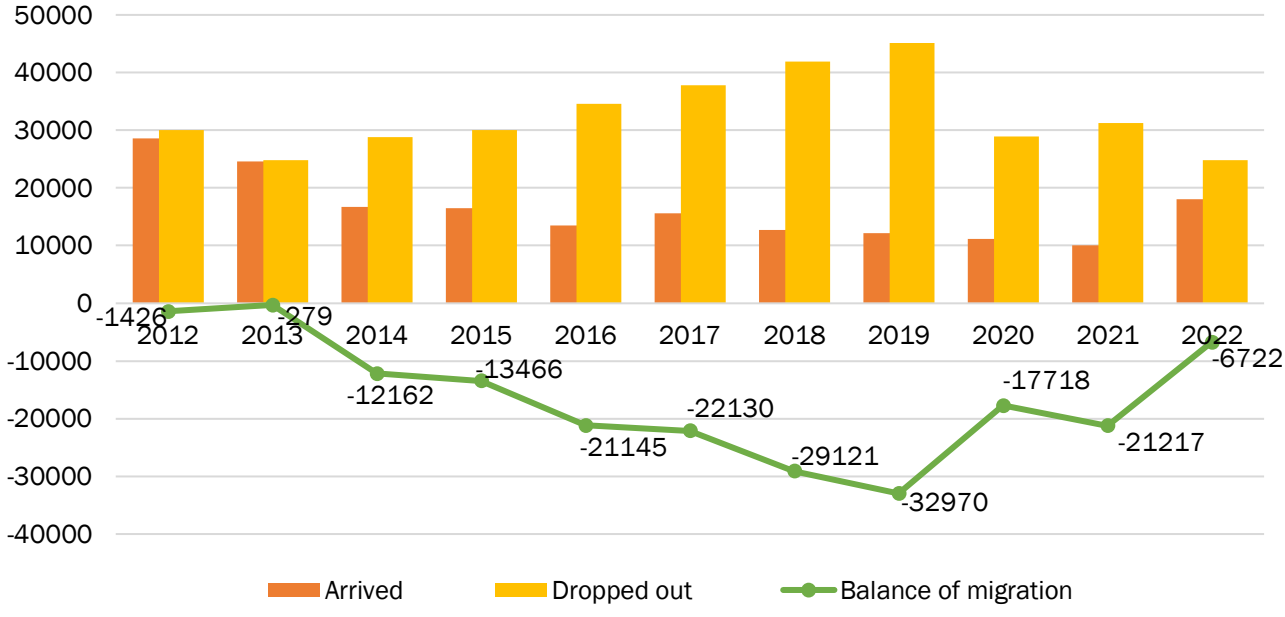

Figure 4. International population migration, people

Source: Compiled by authors according to https://economy.kz/

They indicate the main reasons for visiting:

- private (75%),
- international transportation (16%),
- work (2.5%).

In 2022, positive migration dynamics were associated primarily with the outflow of Russians fleeing mobilization. According to the Ministry of Labor dated on the 13th of December, 2022, since the announcement of partial mobilization, 837 thousand people arrived in the country, and 780 thousand people left. Currently, approximately 298 thousand Russian citizens live in Kazakhstan, which is not much different from previous years, when every year about 250-240 thousand Russians are in Kazakhstan for various reasons. In 2021, approximately 167 thousand Kazakhstanis worked in Russia.

Of the 298 thousand Russians living in Kazakhstan, about 30 thousand work under contracts and are registered on the electronic labor exchange, having temporary registration at their place of residence. In addition, about 20 thousand students from the Russian Federation study in Kazakhstan. Since the beginning of the year, approximately 198 thousand Russians have used Kazakhstan as a transit point and traveled to the country where they planned to leave. The number of relocations within the country increased by 6.1%. A positive migration balance within the country is observed in four regions: the cities of Almaty (35,302 people), Astana (33,798 people), Shymkent (2,756 people) and Almaty region (898 people) (Figure 5).

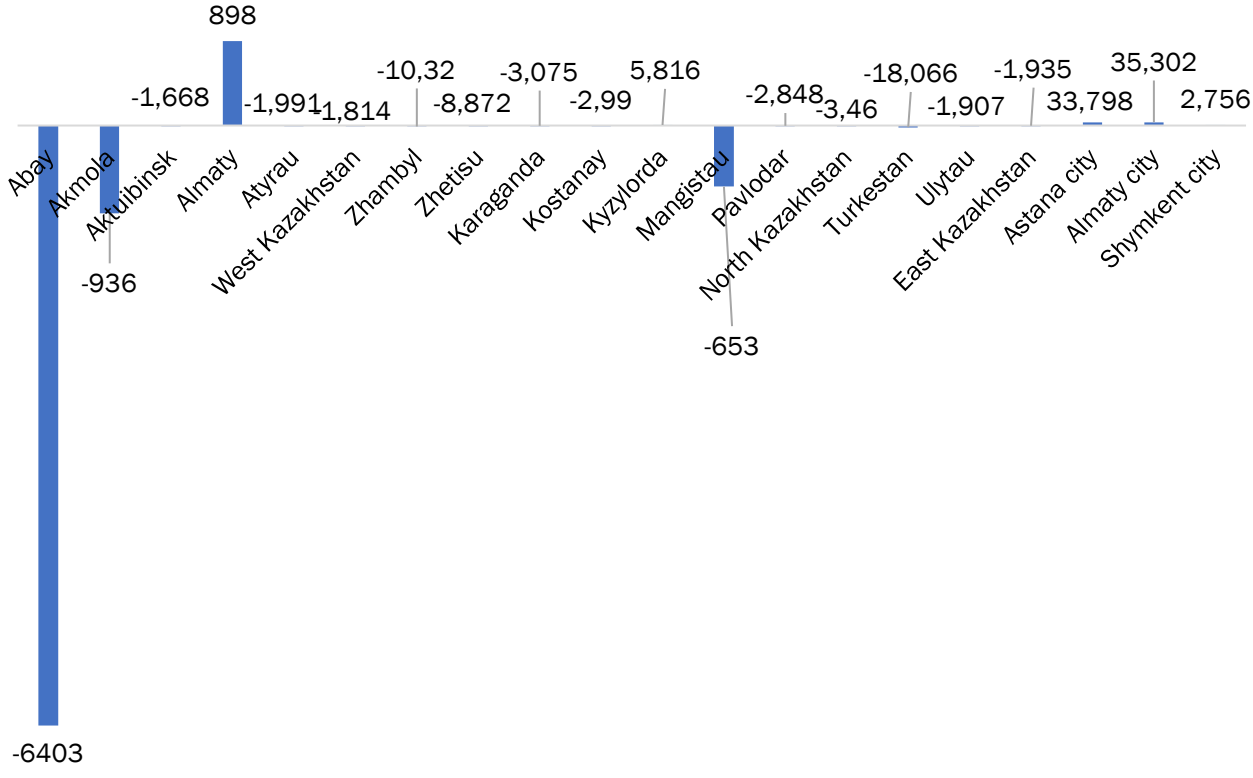

Figure 5. Balance of migration by region, people

Source: Compiled by authors according to https://economy.kz/

The number of relocations within the country increased by 6.1%. In four regions of the country - the cities of Almaty (35,302 people), Astana (33,798 people), Shymkent (2,756 people) and the Almaty region (898 people) - there is a positive migration balance. If the problem of shortage of qualified personnel is not resolved in a timely manner, the economy will lose about $8.5 trillion in profit. Using detailed data analysis, the level of shortage of specialists was predicted in 20 countries in developed and developing

regions of the world: North America (Brazil, Mexico, USA), EMEA (France, Germany, the Netherlands, Russia, Saudi Arabia, South Africa, UAE, UK) and Asia -Pacific region (Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, Singapore, Thailand). Some projected country data is presented as follows (Figure 6).

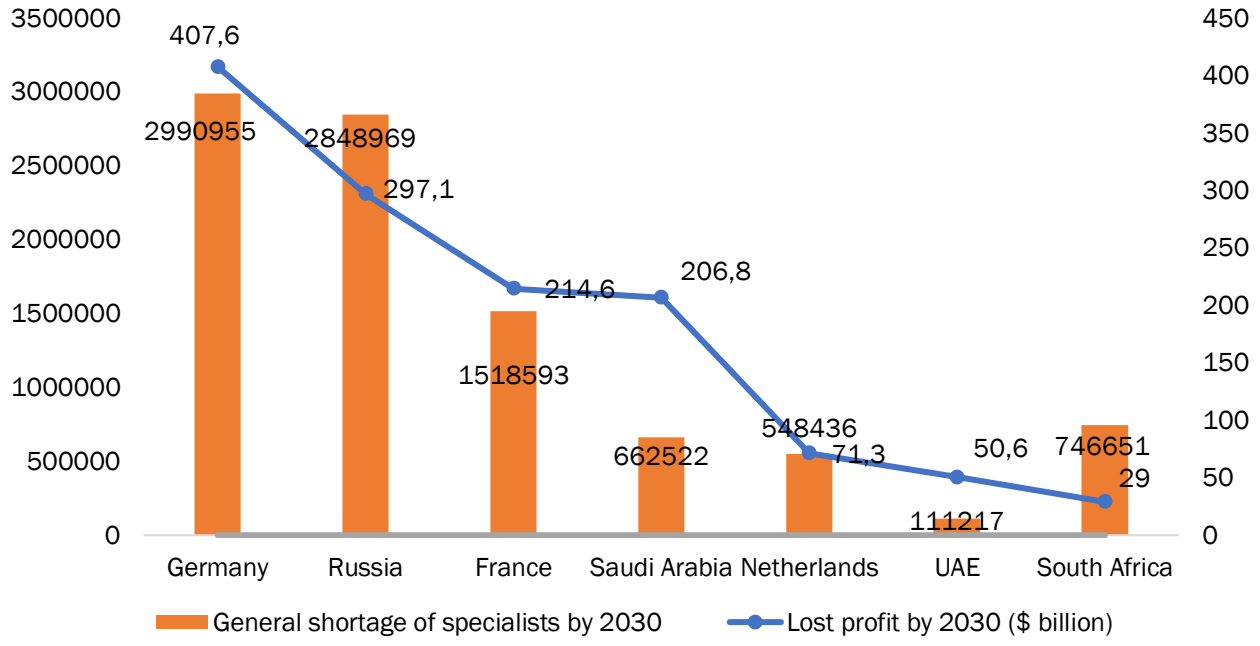

Figure 6. Business losses due to lack of qualified personnel

Source: Compiled by authors

Assessing the state of the labor market in modern conditions, it can be noted that the active part of the population is a key participant in labor relations in society. Consequently, the state and availability of resources for work are a real value and factors in the formation of the labor market (Izguttiyeva et al., 2022). Kazakhstan has a rich history of migration that continues to this day. In recent years, the country has experienced both influx and outflow of population. This is due to various factors, including economic and social conditions, political conditions and climate change. Internal migration is the main direction of migration in Kazakhstan, with people moving from one region to another in search of work, education or a better life. However, there is also a small outflow of population from Kazakhstan to other countries, as well as an influx of migrants from other countries to Kazakhstan. Official statistics on migration in Kazakhstan are usually published with some delay, but overall there has been a decline in migration flows in recent years due to the COVID-19 pandemic and restrictions on movement. However, the situation may change depending on developments in the world.

3. APPLICATION FUNCTIONALITY

Considering the situation in the Republic of Kazakhstan, the author examined the factors influencing the development of the labor market among the younger generation of the Republic of Kazakhstan. Let us put forward hypotheses about the existence of a connection between the indicator under consideration and the following factors:

- gross enrollment in higher education, %;
- size of the urban population, people;
- mortality rate urban population, per 1000 people;

- birth rate of the population per 1000 people;
- number of foreign students, people;
- Gini index coefficient;
- monetary expenditures of the population on average per capita, tenge (Table 3).

Table 3. Factors influencing the development of the labor market among the younger generation

Indicator	*01.2016*	*01.207*	*01.2018*	*01.2019*	*01.2020*	*01.2021*	*01.2022*
Youth aged 18-28 years are employed in the economy, thousand people	2 275,3	2 182,7	2 057,3	2 007,9	2 045,9	2 019,4	2008,6
Gross enrollment in higher education , %	48,44	51,14	54,29	60,73	66,98	64,07	63,59
Number of urban young population, people	1209855	1180447	1163690	1128452	1099754	1066271	1054314
Mortality rate urban population, per 1000 people	6,84	6,83	6,70	6,70	6,73	8,20	7,94
Fertility rate to population per 1000 people	20,77	20,68	20,09	20,26	20,19	20,65	19,87
Number of foreign students, people	10 829	12 840	13 898	21 727	39 558	29 069	27054
Gini index	0,278	0,278	0,287	0,289	0,290	0,291	0,284
Cash expenditures of the population on average per capita, tenge	38 502	41 847	46 319	51 198	55 791	59 701	57087

Source: Compiled by authors according to https://www. stat.gov.kz

The results of data approximation using the least squares method are presented in Table 4.

Table 4. Results of estimating the equation for the growth rate of the younger generation employed in the economy

R	0,820
R^2	0,673
Adjusted R^2	0,579
Fisher test	7,198 ($p-value=0{,}020$)
Variables	
Growth rate of youth employed in the economy aged 18-28 years, % – dependent variable	
Constant	0,240
	Regression coefficients
Growth rate of urban youth, %	0,892*
Population birth rate growth rate, %	1,320***
* p<0,1; ** p<0,05; *** p<0,01	

Source: Compiled by authors

Analysis of the obtained parameters of the multiple linear regression equation allows us to draw the following conclusions:

– an increase in the growth rate of the number of urban youth by 1% will contribute to an increase in the growth rate of youth employed in the economy by an average of 1.412%.
– an increase in the growth rate of the population birth rate by 1% will contribute to an increase in the growth rate of youth employed in the economy by an average of 0.647%.

Thus, only two hypotheses about the existence of a relationship between the following indicators were confirmed:

– youth aged 18-28 years employed in the economy and the number of urban youth;
– the young population employed in the economy aged 18-28 years and the birth rate of the population.

The results of regression analysis applied to the growth rate of the initial data show that a statistically significant and reliable relationship is observed between the indicator "young people aged 18-28 years employed in the economy" and the factors "number of urban youth", "fertility rate" (Table 5).

Table 5. Growth rates of the considered indicators

Growth rate of youth employed in the economy aged 18-28 years, %	*Growth rate of gross enrollment in higher education, %*	*Growth rate of urban youth, %*	*Growth rate of mortality rate urban population, %*	*Growth rate of birth rate population per 1000 people, %*	*Growth rate of the number of foreign students, %*	*Growth rate of the Gini index, %*	*Growth rate of population's cash expenditures on average per capita, %*
1,912	7,354	-0,374	-2,970	0,506	-13,310	4,317	18,119
3,456	0,470	-0,806	-1,020	3,323	-6,435	-2,069	10,363
-1,710	-4,664	-1,670	-5,799	-0,731	107,556	-2,817	9,126
3,607	-4,971	-2,302	-2,873	3,535	-47,962	0,725	6,711
-2,811	0,145	0,076	-3,662	-1,517	19,302	0,000	3,692
-4,070	5,574	-2,431	-0,146	-0,433	18,571	0,000	8,688
-5,745	6,160	-1,420	-1,903	-2,853	8,240	3,237	10,687
-2,401	11,862	-3,028	0,000	0,846	56,332	0,697	10,533
1,893	10,291	-2,543	0,448	-0,346	82,068	0,346	8,971
-1,295	-4,345	-3,045	21,842	2,278	-26,515	0,345	7,008

Source: Compiled by authors

An analysis of the parameters of the multiple linear regression equation shows that both the growth in the urban youth population and the increase in the birth rate of the population have a positive effect on youth employment in the economy. These results may be useful for developing appropriate policies and programs aimed at stimulating employment growth among the younger generation and supporting families with children. However, it is necessary to take into account other factors affecting employment, such as economic policy, level of education, accessibility of the labor market, etc.

CONCLUSION

In the modern world, some developed countries are experiencing a demographic crisis, while the other part is making attempts to avoid this or minimize the negative effect through the implementation of government programs to stimulate the birth rate and attract migrants. Most developed countries are faced with two interrelated global challenges - a declining birth rate and an aging population. The demographic factor is playing an increasingly important role in the state development of the Republic of Kazakhstan. Population decline is seen as a threat to national security, the upcoming reduction in labor resources and an increase in the dependency burden is seen as an obstacle to economic growth, and the aging population is seen as a factor in the inevitable increase in pension fund expenses.

Conclusions about migration processes in the labor market related to the uncertainty of the behavior of the employed population during and after the pandemic may be as follows:

– Uncertainty in terms of place of work: During and after the pandemic, many workers may face job uncertainty due to changes in the economic situation, business closures, or changes in demand for certain types of services and goods. This can lead to migration processes, when workers will be forced to look for new job opportunities in other regions or even abroad.

– Increased mobility: uncertainty in the labor market can contribute to increased mobility of workers who are willing to move to where the job supply is more stable or working conditions are more favorable. This can lead to an increase in domestic and international migration flows.

– Growing demand for flexible employment: in conditions of uncertainty in the labor market, workers may prefer flexible forms of employment, such as remote work, freelancing or temporary contracts. This could lead to changes in the geographic distribution of the workforce and increased demand for digital technologies for remote work.

– The need to adapt labor and migration policies: states and international organizations should adapt their labor and migration policies to new realities, taking into account changes in the labor market, levels of mobility and the needs of workers to protect social and economic rights. This may include the development of flexible and adaptive social protection systems, support for retraining and retraining the workforce, as well as creating conditions for creating new jobs and stimulating entrepreneurship.

In general, migration processes in the labor market during and after the pandemic will be determined by uncertainty and instability, requiring flexible and adaptive approaches on the part of state and non-state actors. Analysis of migration processes emphasizes the importance of flexibility and adaptability for both individuals and society as a whole, to successfully cope with the challenges that the modern labor market poses to them.

Understanding the problems and consequences of changes in the size and age structure of the country's population, trends and prospects for population reproduction, as well as the connections of demographic and migration processes with regional economic and social development will help the government develop policies that will be based on the economic potential inherent in demographic changes.

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Studying the Impact of Macroeconomic Variables on Inflation Rates in Egypt: an ARDL Approach

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ABSTRACT

Reducing inflation is a primary goal of the country's economic policy, as high and sustainable inflation negatively affects economic stability and directly impacts individuals' income and wealth. Inflation also affects a country's trade balance. In addition, high inflation hurts investment and the creation of new employment opportunities. Therefore, this study focused on investigating the dynamic causal relationship between four major economic variables (exchange rate (EX), money supply (M), foreign direct investment (FDI), and balance of trade (BOT) variables) and the inflation rate in Egypt from 1990 to 2022. The main hypothesis of our study is that there are significant effects of the EX, M, FDI, and BOT variables on the inflation rate in Egypt. Since the relationship between these variables is dynamic so the autoregressive distributed lag (ARDL) methodology was used for testing this hypothesis in the short and long term. The statistical results indicated that the suitable model for the data was ARDL (2,2,2,2,2). Furthermore, the EX, FDI, and BOT variables have a significant negative impact on the inflation rate. At the same time, the money supply is positively and significantly related to long-term inflation. There are significant effects of the lags of EX, M, and FDI variables on inflation. Also, the results of the error correction model for the ARDL (2,2,2,2,2) model indicated that economic adjustments between the five variables occur in the short term (after only about 14 months). The study recommends continuing the policy of exchange rate liberalization while working to expand the production base to increase exports and attract more foreign investments.

INTRODUCTION

Inflation is a situation in which there is a continuous rise in the general level of prices. In general, inflation refers to a decline in the purchasing power of a currency, and thus a rise in the cost of living. When inflation is rapid and severe, it can lead to disturbances in the economy, such as decreased purchasing power, decreased investment, and increased unemployment. According to A. Eyesight and N. Rao (2015), if inflation is not at low levels, it negatively affects social welfare and makes the domestic economy operate inefficiently. Over the past ten years, Egypt's high rate of Inflation has had socioeconomic repercussions. Real income has decreased recently because of the currency's declining buying power.

We note that inflation is the result of a wide range of economic and financial factors, including the money supply, the exchange rate, foreign direct investment, and the trade balance (exports – imports.

The economic theory refers to the money supply significantly impacting inflation in the economy. A significant increase in the money supply without a corresponding increase in available goods and services can lead to an increase in inflation rates. Since there is more money in the economy and, at the same time, the available goods and services do not increase to the same degree, people tend to spend more money to buy limited goods and services, which leads to increased demand and, thus, a rise in price levels (Sultana et al., 2019).

The effect of foreign direct investment (FDI) on inflation rates appears through several mechanisms. Foreign direct investment stimulates economic growth and increases productivity, thus reducing inflationary pressures. FDI also contributes to improving technology and innovation, which leads to increased production efficiency and reduced costs, thus reducing inflation rates. It is noted that the impact of FDI on inflation may vary from one country to another, influenced by local economic, political, and institutional factors (Adeniyi, 2020).

The exchange rate is one of the factors that can affect inflation in the economy. The effect of the exchange rate on inflation appears through the channel of imports of raw materials and goods, as changes in the exchange rate affect the cost of importing these materials and goods. If the exchange rate rises, the cost of importing may increase, and thus, there can be an increase in the prices of imported products, which can lead to increased inflation.

Changes in the exchange rate also affect the local prices of goods and services. A lower exchange rate allows consumers to purchase more imported goods and services at lower prices, which contributes to reducing inflation. Conversely, a higher exchange rate increases the domestic cost of imported goods, which may lead to increased inflation (Abdurehman and Hacilar, 2016).

Through monetary policy, we find that exchange rate changes affect monetary policy. As the value of the local currency declines due to changes in the exchange rate, the central bank must raise interest rates to maintain currency stability and reduce inflation. High-interest rates may, in turn, slow economic growth but may help control inflation.

The trade balance is the difference between the value of a country's exports and a country's imports. The effect of the trade balance on inflation can be multifaceted. If the economy achieves a trade surplus, that is, the value of its exports exceeds the value of its imports, there is a positive effect on inflation, as the trade surplus can increase the domestic supply of goods and services, which leads to increased competition and a decline. Prices, which, in turn, contribute to reducing inflation, but if there is a trade deficit, inflation has a negative impact. A trade deficit may increase demand for imported goods and decrease domestic supply, leading to increased inflation (Ektiarnanti et al., 2023).

Additionally, there has been a significant decrease in the desire to save and invest, which has impacted the nation's economic growth. A problem that impacts every part of life, particularly the economy, is Inflation. As a result, the government must ensure that the erratic and volatile prices of products and services do not adversely impact the plans and ongoing initiatives. For quality planning to be possible, every organization must have a stable macroeconomic environment free from irreverent pricing changes that lead to reliably accepted future projections and forecasting. This also applies to an individual since careful planning makes it possible to succeed in unstable economy. As a result, there is an increasing necessity to visually inspect inflation research to create a trustworthy and time-independent model.

Egypt's currency rate policy saw significant fluctuations between 1990 and 2022, which impacted the trade balance. The establishment of a flexible exchange rate regime in 2003 resulted from the dollar's unavailability at official rates, which led to a cumulative devaluation of almost 68 percent against the US dollar from 2000 to 2004. When the Central Bank of Egypt (CBE) introduced the interbank foreign currency market in 2004, the pound increased by 4% in a quarter. Higher interest rates and the stabilization of foreign currency during that period led to a rise in local currency deposits. Using new notes, conventional treasury bills, and certificates of deposit with two-year maturities, CBE intervened in the open market in 2005–2006. Market interest rates have become increasingly sensitive to the primary policy rates as the monetary transmission mechanism has improved. Alongside these adjustments came a decline in Inflation. After Lehman Brothers failed in 2008, the value of the pound dropped by around 6%. However, in 2009, government reserves and ongoing capital inflows caused the currency rate to nearly return to its pre-crisis level.

The political scene of 2011 saw a significant shift marked by unpredictability and widespread unrest. Increased debt, Inflation, and fiscal deficit combined with financial instability forced the Central Bank to implement new procedures (Foreign Exchange Auctions) in 2012. Over the period (2011-2015), the pound's value decreased by 13% while the exchange rate increased from 5.80 pounds to LE 7.26. The attacks of September 11, the war in Iraq, and other Middle Eastern events have caused the exchange rate to worsen and the public debt burden to rise by almost 203,100 million pounds in 2012–2013. 2015 there was a 46-billion-dollar external debt and a 12% GDP public budget deficit overall. Even though several steps were taken, including the depreciation of the currency, the liberalization of the exchange rate, and the floating of the Egyptian pound in 2016 to eradicate the black market and attract foreign direct investment, the outcomes were unsatisfactory. Furthermore, the 2019 Corona epidemic negatively impacted the nation's economy and trade balance. Within this framework.

Many studies have dealt with the concept of inflation, its determinants, and its negative effects on the economy, and from here, the problem of the study crystallized in explaining the impact of several macroeconomic variables and their impact on inflation. The study's main objective is to demonstrate the dynamic causal link between macroeconomic variables and inflation in Egypt.

This paper will be divided into four Sections. The first section is an Introduction, the second Section presents the literature review, the third Section, along with the empirical application, and the fourth Section is conclusions and Recommendations.

1. LITERATURE REVIEW

To better understand the issues analyzed in the paper, it is necessary to review the most important results of previously conducted studies. The following authors write about the dynamic relationship between macroeconomic variables and inflation in Egypt and other countries.

M. Abonazel and N. Elnabawy (2020) and A. Imam (2023) analyzed the impact of some macroeconomic factors on the inflation rate in Egypt. The results indicated that the growth in money supply and exchange rate had statistically significant effects on the inflation rate in Egypt, while the real GDP did not have a significant impact on the inflation rate. Also, increasing government spending will reduce inflation rates in the long run. Similar results were found by the study of S. Damayanti and G. Jalunggono (2022) in Indonesia. They found that inflation is positively affected by interest rates and money supply and gives a negative response to economic growth.

V. Inim et al. (2020), M. Abonazel et al. (2021), and C. Ugoh et al. (2023) Investigated the determinants of inflation in Nigeria. The findings indicated that the current inflation, exchange rate, GDP, interest rate, and money growth will remain significant determiners of the inflation rate in Nigeria in the next quarter. However, oil exports do not significantly impact the inflation rate. Additionally, the study discovers the long-run cointegration relationship among inflation, exchange rate, and money supply, which will be achieved in the short run within the next two quarters of the year. Similar results were found by the study of R. Islam et al. (2022) in Bangladesh. They found that nflation in Bangladesh is affected by the GDP, money supply, import and export growth, and population growth.

T. Nigusse et al. (2019) and S. Tolasa et al. (2022) studied macroeconomic factors such as the money supply, real GDP, price of crude oil globally, budget deficit, and real effective exchange rate that affect on Ethiopian inflation levels as defined by the consumer price index. The results of the two studies indecated that a long-run positive relationship between Ethiopian Inflation and the money supply, world oil prices, budget deficit, and real effective exchange rate.

In Romania, I. Baciu (2014) investigated the correlations between exchange rate, money supply, reference interest rate, and net average monthly nominal wage affecting inflation. The study's results indicated that the inflation rate is affected by the average monthly nominal wage and a strong link between the inflation rate and the reference interest rate. Similar results were found by the study of A. Al-Mutairi et al. (2020) in Kuwait. They found that inflation in Kuwait is affected by the interest rate, imports of goods and services, and the money supply.

The relationship between the exchange rate, trade balance, and Inflation In Sri Lanka was investigated by A. Thahara et al. (2021). The results of this study suggested that Inflation positively impacts the trade balance and the exchange rate in the short run.

Table 1 presents a summary of previous studies on the inflation rate in different countries.

Table 1. Summary of previous studies on inflation rates

Study	*Country*	*Study period*	*The main variables that affect inflation*
Baciu (2014)	Romania	1997 to 2013	- Average monthly nominal wage - Interest rate
Nigusse et al. (2019)	Ethiopia	1985 to 2016	- Money supply - World oil prices - Budget deficit - Exchange rate - GDP
Inim et al. (2020)	Nigerian	1999 to 2018	- Money supply - Exchange rate - Political unpredictability - Inadequate infrastructure development - Corruption - Double taxation
Abonazel and Elnabawy (2020)	Egypt	2005 to 2018	- Money supply - Exchange rate
Al-Mutairi et al. (2020)	Kuwait	1979 to 2015	- Money supply - Interest rate - Imports of goods and services - Budget deficit
Abonazel et al. (2021)	Nigeria	2005 to 2019	- Money supply - Exchange rate - GDP
Thahara et al. (2021)	Sri Lanka	1977 to 2019	- Trade balance - Exchange rate
Islam et al. (2022)	Bangladesh	1981 to 2020	- Money supply - GDP - Import and export growth - Population growth
Tolasa et al. (2022)	Ethiopian	1981 to 2020	- Money supply - Real GDP - Exchange rate - Population growth - Gross national saving - Imports
Damayanti and Jalunggono (2022)	Indonesia	1989 to 2019	- Money supply - GDP

			- Interest rate
Imam (2023)	Egypt	1990 to 2022	- Exchange rate - Government spending
Ugoh et al. (2023)	Nigeria, South Africa, and Angola	2001 to 2020	- Money supply - GDP - Interest rate - Import and export growth

Source: own

Through the previous presentation of previous studies, we find that the research gap lies in the scarcity of studies that comprehensively analyze the combined effect of the exchange rate, foreign direct investment, money supply, and trade balance on inflation in Egypt. While individual studies may exist, integrating these factors into a comprehensive framework allows for a more comprehensive understanding of the dynamics and interactions between these variables and their combined impact on inflation.

2. DATA AND METHODOLOGY

2.1 Data Source

The inflation rate for Egypt and some macroeconomic variables expected to impact the interest rate (exchange rate, money supply, foreign direct investment, and trade balance) from 1990 to 2022 were obtained from the World Bank website (https://databank.worldbank.org).

To analyze the impact of the exchange rate, money supply, foreign direct investment, and trade balance on the inflation rate, the linear relationship was proposed (Abonazel and Elnabawy, 2020; Abonazel et al., 2021). The proposed econometric model is

$$INF = \beta_0 + \beta_1 EX + \beta_2 M + \beta_3 FDI + \beta_4 BOT + \varepsilon$$

Inflation rate represents the dependent variable, which is the rate of inflation. The independent variables expected to influence the inflation rate are the exchange rate, money supply, foreign direct investment, and trade balance. $\beta_1, \beta_2, \beta_3$, and β_4 are the regression coefficients, representing the magnitude and direction of the influence of each independent variable on the inflation rate. While β_0 is the intercept of the regression equation. ε is the error term, capturing the unexplained variation in the inflation rate not accounted for by the independent variables.

The estimated coefficients of $\beta_1, \beta_2, \beta_3$, and β_4 provide insights into the relationship between each independent variable and the inflation rate. A positive coefficient suggests a positive relationship, indicating that an increase in the independent variable leads to an increase in the inflation rate, while a negative coefficient suggests a negative relationship.

2.2 Descriptive Statistics

Economic statistics verify that Egypt's foreign exchange rate policies have undergone significant phases. First, there was the nationalization era, government involvement in the economy in the 1960s, and the implementation of the open door and economic openness policies in the 1970s. Second, the 1980s, when there were the first attempts at economic change in reaction to outside shocks. Third: the period of comprehensive economic reform, which began in the early 1990s and included the implementation of a structural stabilization program as well as economic reform; and lastly, the so-called period of economic liberalization, which is still in effect today and defines the exchange rate based on supply and demand. We estimate Inflation as a function of the real exchange rate, money supply, foreign direct

investment, and trade of balance to determine how the exchange rate float affects Inflation. The World Bank provided yearly economic statistics for Egypt from 1990 to 2022, which served as the study's foundation.

Table 2. Descriptive statistics of the variables from 1990 to 2022

Variable	*Inflation*	*Exchange Rate*	*Money Supply*	*Foreign Direct Investment*	*Balance of Trade*
Abbreviation	INF	EX	M	FDI	BOT
Minimum	2.26976	1.55	69.71546	-4.827000e+08	-3.569951e+10
Mean	9.98961	7.15089	83.96651	4.061126e+09	-1.280750e+10
Median	9.46973	5.63543	83.15590	2.797700e+09	-8.565000e+09
Standard Deviation	5.88288	5.08926	8.193062	3.788159e+09	1.121050e+10
Maximum	29.5066	19.1604	98.13613	1.157810e+10	3.979000e+08

Source: Authors collected and processed from Eviews 13

Table 2 presents some descriptive statistics (minimum values, means, medians, standard deviations, and maximum values) for Inflation, Exchange Rate, Money Supply, foreign direct investment, and trade balance. Over the sample period, we note that the minimum exchange rate is 1.55, which is the exchange rate between the local and foreign currencies, and it was in the early 1990s when the comprehensive economic reform began. But with the events the country went through, the revolution, and the policy of liberalizing the exchange rate, it reached its maximum level, 19.1604.

The average value was 7.15089. As for foreign direct investment, its minimum was -4.827e+08 in 2011 due to the revolution in Egypt. This is normal as foreign investment grows in politically and economically stable countries. This happened before 2011, as investment flourished and peaked in 2007 at a value of (1.157810e+10). The average value was (4.061126e+09). As for Inflation, its minimum was 2.26976 in 2001 due to Egypt's Economic and political stability. This is normal, as Inflation gets better in politically and economically stable countries. This did not happen after the events of 2011, as Inflation flourished and peaked in 2018 to reach a value of 29.5066.

The average value was 9.98961. This is the case with the money supply. It reached its minimum in 2012 after the revolution at a value of 69.71546, then it returned and achieved its highest value in 2016 at 98.13613. The average value was 83.96651. This is the case with the balance of trade. It reached its minimum value of (-3.569951e+10), then it returned and achieved its highest value at a value of (3.979000e+08). The average value was (-1.280750e+10). The lower standard deviation results also suggest that the time series of the data is consistent.

Table 3. Jarque-Bera test of variables

Variable	*Jarque-Bera*	*p-value*
INF	11.51	0.003168
EX	9.7603	0.007596
M	2.0625	0.3566
FDI	3.2356	0.1983
BOT	4.0466	0.1322

Source: Authors collected and processed from Eviews 13

Table 3 shows the value of the Jarque-Bera test to test the normality of the data. The main result from these statistics is that all variables without (Inflation and exchange rate) are normally distributed because the p-value of the Jarque-Bera test of each variable is more than 0.05. We can't reject the null hypothesis, where the null hypothesis of the Jarque-Bera test is the data is normally distributed (Jarque and Bera, 1980).

H_0: Data is is normally distributed.

H_1: Data is not normally distributed.

Table 4. Correlation matrix of independent variables

Variable	*EX*	*M*	*FDI*	*BOT*
EX	1			
M	0.06	1		
FDI	0.63	0.30	1	
BOT	-0.76	0.21	-0.54	1

Source: Authors collected and processed from Eviews 13

Table 4 shows the value of the Pearson correlation matrix of independent variables. Shows a correlation between every pair of independent variables:

An approximately low correlation between exchange rate and money supply. This indicates a weak link between the exchange rate and money supply. The change in money supply is not strongly related to exchange rate fluctuations, which suggests that other factors may have a greater impact on the exchange rate.

A low correlation between money supply and the balance of trade indicates that changes in the money supply do not significantly impact the trade balance, which expresses the difference between a country's exports and imports. Other factors, such as trade policies, global demand, and competitiveness, may play a larger role in determining the trade balance.

And there is a low correlation between money supply and foreign direct investment. A weak correlation indicates that changes in money supply have a limited impact on FDI. Other factors, such as market conditions, political stability, and investment regulations, may have a stronger influence on the volume of inflows or outflows of FDI.

Moderate correlation between exchange rate and Foreign Direct Investment. This indicates a significant relationship between the exchange rate and FDI. A change in the exchange rate can affect the investment attractiveness of a country, affecting the level of foreign direct investment.

Moderate correlation between exchange rate and balance of trade balance. Moderate correlation indicates that changes in the exchange rate can moderately affect the balance of the trade balance. Exchange rate fluctuation can affect the competitiveness of exports and imports, affecting the trade balance to some extent.

According to all correlation coefficients that are less than 0.8, the correlation data in Table 4 indicate no multicollinearity problem between the independent variables (Abonazel and Elnabawy, 2020; Abonazel et al., 2021).

2.3 Stationarity: Unit Root Test

M. Pesaran and Y. Shin (1999) demonstrated that cointegration analysis is not applicable when dealing with integrated variables of different orders, wherein some series are I (1) and others are I (0). However, the ARDL cointegration procedure can be utilized in such cases. S. Johansen and K. Juselius (1990) demonstrated despite not requiring pre-testing for unit roots, as stated, it is crucial to examine the stationary

condition of all chains as an initial step to prevent the ARDL model from crashing in the presence of an integrated stochastic trend of I (2). Stationarity is a time series that maintains a consistent mean, variance, and structure throughout its duration. Alternatively, nonstationary time series are stochastic processes that are distinguished by unit roots or structural breaks. Unit roots are the primary factors contributing to non-stationarity. The presence of a unit root signifies the nonstationary nature of the time series under consideration, while its absence implies stationarity. Dickey and Fuller (1979) introduced the stationarity test based on the unit root in time series. The logic behind the unit root test is that if a nonstationary series (X) needs different d times to become stationary, then the series has d unit roots at its level and must be integrated of order d, denoted as I (d).

H_0: Series has a unit root.

H_1: series is stationary.

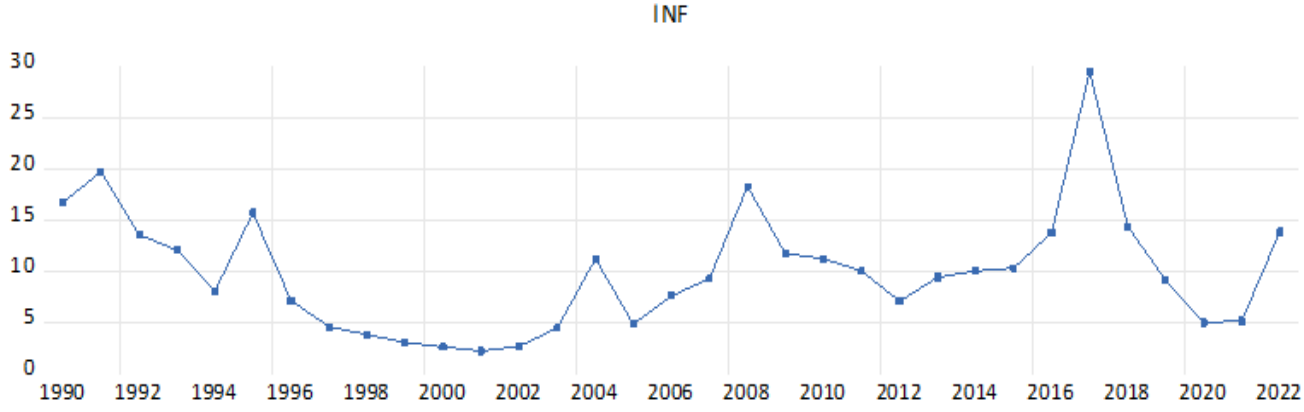
The DF test is predicated on the assumption of white noise in the disturbance run. Consequently, if there is autocorrelation in the dependent variable, it will result in autocorrelation in the error run. This, in turn, renders the DF test invalid. D. Dickey and W. Fuller (1979) introduced the DF test as an enhancement to the Dickey-Fuller test (ADF) by considering p lag values. The DF and ADF tests employ the same null hypothesis and critical values table.

Table 5. Results of Augmented Dickey-Fuller Test

Series	*Integrated Order*
INF	I (1)
EX	I (1)
M	I (0)
FDI	I (1)
BOT	I (1)

Source: Authors collected and processed from Eviews 13

Table 5 demonstrates that the ADF test confirms that the money supply (M) series is stationary at the level without differences I(0). In contrast, the stationarity of I(1) included variables (Inflation, Exchange Rate, Foreign Direct Investment, and balance of trade) at (integrated of order 1). The time series plots of the variables from 1990 to 2022 are presented in Figure 1, and time series plots of the variables from 1990 to 2022 after taking differences are presented in Figure 2.



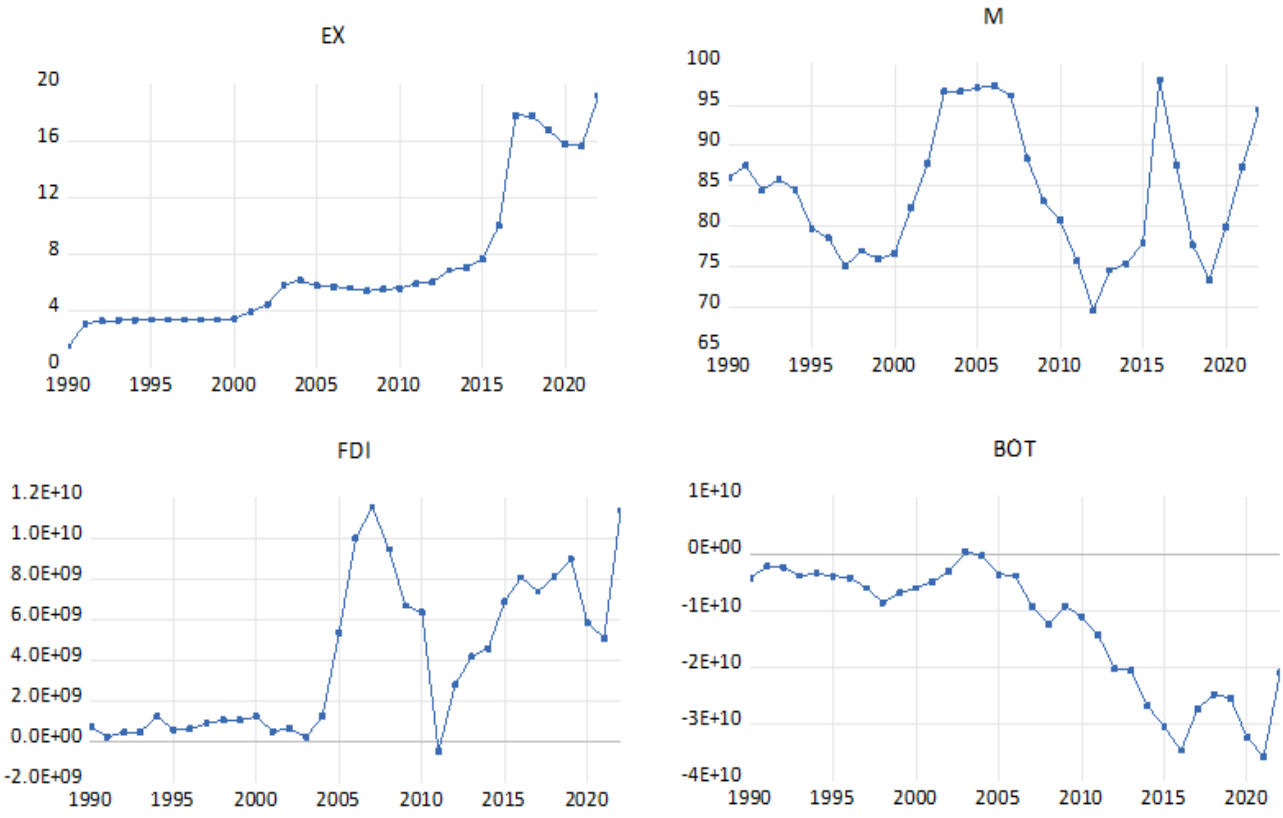
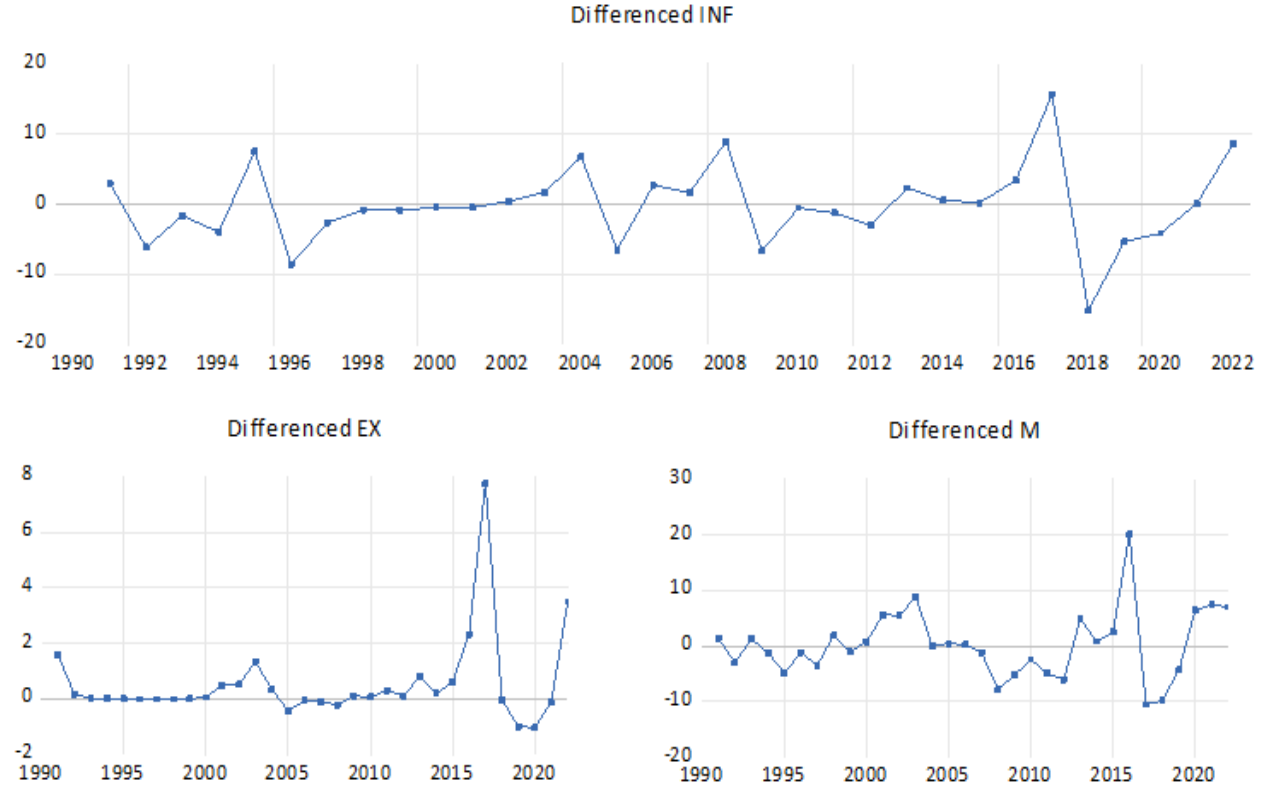


Figure 1. Time series plots of the variables from 1990-2022

Source: own



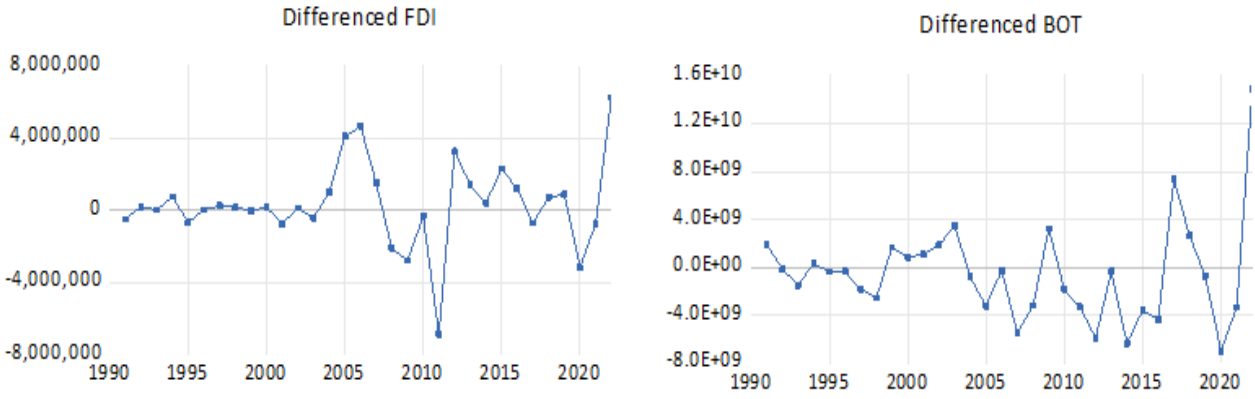


Figure 2. Time series plots of the variables from 1990 to 2022 after taking differences

Source: own

2.4 Model Selection

According to the results of the unit root test, the ARDL methodology will be followed, as the study variables of stationarity are distributed between I(0) and I(1), and therefore, the proposed ARDL(p, q_1, q_2, q_3, q_4) model will take the following form (Enders, 2004; Hill et al., 2012):

$$INF_t = \beta_0 + \sum_{i=1}^{p} \alpha_i INF_{t-i} + \sum_{i=0}^{q_1} \beta_{1i} \mathrm{EX}_{t-i} + \sum_{i=0}^{q_2} \beta_{2i} M_{t-i} + \sum_{i=0}^{q_3} \beta_{3i} FDI_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} \mathrm{BOT}_{t-i} + \varepsilon_t.$$

The R software (version 4.1.3) was used to estimate the ARDL(p, q_1, q_2, q_3, q_4) model with automated lag selection. The least Akaike information criterion (AIC) was used to pick the ARDL (2,2,2,2,2) model, see Abonazel et al. (2023).

Table 6. Results of the Akaike Information Criterion Test

INF	*EX*	*M*	*FDI*	*BOT*	*AIC*
2	2	2	2	2	160.3712
1	2	1	0	0	164.1825
1	2	1	0	1	165.8351
1	2	2	0	0	165.8419
1	2	1	1	1	166.8188
1	2	2	1	1	168.6298
1	1	1	1	1	174.8414

Source: Authors collected and processed from Eviews 13

Table 6 shows the best model selected by the lowest value of AIC, where it is 160.3712 for model ARDL (2,2,2,2,2). It means that we will take up to Lag 2 for the dependent variable (Inflation) and up to Lag 2 for the independent variables (exchange rate, money supply, foreign direct investment, and balance of trade).

Table 7. The results of the ARDL (2,2,2,2,2) model

Variable	*Estimate*	*Std. Error*	*t value*	*p-value*
Intercept	-70.5998	26.10788	-2.70416	0.0156**
INF(-1)	-0.07151	0.214311	-0.33368	0.743
INF (-2)	0.205212	0.14351	1.429946	0.172
EX	0.043008	0.983227	0.043742	0.9657
EX (-1)	-2.49633	1.251385	-1.99486	0.0634
EX (-2)	1.034506	0.978346	1.057403	0.306
M	-0.25006	0.127987	-1.9538	0.0684
M (-1)	0.771246	0.23919	3.224404	0.0053**
M (-2)	0.422678	0.301918	1.399976	0.1806
FDI	-8.61E-10	4.33E-10	-1.98865	0.0641
FDI (-1)	4.37E-10	3.44E-10	1.271775	0.2216
FDI (-2)	-6.33E-10	3.67E-10	-1.72587	0.1036
BOT	-1.75E-10	1.89E-10	-0.9273	0.3675
BOT (-1)	-2.65E-10	3.40E-10	-0.77956	0.447
BOT (-2)	-7.47E-10	4.60E-10	-1.62288	0.1242

Note: *** significant at 0.001, ** significant at 0.01, * significant at 0.05

Source: Authors collected and processed from Eviews 13

Table 7 shows that there are significant effects of the lags of some of the macroeconomic variables on Inflation. We found a significant effect of the second lag of the exchange rate on Inflation. The Money Supply and the first lag of the Money Supply have a significant effect. Additionally, Foreign Direct Investment and the second lag of Foreign Direct Investment have a significant effect. The first and second lags in Inflation have no significant effect on Inflation. The exchange rate and the second lag in the exchange rate have no significant effect on Inflation. in addition to the insignificance of the second lag of Money Supply. In addition to the insignificance of the first lag of Foreign Direct Investment. The balance of trade, first, and second lag insignificance of Inflation.

2.5 Diagnostic tests

2.5.1 Normality test

Jarque and Bera (1980) proposed the Jarque-Bera (JB) test that was used to check the normality of the residuals. The hypotheses of the Jarque-Bera (JB) test are H0: residuals are of normal distribution, and H1: residuals are not of normal distribution. Table 8 indicates that the residuals are normally distributed because the P-value of the JB test (0.4153) is more than 0.05. Then, the null hypothesis H0 is not rejected at level 0.05.

2.5.2 Serial correlation and Heteroscedasticity tests

The serial correlation and heteroskedasticity of the mistakes have been assessed using the Breusch-Godfrey LM and Breusch-Pagan-Godfrey tests.

The hypotheses of the LM test are

H_0: No serial correlation

H_1: Serial correlation is present

The hypotheses of Heteroskedasticity test are

H_0: No heteroscedasticity

H_1: Heteroscedasticity is present

Table 8. Results of Normality, Serial Correlation, and Heteroskedasticity Tests

Test	*Chi-squared value*	*p-value*
Normality: Jarque-Bera (JB) test	1.7575	0.4153
Serial correlation: Lagrange multiplier (LM) test	1.322318	0.2978
Heteroskedasticity: White test	16.966	0.2580

Source: Authors collected and processed from Eviews 13

Table 8 shows that there is no indication of serial correlation in the residuals run of the estimated model, indicating that the null hypothesis that there is no serial correlation is not rejected at level 0.05 because the P-values of the LM test (0.2978) is more than 0.05. Furthermore, since we do not reject the null hypothesis that there is no heteroscedasticity at level 0.05 because the P-values of the white test (0.258) are more than 0.05, Table 8 demonstrates that there is neither heteroscedasticity nor constant variance in the residuals.

2.5.3 Stability test

Verifying that the model is adequate before making predictions is another crucial stage in the estimation process. As a result, we identified the residual performance and verified the model's stability. The cumulative sum of the recursive residuals (CUSUM) and CUSUM of squares are used to assess the stability and correctness of the calculated model (see Figures 3 and 4). According to these stability figures, the CUSUM and CUSUM of squares are inside the 5% significant lines, indicating that the estimated model meets the stability criteria for the sample period.

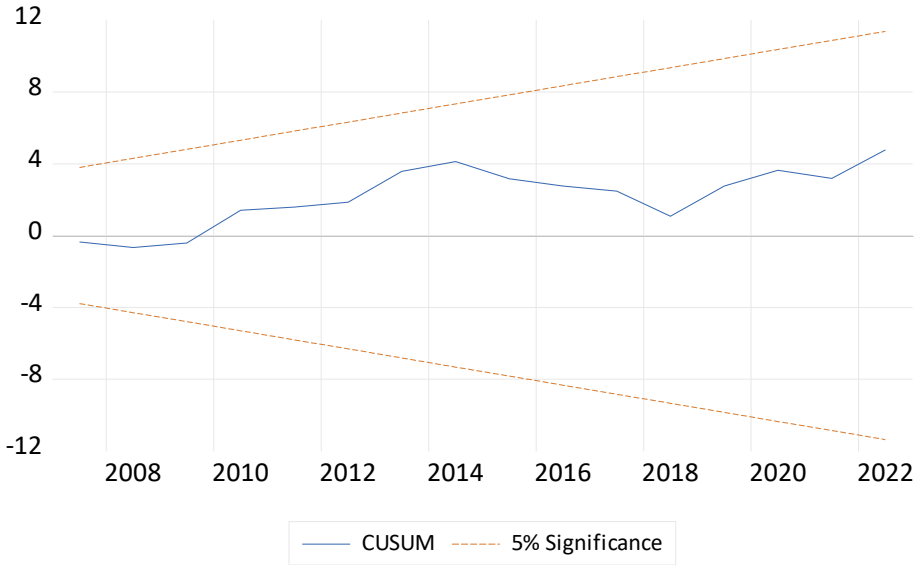


Figure 3. CUSUM stability test of the ARDL (2,2,2,2,2) model

Source: own

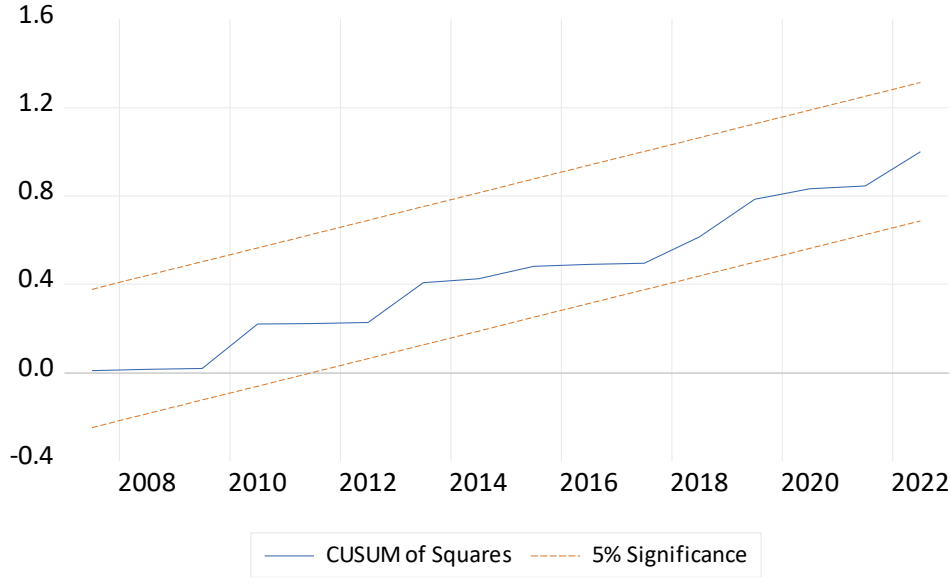


Figure 4. CUSUM of squares stability test of the ARDL (2,2,2,2,2) model

Source: own

2.6 F-Bounds Test

The bounds test, a statistical test developed by Pesaran et al. (2001), aims to derunine if a long-run relationship exists between two or more variables within a given model. This test is crucial in analyzing time series data and assessing the presence of cointegration, which indicates a common stochastic trend between the variables. Through the examination of the significance levels of the test statistics, scholars can deduce whether there is a stable relationship that persists over time. Consequently, the bounds test plays a pivotal role in understanding the dynamics and interdependencies among economic variables, providing valuable insights into the long-run behavior of the system under investigation.

Three distinct cases exist that pertain to the value of the F statistic. In the first case, if the value of the F statistic is less than I(0), the null hypothesis is not rejected, and as a result, we can confidently conclude that there is no long-run relationship. Moving on to the second case, should the value of the F

statistic exceed I(1), the null hypothesis is rejected, suggesting a long-run relationship. Finally, in the last case, if the value of the F statistic falls within the range of two established bounds, it becomes exceedingly difficult to make a definitive judgment regarding the presence or absence of a long-run relationship.

H_0: No long-run relationship

H_1: Long run relationship is present

Table 9. Bound test of ARDL (2,2,2,2,2) model

Test Statistic	*Value*	*Significant level*	*I(0)*	*I(1)*
F-statistic	4.151242	10%	2.2	3.09
K	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Authors collected and processed from Eviews 13

Table 9 shows a long-run relationship, where We are in the second case as the value of the F-statistic is greater than the upper bound, concluding that there is a long-run relationship at different significance levels, 5% and 10%.

Table 10. The results of the ARDL (2,2,2,2,2) model in the long-run

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*p-value*
EX	-1.63779	0.511284	-3.2033	0.0055**
M	1.089535	0.283856	3.838337	0.0015***
FDI	-1.22E-09	5.06E-10	-2.51293	0.0413*
BOT	-1.37E-09	3.99E-10	-3.43695	0.0034***
Intercept	-81.4959	22.90332	-3.55826	0.0026***

Note: *** significant at 0.001, ** significant at 0.01, * significant at 0.05

Source: Authors collected and processed from Eviews 13

Table 10 shows that the ARDL bound testing approach's long-run equilibrium test findings demonstrate that, over time, there is an effect on the exchange rate, and it is the positive causal linkage between the exchange rate and Inflation. Additionally, there is an effect on Money Supply, which is the negative causal linkage between Money Supply and Inflation. In addition, there is an effect on the Foreign Direct Investment, which is the negative causal linkage of Inflation and the Foreign Direct Investment. In addition, there is an effect on the balance of trade: the negative causal linkage of Inflation and the balance of trade.

2.7 Error Correction Model

The Error Correction Term (ECT) provides valuable insights into the degree to which any prevailing disequilibrium is rectified. It effectively gauges the extent to which any imbalances from the preceding period are being tackled at the current point in time. A positive coefficient associated with the ECT signifies a divergence, indicating a persistent deviation from the desired equilibrium state. Conversely, a negative coefficient suggests convergence, implying a gradual movement towards equilibrium. In the case where the estimated value of the ECT equals 1, it signifies that the entire adjustment process occurs within the same period, demonstrating an instantaneous and complete correction. However, if the estimated value

of the ECT is 0.5, it indicates that only 50% of the necessary adjustment takes place in each subsequent period or year. Lastly, when the ECT equals 0, it signifies the absence of any adjustment, rendering the assertion of a long-run relationship nonsensical.

Table 11. The results of the error correction model

Variable	*Estimate*	*Std. Error*	*t value*	*p-value*
Intercept	-0.7060	13.00	-5.431	2.57e-05***
D(INF(-1))	-0.20521	0.095962	-2.13848	0.06054
D(EX)	0.043008	0.573374	0.075008	0.94472
D(EX(-1))	-1.03451	0.480289	-2.15392	0.06991
D(M)	-0.25006	0.07964	-3.1399	0.00683**
D(M(-1))	-0.42268	0.189706	-2.22807	0.04334*
D(FDI)	-8.61e-10	2.41e-10	-3.58137	0.0028**
D(FDI(-1))	6.33e-10	2.08e-10	3.043863	0.00763**
D(BOT)	-1.75e-10	1.43e-10	-1.22368	0.25207
D(BOT(-1))	7.47e-10	2.43e-10	3.076382	0.01267*
ECT	-0.8663	0.151514	-5.71761	2.97e-05***

Note: *** significant at 0.001, ** significant at 0.01, * significant at 0.05

Source: Authors collected and processed from Eviews 13

Table 11 shows the results of the ECT model of the ARDL (2,2,2,2,2) model. In our case, it is noteworthy to mention that the Error Correction Term (ECT) exhibits a negative sign, thus signifying its high level of statistical significance. This finding strongly suggests the occurrence of convergence within the system under investigation. As a result, we can deduce that a significant 86.6% of the necessary adjustment from the short-run to the long-run equilibrium state occurs during the year. This implies that the crucial adjustment process occurs over one year, specifically after the year and quarter have transpired.

CONCLUSIONS

This study estimated one of the dynamic causal relationships between the inflation rate, exchange rate, foreign direct investment, money supply, and trade balance in Egypt from 1990 to 2022. The ARDL model overcomes the problem of mixed stationary and nonstationary series as it can handle series that integrate from different orders. Moreover, it overcomes the serial correlation in the least square regression method. The inflation rate has a long-run equilibrium relationship with its determinants (exchange rate, foreign direct investment, money supply, and balance of trade), and the best ARDL model to describe this relation is ARDL (2,2,2,2,2). The exchange rate, foreign direct investment, and trade balance significantly negatively affect the inflation rate. Still, the money supply has a significant positive effect on the inflation rate in the long run. We also concluded that 86.5% of short to long-run adjustments occur yearly. The study recommends continuing the policy of exchange rate liberalization while working to expand the production base to increase exports and attract more foreign investments.

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Optimal Capital Structure to Increase Indonesia Firm Value

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ABSTRACT

This study aimed to determine the construction firms' optimal capital structure compared to the sub-sector industry in the Indonesia Stock Exchange (IDX). The population comprised ten issuers of the construction sub-sector in IDX with quarterly data from June 2013 to December 2020. The data were analyzed using static panel data with three independent variables moderated by ownership of state- and non-state-owned companies. Furthermore, three macro and two dummy variables for infrastructure policy and the Covid-19 pandemic were used. The results showed that company value is significantly influenced by optimal capital structure, profitability, tangibility, infrastructure budget, interest and exchange rates, infrastructure policy, and the pandemic. The construction companies' optimal capital structure was 4.8 times the industry's DER. Each construction company's capital structure was lower than the industry's optimal firm value. Therefore, construction companies should optimize their capital structure to achieve optimal firm value.

INTRODUCTION

Infrastructure development is Indonesia's national priority, essential in increasing public access to basic services and improving productivity and competitiveness. Indonesia needsgood infrastructure to become a developed country. Since infrastructure is also an investment tool for Indonesians, the government builds toll roads, airports, Mass Rapid Transportation System (MRT), ports, and dams. Figure 1 shows that the infrastructure budget increased by 169.43% from Rp. 157.4 trillion in 2014 to Rp. 423.3 trillion in 2020. The government estimates the funding needsfor infrastructure development at IDR 5,519 trillion (MNDPRI, 2014). Governments worldwide struggle with the demand for large expenditures with limited budgets ininfrastructure development (UN Habitat, 2015). In line with this, Indonesia is building

new infrastructure projects to facilitate local economic growth and prosperity. The development of road infrastructure and supporting facilities also impacts regional economic growth (Kunstler, 1993).

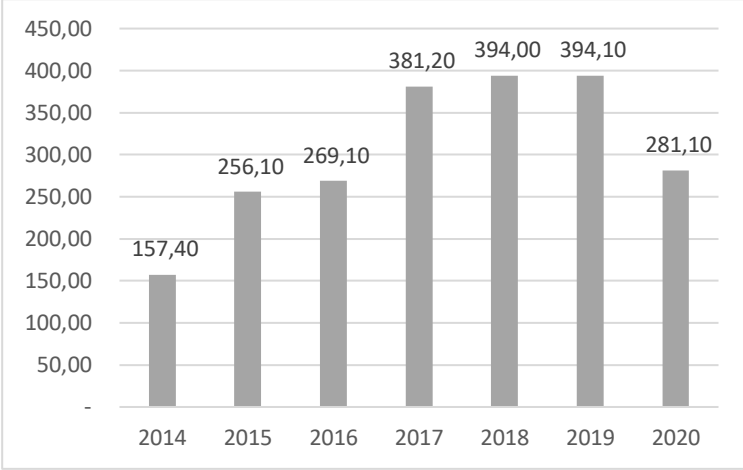

Figure 1. Indonesia's Infrastructure Budget 2014-2020 (Rp trillion)

Source: own

Infrastructure is essential in production activities and impacts other sectors' economic efficiency. The government must implement policies encouraging economic productivity, such as providing high-quality infrastructure and long-term investment and innovation (UN Habitat, 2015). The Public-Private Partnership (PPP) approach is an alternative in infrastructure development programs to financing transportation projects in Indonesia. However, infrastructure is the responsibility of the government and the private sector. This makes construction companies require significant funding to run their business activities and achieve an optimal capital structure that increases their value.

1. LITERATURE REVIEW

The capital structure comprises the company's capital sources, consisting of capital and short-and long-term debt (Modigliani & Miller, 1958). A capital structure maximizes the company's stock price using an optimal debt ratio. Maximum firm value is the financial management's goal because it increases stockholders' wealth (Koller et al., 2020). Optimal capital structure maximizes the company's stock price and requires an optimal debt ratio, because the optimal capital structure can decrease the capital costs and the firm's market value (Alipour et al., 2015). As commonly employed in previous studies, the price-to-book value (PBV) used as the firm value indicator. PBV compares the market price with the book value per share. A PBV value implies increased market confidence in the company (Khanna & Sonti, 2004). The primary objective of capital structure decisions is to maximize the firms' market value. Financial and macroeconomic variables significantly influence management decisions in compiling the capital structure, and Bui et al. (2023) found a significant positive relationship between capital structure and firm value.

1.1 Optimal Capital Structure and Company's Value

Figure 2 explains about model of optimal capital structure. The optimal capital structure maximizes a company's stock price and necessitates a low debt-to-equity ratio (Brealey et al., 2018). They should manage and respond quickly and accurately regarding the sources of funds used to strengthen the capital structure. In this case, the company could minimize its business risks, strengthening positive market sentiment. The company's capital structure could be optimized by maximizing the firm's value. Furt-

hermore, optimal capital structure varies because each company has different characteristics (Titman & Tsyplakov, 2007). The hypothesis proposedis as follows:

H1: Optimal capital structure positively affects a company's value.

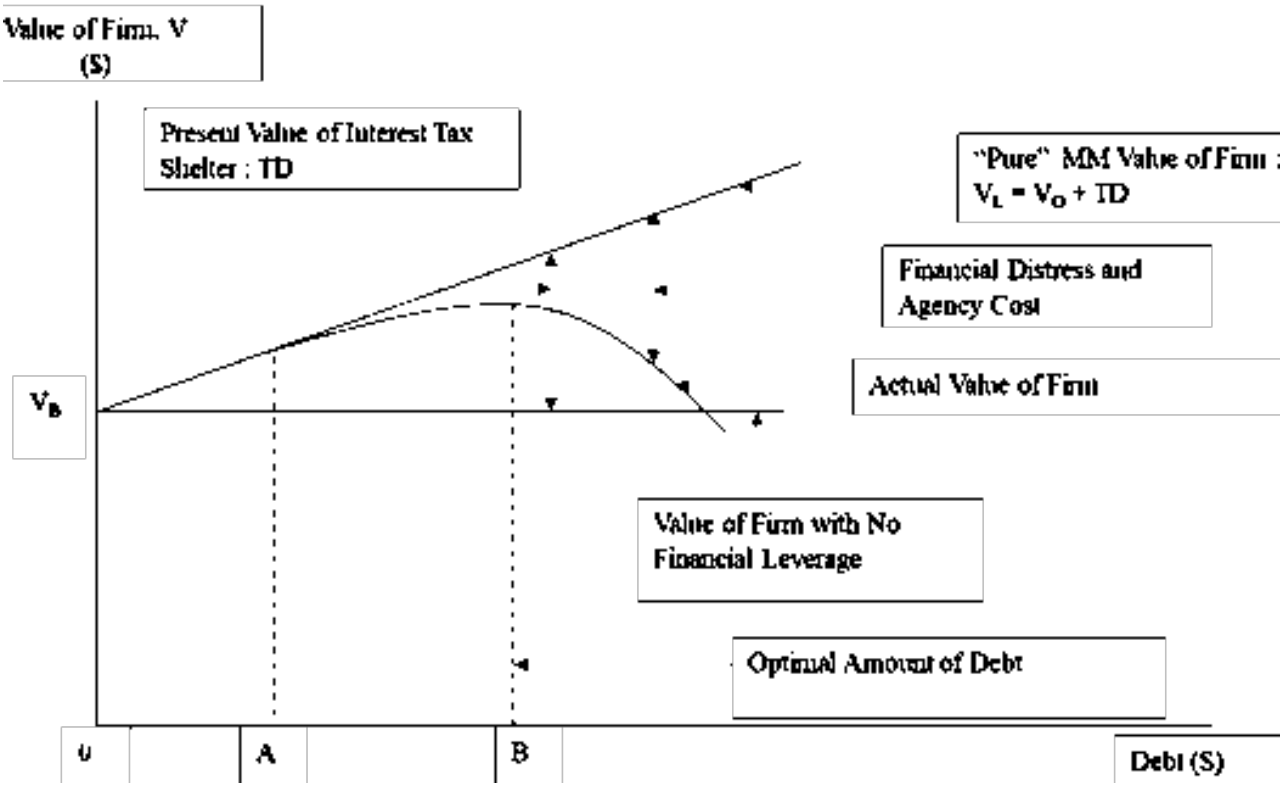

Figure 2. Optimal Capital Structure

Source: own

1.2 Profitability and Company's Value

Profit is a measure of a company's capacity to fulfill its responsibilities to its funders, and it is essential in determining firm value. Chen and Chen (2011) stated that a higher company's profit attracts more investors. High profits indicate prospects for the company. Furthermore, high investor interest due to high profits increases the stock price, positively affecting firm value. High profits attract investors because the greater dividends to be later distributed.Additionally, more investors increase stock prices and the company's value (Akhmadi & Januarsi, 2021). The hypothesis proposed is as follows:

H2: Profitability positively affects a company's value.

1.3 Tangibility and Company's Value

Tangibility is positively related to debt because high tangible assets could be used as real guarantees to the firm's creditors. Therefore, an increase in the value of tangible assets used as a guarantee increases the company's debt (Myers & Majluf, 1984). Tangibility is an important variable in determining the company's capital structure because tangible assets are usedas collateral that attracts investors. This is in line with (Christofi et al., 2023), which stated that higher company assets increase its value. Investors are entitled to the company's guaranteed tangible assets when it experiences financial distress or bankruptcy. The hypothesis proposed is as follows:

H3: Tangibility positively affects a company's value.

1.4 Activity and Company's Value

Sales growth reflects the company's business success and increases investment opportunities, demand indicators, and competitiveness. They affect the ability to maintain profits and predict future growth. According to Cheng Yu-Shu et al. (2010), companies with a greater operating sales growth rate have a higher firm value. The total asset turnover ratio measures the turnover of all company assets and how much revenue they generate (Berk & Demarzo, 2019). A higher asset turnover rate indicates an increase in the company's sales value. This promotes more asset utilization to anticipate market demand. The increase in asset turnover also shows that the public is satisfied with the company's products. This increases the value of product sales and profits. It attracts investors because the company can generate income, increasing the stock price. The hypothesis proposed is as follows:

H4: Activity positively affects a company's value.

1.5 Infrastructure Budget and Company's Value

Infrastructure spending is part of the government's capital expenditures because the utilization value of the infrastructure built is more than one year. The Indonesian government accelerates infrastructure development projects to promote regional economic growth. The Ministry of Public Works and Public Housing PUPR is among the ministries that provide infrastructure. It is allocated the most significant portion of infrastructure spending in the Budget Allocation on National Economy (MNDPRI, 2014). According to (Dunk, 2011), the government's infrastructure budget positively impacts economic growth. The hypothesis proposed is as follows:

H5: Infrastructure Budget positively affects a company's value.

1.6 Exchange Range and Company's Value

An appreciation or depreciation of the national currency exchange rate influences exports and imports and companies' value (Dominguez & Tesar, 2006). Companies using imported production materials increase their debt when the domestic currency against foreign currencies depreciates. In this case, a currency's depreciation negatively impacts a company's market value (Simakova, 2017). The production costs of companies relying on imported raw materials increase when the exchange rate depreciates in production costs will occur, reducing profits. The hypothesis proposed is as follows:

H6: Exchange rate negatively affects a company's value.

1.7 Interest Rate and Company's Value

An increase in interest rate prompts management to change its capital structure and reduce the financial burden that must be paid. Furthermore, interest rates have a significant adverse effect on firm value (Tarkom & Ujah, 2023). According to (Mankiw, 2022), interest rates negatively and positively affect investment in the long and short term, respectively. The increase in interest rates will increase the company's burden. They cause a decline in company performance, stock prices, and company value. Also, interest rates have a substantial negative relationship with share prices in emerging countries. The hypothesis proposed is as follows:

H7: Interest rate negatively affects a company's value.

1.8 Infrastructure Policy and Company's Value

Infrastructure policy is the government's effort to control the economy through government revenues and expenditures. The infrastructure policy is implemented through integration by increasing the role of Public-Private Cooperation. This policy involves the company and shareholders with different

interests (Davies & Crawford, 2014). The variable was created due to the differences in government policies on construction companies' value from 2015 to 2019. The hypothesis proposed is as follows:

H8: Infrastructure Policy positively affects a company's value.

1.9 The Covid-19 Pandemic and Company's Value

The Covid-19 pandemic negatively impacted companies, causing a decline in stock prices and financial performance that affected firm value (Almustafa et al., 2023). Moreover, it has wreaked havoc on various industries, including the financial market, making individuals wary of investing. Since March 2020, the Composite Stock Price Index (IHSG) of the Indonesia Stock Exchange (IDX) has decreased because many investors have sold their shares (Indonesia Stock Exchange, 2021). The pandemic severely affected the economy worldwide. China's GDP dropped by 6.8%, and many countries suffered from corporate bankruptcies and unemployment (Zhang et al., 2021). The hypothesis proposed is as follows:

H9: The Covid-19 pandemic negatively affects a company's value.

Based on this equation, the primary independent variable is the optimal capital structure. The other determinant variables include profitability, tangibility, activity, infrastructure budget, exchange rate, and interest rate. This model specification allows for identification of the optimal PBV level for each existing debt value.

2. RESEARCH METHOD

2.1 Data

This study used secondary data sourced from IDX, Bank Indonesia, and the Ministry of Public Works. It utilized static panel data on ten listed construction companies in the 2013-2020 quarterly period.

Table 1 explains the company's value is the dependent variable measured as the price to book value (PBV). The independent variables are the company's profitability, tangibility, and activity. The effects of independent variables on the dependent variable were moderated by state and non-state ownership, macroeconomic conditions such as infrastructure budget, exchange and interest rates, government policy on infrastructure, and the Covid-19 pandemic.

Table 1. Variable definition and measurement

No.	*Variables*	*Notation*	*Description on Relationship*	*Source*
1.	Company's value	PBV	(Price/ Book Value)	IDX
2.	Capital Structure	DER	(Debt /Equity)	IDX
3.	Optimal Capital Structure	DER^2	$(Debt/Equity)^2$	IDX
4.	Profitability	PROF	(EBIT/Total Assets)	IDX
5.	Tangibility	TANG	(Fixed Assets/Total Assets)	IDX
6.	Activity	AKTF	(Sales/Total Assets)	IDX
7.	Infrastructure budget	LNINFRA	Infrastructure Budget	Ministry of Public Works and Public Housing
8.	Exchange Rate	LNUSD	(Rp/USD)	BI
9.	Interest Rate	RATE	Bank Indonesia Interest Rate	BI
10.	Ownership	DOWN	1 for State-Owned Company; 0 for Non-State-Owned Company	Degenerate
11.	Infrastructure Policy	DPLCY	1 for $2015 \leq x \leq 2019$; 0 for<tahun 2015 and >tahun2019	Degenerate
12.	The Covid-19 Pandemic	DPAN	1 when $\geq$ tahun 2020 ; 0 when < 2020	Degenerate

Source: own

The sample data consisting of ten construction companies listed in Indonesia stock exchange, such as Acset Indonusa Tbk Corp (ACST), Adhi Karya Corp (ADHI), Nusa Konstruksi Enjiniring (DGIK), Jaya Konstruksi Manggala Pratama Corp (JKON), Nusa Raya Cipta Corp (NRCA), PP Corp (PTPP), Surya Semesta Internusa Corp (SSIA), Total Bangun Persada Corp (TOTL), Wijaya Karya Corp (WIKA), and Waskita Karya Corp (WSKT).

2.2 Panel Data Analysis

Static panel data analysis technique was used to determine the effect of independent variables on firm value. There are two stages in choosing an estimation method for panel data analysis. The first step compares the pooling least square method using OLS or Common Effect Method (CEM) with the fixed effect method (FEM) using the Chow-test or Likelihood ratio test. When the test results show the best OLS model, the OLS or CEMmodel is compared with the Random Effect model using the Lagrange Multiplier (LM) test. However, when FEM is better than CEM, the random effects method (REM) uses the Hausman test to determine the best regression model to be used (Gujarati & Porter, 2020).

2.3 Design of Regression Model

A static panel regression model with the following specification was used in the analysis.

$$PBV_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 DER2_{it} + \beta_3 PROF_{it} + \beta_4 DOWNPROF_{it} + \beta_5 TANG_{it} + \beta_6 DOWNTANG_{it} + \beta_7 AKTF_{it} + \beta_8 DOWNAKTF_{it} + \beta_9 LNINFRA_{it} + \beta_{10} LNUSD_{it} + \beta_{11} RATE_{it} + \beta_{12} DPLCY_{it} + \beta_{13} DPAN_{it} + \mu_{it} \ldots (1)$$

where:

PBV_{it} : Price to Book Value of Company-i in time-t.

DER_{it} : Debt to Equity of Company-i in time-t.

$DER2_{it}$: Debt to Equity Squared of Company-i in time-t.

$PROF_{it}$: Profitability of Company-i in time-t.

$DOWNPROF_{it}$: Moderation of Company Ownership with Profitability of Company-i in time-t

$TANG_{it}$: Tangibility of Company-i in time-t.

$DOWNTANG_{it}$: Moderation of Company Ownership with Tangibility of Company-iin time-t

$AKTF_{it}$: Activity of Company-i in time-t.

$DOWNAKTF_{it}$: Moderation of Company Ownership with Activity of Company-Iin time-t

$LNINFRA_{it}$: Infrastructure Budget in time tL

$NUSD_{it}$: exchange Rate in time t.

$RATE_{it}$: Bank Indonesia Interest Rate in time t.

$DPLCY_{it}$: Infrastructure Policy, 1 if $2015 \leq x \leq 2019$; 0 if < 2015 and > 2019.

$DPAN_{it}$: The Covid-19 Pandemic, 1 if > 2020; 0 if < 2020

β_0 : *common y-intercept*.

B_1-β_{13} : *coefficients of the concerned explanatory variables.*

μ_{it} : *error term of the firm I at time t.*

3. EMPIRICAL RESULTS

3.1 Descriptive analysis

Table 2 shows the descriptive analysis results of the construction company's financial characteristics variables. They include company value (PBV), leverage (DER), profitability (PROF), tangibility (TANG), and activity (AKTF). PBV ranges between 0.241 and 8.808. DGIK has the highest PBV value of 8.808, while PTPP has the lowest with 0.241. The mean value of the average PBV of ten construction companies is 2.021, with a standard deviation of 1.681. DER ranges between 0.630 and 6.321. ADHI has the highest DER value of 6.321, while ACST has the lowest with 0.630. The mean value of the average DER of ten construction companies is 2.039, with a standard deviation of 1.311.

Table 2. Statistical data description of variables

VARIABLE		*ACST*	*ADHI*	*DGIK*	*JKON*	*NRCA*	*PTPP*	*SSIA*	*TOTL*	*WIKA*	*WSKT*
MEAN											
PBV	2.021	2.084	1.597	4.545	0.559	1.457	2.527	0.944	2.556	2.026	1.913
DER	2.039	1.672	4.348	0.971	1.040	0.922	3.024	0.951	1.956	2.432	3.073
PROF	0.016	0.004	0.015	0.021	0.001	0.022	0.018	0.024	0.024	0.017	0.015
TANG	0.096	0.133	0.052	0.153	0.082	0.051	0.111	0.154	0.054	0.115	0.057
AKTF	0.198	0.163	0.161	0.287	0.168	0.336	0.172	0.144	0.220	0.160	0.165
STANDARD DEVIATION											
PBV	1.681	1.546	0.937	2.225	0.229	0.970	2.022	0.496	1.115	1.203	1.330
DER	1.311	1.011	1.329	0.209	0.257	0.104	1.183	0.194	0.214	0.375	0.718
PROF	0.272	0.067	0.009	0.018	0.014	0.012	0.010	0.036	0.007	0.010	0.015
TANG	0.049	0.041	0.014	0.024	0.020	0.016	0.055	0.029	0.013	0.036	0.011
AKTF	0.108	0.070	0.083	0.121	0.056	0.114	0.079	0.046	0.033	0.064	0.159
MINIMUM											
PBV	0.241	0.524	0.319	0.919	0.264	0.560	0.241	0.425	0.798	0.446	0.241
DER	0.630	0.630	2.189	0.672	0.713	0.669	1.718	0.685	1.536	1.468	1.619
PROF	-0.347	-0.347	0.005	-0.005	-0.027	0.002	0.003	-0.013	-0.004	0.001	-0.040
TANG	0.011	0.071	0.025	0.116	0.054	0.032	0.011	0.013	0.029	0.075	0.037
AKTF	0.032	0.056	0.062	0.127	0.073	0.185	0.061	0.075	0.159	0.049	0.032
MAXIMUM											
PBV	8.808	8.725	4.210	8.808	1.128	4.609	8.290	2.670	5.611	4.209	5.895
DER	6.321	4.580	6.321	1.594	1.683	1.181	5.366	1.420	2.297	3.089	5.369
PROF	0.197	0.054	0.043	0.056	0.026	0.055	0.047	0.197	0.037	0.360	0.044
TANG	0.215	0.215	0.074	0.191	0.130	0.077	0.172	0.185	0.076	0.172	0.076
AKTF	0.805	0.335	0.426	0.528	0.270	0.533	0.354	0.224	0.291	0.315	0.805

Source: own

PROF ranges between -3.047 to 0.197, where ACST has the highest and lowest values. The mean value of the average PROF is 0.016, with a standard deviation of 0.072.TANG ranges between 0.011 to 0.215. ACST and PTPP have the highest and lowest TANG values, respectively. The mean value of the average TANG is 0.096, with a standard deviation of 0.049. AKTF ranges between 0.032 to 0.805, with WSKT having the highest and lowest values. The mean value of the average AKTF is 0.198, with a standard deviation of0.108.

3.2 Results of Estimation of the Panel Regression Model

Table 3 explains the CEM analysis results the parameters or coefficients of all independent variables affect PBV, with a significance level of 1%. The coefficient of determination R2 for the CEM model was 0.4868. The FEM analysis results show that the independent variables significantly affect PBV, unlike the previous CEM. The effect of all independent variables is significant at α=1% and α = 10%, with a coefficient of determination, R2 of 0.45492. The REM analysis shows that the variables all independent variables affect PBV, with a significance level of 5% and 10%. The coefficient of determination R2 is 0.5489.

Table 3. Results of Estimation of the Panel Regression Model

	CEM		*FEM*		*REM*	
Variable	*Coefficient*	*Prob*	*Coefficient*	*Prob*	*Coefficient*	*Prob*
DER	1.7173933***	0.000	0.81190309***	0.007	0.82589476***	0.005
DER2	-.19306152***	0.000	-.08361715*	0.051	-.08583181**	0.041
PROF	-10.814947***	0.000	-11.641637***	0.000	-11.733339***	0.000
DOWNPROF	37.879616***	0.005	28.656647***	0.005	29.126188***	0.004
TANG	15.157947***	0.000	12.821473***	0.000	12.598071***	0.000
DOWNTANG	-7.5870051***	0.002	-11.699076***	0.004	-11.445026***	0.001
AKTF	7.3860032***	0.000	0.24830475	0.816	0.68793384	0.504
DOWNAKTF	-4.7330439***	0.003	0.85837235	0.560	0.454902	0.750
LNINFRA	-1.8435864**	0.011	-1.6861918***	0.002	-1.6976875***	0.002
LNUSD	-8.1612915***	0.000	-7.9740623***	0.000	-7.9763336***	0.000
RATE	41.553498***	0.000	47.874387***	0.000	47.570404***	0.000
DPLCY	1.9006168***	0.000	1.5250081***	0.000	1.5445431***	0.000
DPAN	2.8876252***	0.000	2.1259935***	0.000	2.1638919***	0.000
_CONS	127.40762***	0.000	123.42647***	0.000	123.73828***	0.000
R-squared	0.4868		0.5492		0.5489	

legend: * p<.1; ** p<.05; *** p<.01

Source: own

Table 4 explains the Likelihood test results in Table 5 show that the probability value is less than 0.05, meaning H_0 is rejected. Therefore, FEM is the best data panel estimate model. Chow test was conducted to test a better panel model between FEM and CEM. The results show thatFEM is better than CEM, with a probability < 0.05.

Table 4. Likelihood Test Result/Chow Test

F test that all u_i=0: F(9, 287) = 26.76	Prob > F = 0.0000

Source: own

Table 5 explains the Lagrange Multiplier test was conducted to compare CEM and REM using the Breusch-Pagan method. Based on the LM test results, the panel model shows that REM isbetter than CEM (Breusch Pagan 0.05).

Table 5. Lagrange Multiplier Test Result

Estimates results:

	Var	*sd = sqrt(Var)*
pbv	2.824235	1.680546
e	0.848544	0.9211645
u	0.943254	0.9712031
Test: Var (u) = 0		
	chibar2(01)	432.96
	Prob > chibar2	0.0000

Source: own

Table 6 explains the possibility test shows that the best model is FEM. The Hausman test compared FEM with REM and found that Cross Section Random >0.05, meaning REM models are better than FEM. The best model among the three models is the REM.

Table 6. Hausman Test Results

Test: H0: difference in coefficients not systematic	
Prob>Chi2	0.6730

Source: own

4. DISCUSSION

4.1 Optimal Capital Structure

The estimation results show that the debt-to-equity ratio (DER) significantly and positively affects firm value. The capital structure or debt increases the construction company's value. The company reduced its cost of capital by taking on more debt, increasing its value. This is in line with the MM hypothesis that rising debt lowers thecost of capital and increases the company's value. The maximization approach to a quadratic function found that the optimal capital structure of Indonesia's construction industry is 4.8 times DER (Figure 3).

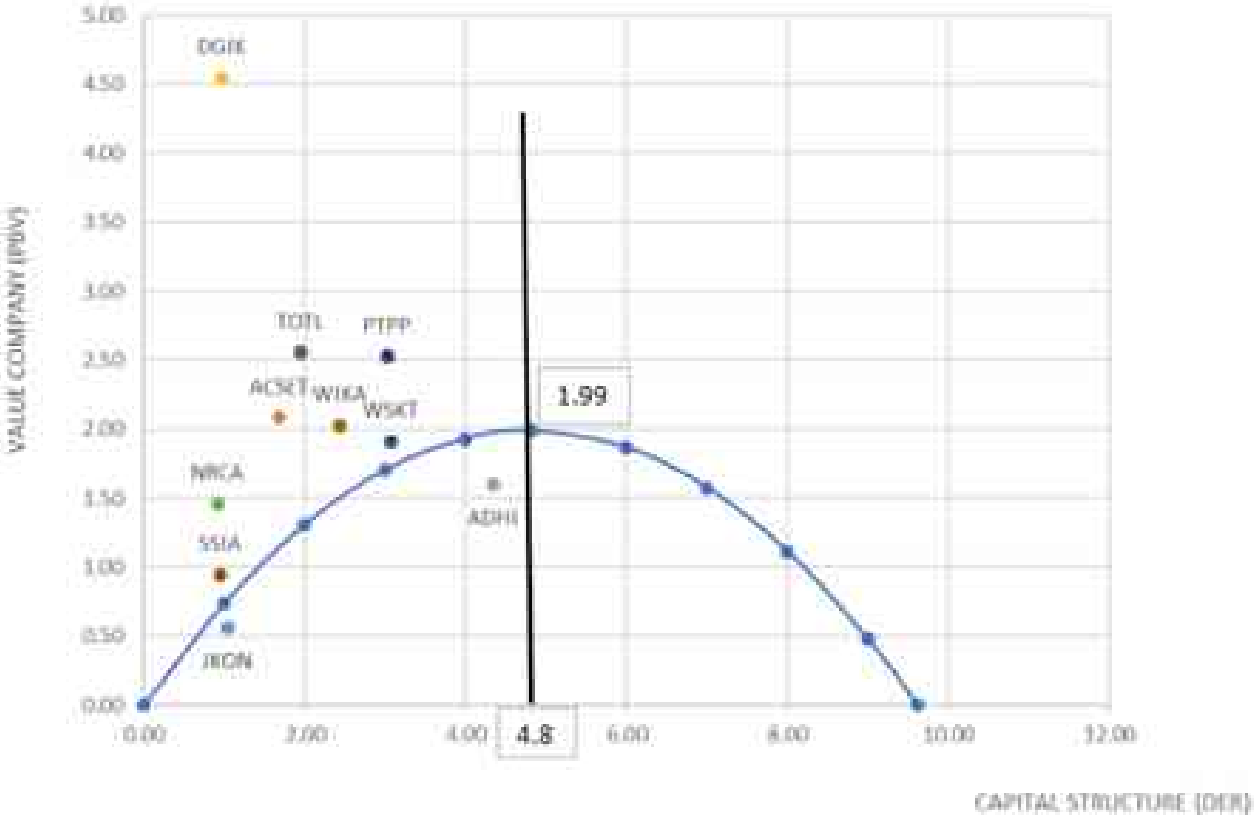

Figure 3 Construction Company's Optimal Capital Structure

Source: own

This number suggests that construction companies on average owe up to 4.8 of their debt-to-equity ratios. The capital structure of each construction company is lower than the industry's optimal capital structure.

4.2 Profitability

Profitability significantly and negatively affects the construction companies' value. Inthis case, an increase in profits reduces the company's debt, increasing the cost of capital (WACC) and decreasing its value. Companies with a high return on investment use relatively small debt. An increase in the company's profitability reduces its debt levels. This supports Paulo Esperança et al. (2003), which stated that less profitable companies are more likely to require external funding or debt. A decrease in profitability increases the value of non-state-owned companies more than state-owned companies and vice versa.

4.3 Tangibility

Tangibility or significant investment increases profits and the value of construction companies. In this case, higher company assets increase its value because large companies have more stable conditions and prospects that attract investors to buy shares. An increase in the demand for company shares increases the share price, indicating excellent company value. Tangible assets could be used as collateral to attract investors and increase the company's value. This supports (Christofi et al., 2023) that tangible assets positively affect firm value. Non-state-owned companies have more robust assets to increase their value because they manage their tangible assets more effectively and efficiently.

4.4 Activity

The estimation results show that the activity does not significantly affect the firm's value. Furthermore, the increase in sales does not affect firm value because of low income. It means that the construction company cannot profit even while earning revenue. The increase in income does not affect the company's value because it does not provide the expected profit or the minimum required return. Dang et al. (2019) stated that sales growth does not significantly increase the firm's value. Therefore, the company's value cannot be reflected through the increase in sales. The results show no difference in the effect of income on the value of state-owned and non-state-owned companies.

4.5 Infrastructure Budget

Accelerating connectivity or infrastructure development requires aconsiderable budget involving construction companies and optimal funding to increase itsvalue. The estimation results show that the infrastructure budget significantly and negatively affects the construction company's value. The profitability for infrastructure budget projects reduces the value of construction companies because the projects incur more costs than the revenue. This is in line with (Firth et al., 2013) that local governments spending more incur greater costs from companies, lowering the firm value, specifically for state-owned enterprises.

4.6 Exchange Rate

The exchange rate is the price of a currency expressed in another currency. It creates negative sentiment and discourages investors, reducing the company's market. The estimation findings demonstrate that the exchange rate's variable coefficient significantly and negatively impacts firm value. The price of material for project construction or investment has increased. Therefore, more considerable funding is neededto finance the purchase of materials and investment. An increase in raw materials and investment price reduces the construction company's profit, lowering firm value. This isin line with Simakova (2017) that exchange rate and the firm's value have a negative relationship.

4.7 Interest Rate

The interest rate of Bank Indonesia used as a measure of the cost of capitalincurred to obtain the capital from their capital. The estimation results show that interest rates significantly and positively affect firm value. Although interest rates have increased, the increase in company income is more significant, dominating and increasing the value. The result of this study contravenes the hypothesis that states that the interest rate significantly and negatively affects firm value (Olalere et al., 2020).

4.8 Infrastructure Policy

Infrastructure policy represents government policy created due to differences in policies on firm value from 2015 to 2019. The infrastructure policy dummy was made because of the differences in government policies on company value before and after 2015 to 2019. The estimation results show that the infrastructure policy significantly and positively affects firm value. This means the infrastructure projects provide added value for construction companies. The results of this study are in line with the hypothesis that states that infrastructure policy significantly and positively affects firm value (Suárez-Cuesta & Latorre, 2023).

4.9 The Covid-19 Pandemic

The estimation results show that the pandemic significantly and positively affected firm value. Construction activities and projects decreased due to the Covid-19 pandemic. However, the pandemic

increased the company's value because construction companies avoided projects with no added value. The companies also conducted operational efficiency and corporate restructuring. Investors still benefit from buying stocks during the epidemic by backing up their decisions with thorough calculations. This supports. Concerning resilience to the Covid-19 pandemic, with stock pricesrising significantly during its outbreak. For instance, China became a safer investment destination during the pandemic period. The result of this study contravenes the hypothesis that states that the Covid 19 pandemic significantly and negatively affects firm value (Boumlik et al., 2023).

CONCLUSIONS

While investing in construction companies, investors should evaluate indicators such as optimal capital structure, profitability, tangibility, infrastructure budget and policies, exchange and interest rates, and the Covid-19 pandemic. The effects of these indicatorson companies' value are moderated by state and non-state company ownership, profitability, and tangibility.

The optimal capital structure of construction companies significantly affects firm valueby 4.8 times DER. The capital structure of each construction company is lower than the industry's optimal capital structure. ACST has a capital structure of 1.672 times its DER, ADHI 4.348, DGIK 0.971, JKON 1.040, NRCA 0.922, PTPP 3.024, SSIA 0.951, TOTL 1.956, WIKA 2.432, and WSKT 3.073. Construction companies must manage theiroperations efficiently to generate profits from the project's income. They must also select projects that provide profitability to the company's value. Therefore, construction companies should adjust their financing decisions during the Covid-19 pandemic toachieve optimal capital structure.

Suggestion for future research

Studies should examine the effects of liquidity ratio, business risk, and good corporate governance on the firm value. They should also evaluate determinants of firm value separately between state-owned and non-state-owned construction companies dueto their differing characteristics. Furthermore, future studies should include the state-owned companies not listed as engaged in infrastructure development. They should use financial ratios to benchmark the construction companies' capital structure.

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Causes of Defaults in Argentina and Likelihood of Another

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ABSTRACT

For more than 100 years, Argentina has attracted the attention of the global community for the specific evolution of its internal economic and political processes and the international context of its economic development. The prosperity of the Argentine economy depends on internal and external factors. The chronic government budget deficit and the low domestic savings rate led to indebtedness in the international financial markets. The government budget deficit and indebtedness in international markets result in inflation and devaluation of the Argentine peso. Externally, economic growth and economic stability are influenced by the demand in world agricultural markets for Argentine products and the willingness of foreign investors to buy Argentine bonds. When export earnings fall, Argentina's ability to repay its foreign liabilities decreases, which generally leads to further defaults. Paper analyzes the factors that will potentially lead the Argentine economy into another default. Paper models the probability of default in the Argentine economy using the multivariate analysis. The 9 factors selected to model the probability of default show the impact and extent of the event. Based on the results obtained, it can be concluded that the model built based on statistical selection of factors shows similar results in terms of predicting non-default cases, and worse in terms of predicting default cases, compared to the model built based on the phased inclusion of variables. The ability to better identify non-defaults than to identify cases of defaults, in general, is a characteristic of this class of models, in part this fact can be explained by the fact that the models were built based on a sample in which the number of non-default cases is greater than the number of default variants.

INTRODUCTION

Argentina represents a special phenomenon in the world economy. The country benefits from advantages based on rich natural resources, a well-developed export-oriented agriculture, a skilled workforce and diversified industrial production.

From the late 19th century onwards, the country's rapid economic growth began, thanks to the favorable internal economic conditions and external factors, two technical inventions that modernized and accelerated maritime transport, and an increase in the demand for agricultural products in world markets. As the 'breadbasket of the world', Argentina became one of the world's largest exporters of agricultural products and has remained so ever since. At the turn of the 19th and 20th centuries, Argentina was the twelfth richest country in the world, with a GDP per capita of USD 2 756 (Nationmaster, 2021). After the world economic crisis of the 1930s, it began to decline and ceded its place in world trade to competitors. Today its GDP per capita is USD 20 820 in purchasing power parity and USD 14 508 in nominal terms, ranking it 66th in the world (Worldometer, 2021). Throughout the 20th century, Argentina suffered recurrent economic crises, chronic government deficits, high inflation and an inability to pay its foreign financial obligations (*The Economist*, 2020). During the two hundred years of independence, Argentina has declared nine defaults. Argentina's economic and social policies remain unbalanced and may lead to further defaults. In this paper, we analyze the factors that will potentially lead the Argentine economy into another default.

1 LITERATURE REVIEW

As a special phenomenon in the world economy, Argentina's economic development has attracted the attention of theorists who have sought to define the problems in the country's economic development and, at the same time, to propose measures to change the often critical economic situation. In the scientific economic literature, we encounter many fundamental articles on the subject. Let us mention at least some of the works published in the world's renowned scientific journals. Our attention was drawn to an analytical article by Lewis published under the title "Explaining decline: a review of recent debates in the economic and social history literature on Argentina" (Lewis, 1998). The author focused on an assessment of published quantitative and qualitative data on the development of the Argentine economy, the analysis of which was intended to explain the failure to complete the relatively smooth transition from rapid economic growth and institutional change in the late 19th century to a developed economy and economic policy in the second half of the 20th century. The article analyzes three distinct phases in Argentine growth over the last hundred years: strong, sustained growth from about the 1870s to the end of the 19th century; a period of rapid cyclical change but a negative overall trend from 1910 to 1940; and another strong upswing from the 1940s to the 1970s. For almost fifty years, Argentina experienced no notable long-term positive results in economic growth. In terms of an assessment of political economy, the author considers institutional failure as the inability to resolve distributional conflicts between accumulation and consumption and between different sectors of the economy.

Another interesting paper by R. Spruk (2019) "The rise and fall of Argentina" examines again the institutional failures in ensuring the long-term positive development of Argentina's economy. He draws attention to the uniqueness of the situation in the world economy, where a rich country - Argentina - is gradually slipping into the group of economically middle-developed countries. The author draws on an extensive Argentine historical bibliography to identify institutional failures and traces them over the period 1850-2012. The paper concludes that with effective economic management and the necessary structural changes, Argentina would have largely avoided decline and could have been among the rich countries with a per capita income like that of New Zealand. R. Scharff (20039 in his article "Argentina: from hyperinflation to deflation and foreign economic insolvency" also reflects on the achievements of the historical development of Argentina's economy up to the issue of its insolvency. He examines Argentina's economic growth and compares it historically with the situation in the USA, Australia, Canada, and OECD member states during the 20th century. He analyzes the impact of interest rates and their effect on economic growth, explains the role of the currency board in stabilizing the Argentine economy and its subsequent default. In his paper, he searches for the cause of the long-term decline of the Argentine economy.

Our attention was drawn to the article by I. Brambilla et al. (2018) "Argentine trade policies in the XX century: 60 years of solitude". Like other authors, they pay attention to the peculiarities of Argentina's economic development. At the turn of the 19th and 20th centuries, the Argentine economy was on the road to prosperity, which, however, was never achieved in the absence of a change in the economic structure. International trade and trade policy are identified in the article as the culprit of the economic problems. The authors point to the fact that in the past Argentine governments have favored industrial development over agriculture, in which Argentina has a major comparative advantage. The economic policies of successive governments have not led to the expected economic growth and restructuring of the economy.

In his article "Currency Board in Argentina", L. Křupka (2021) analyses the effectiveness of the introduction of the currency board in the 1990s in the Argentine economy. In the 1990s, President C. Menem deployed the currency board policy to reduce inflation. Inflation declined in absolute terms, but Křupka points out that the currency board policy lacked other components of a stabilizing macroeconomic policy and lacked institutional factors therefore the system was not fully and long term functional. A deep crisis followed, which ended with the declaration of bankruptcy in the early 2000s.

According to J. Jonas (2002), in fact, the path of least resistance has been external borrowing rather than constraining, politically difficult, compromises. American economist P. Samuelson said in 2005: "*If I had been asked in 1945 which part of the world had the greatest prospects, I would have said Latin America - Argentina and Chile. They have a mild climate and a population of European origin. I was absolutely wrong*" (Glaeser et al., 2018).

M. Mussa (2002), in his work "Argentina and the Fund: From Triumph to Tragedy (Policy Analyses in International Economics)" examines the evolution of Argentina's economy at the turn of the century. He reviews Argentina's initially successful, decade-long experiment with monetary and market-oriented economic reform, which led to the stabilization of the Argentine economy. However, Moussa reflects on the catastrophic crisis of late 2001 and early 2002. He points out that the IMF consistently supported Argentina's stabilization and reform efforts in the 1990s. The author points to many of Argentina's economic policies that could be implemented in other developing economies. However, he questions where there was a flaw in Argentina's choice of economic policy instruments that did not lead to Argentina's long-term success.

2. METHODOLOGY

The purpose of the practical part of the work is:

- collect the necessary statistical information and form a representative sample to build a model based on data on the economy of Argentina,
- to highlight the most risk-dominant indicators (financial, macroeconomic, and institutional indicators), allowing the best way to divide the country's economy in terms of the default / non-default attribute,
- based on the selected indicators, build a set of multifactor models for assessing the probability of default,
- to analyze the quality of the obtained models and provide an economic interpretation.

In practice, there are many approaches to assessing the probability of default. In following two figures we provide an overview and develop a classification of the main models of this type, considering the prerequisites and assumptions underlying each model, the strengths, and weaknesses of each subclass of models.

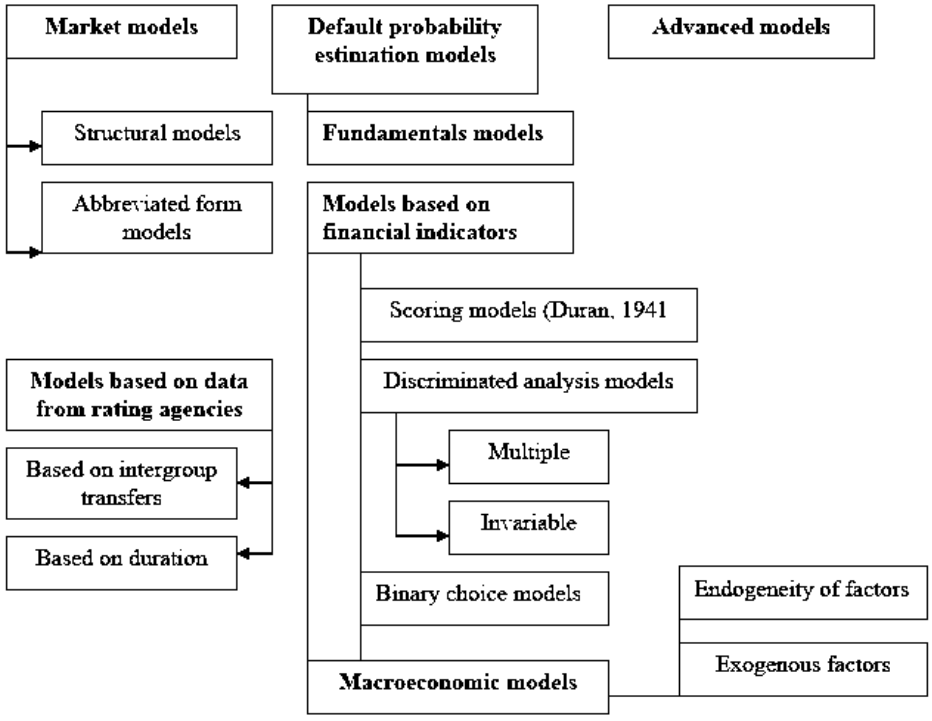

Figure 1. Classification of default probability models
Source: authors

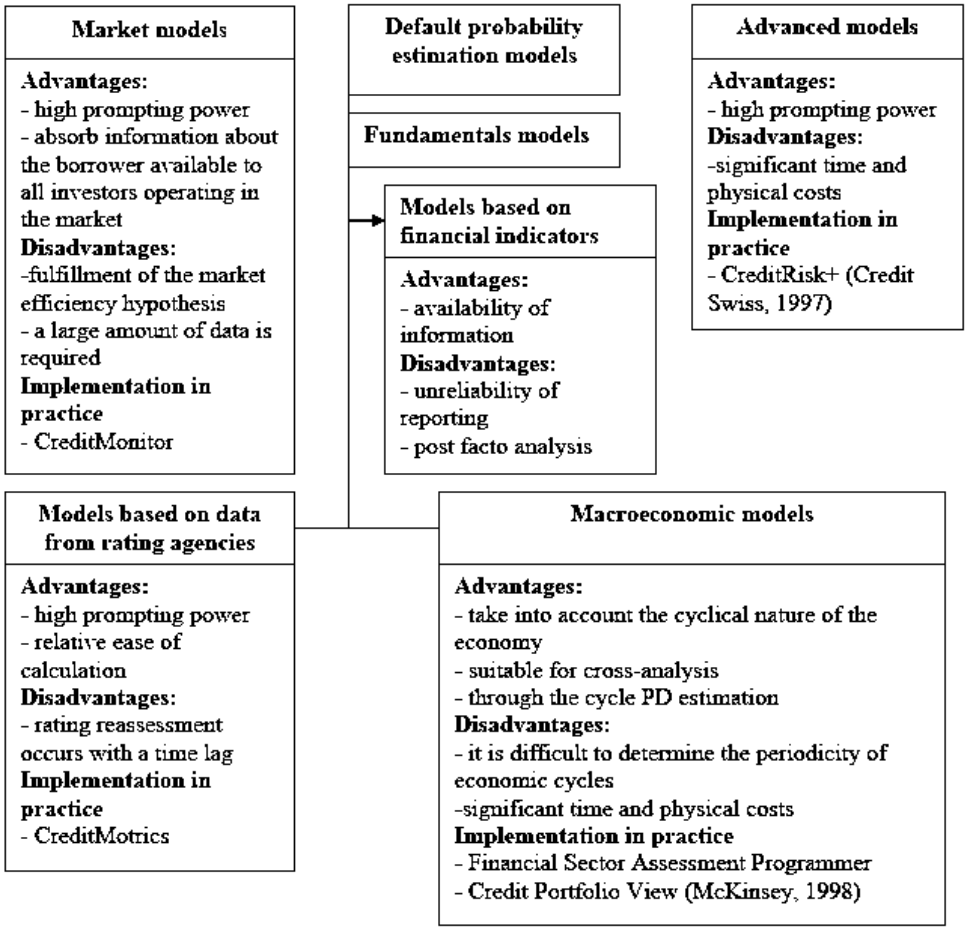

Figure 2. Analysis of default probability models
Source: authors

2.1 Modeling the probability of default in the Argentine economy: multivariate analysis

Within the framework of multivariate modeling of the probability of default, it is proposed to carry out the following main stages:

- Analysis of emissions and data rationing.
- Analysis of the multicollinearity of dependence and pair wise correlations.
- Selection of the most risk-dominant financial indicators using the following methods:
  - Method 1: Conducting statistical tests to isolate the most descriptive variables.
  - Method 2: selection of the optimal combination of factors in terms of model quality based on the phased inclusion of indicators from each class.
  - Method 3: selection of factors based on one-way factors AR (Accuracy Ratio) and ROC-curves.
- Testing the hypothesis about the importance of macroeconomic factors.
- Testing the hypothesis about the importance of institutional factors.
- Checking the functional form of the dependence of the explanatory factors of the model.
- Checking the quality of the final models and a comparative analysis of the results.

In this paper, a multivariate model for assessing the probability of default is built based on binary choice models.

The functional dependence of the binary model is set by the logit-model, which looks like:

$$P(Y_i = 1) = \frac{1}{1 + e^{-(b_0 + b_1 X_{i1} + b_2 X_{i2} + \cdots + b_n X_{in}}}$$

where:

$Y_i = \{^{1, default}_{0, undefault}$,
X_{ij} = the value of the j-th explanatory variable for the i-borrower,
b_j = regression coefficient of the j-th variable.

Observations of financial, macroeconomic, and institutional indicators were used as a vector of explanatory variables. Calculations were performed using the EViews, MedCalc and Excel programs.

2.2 Emission Analysis and Data Normalization

Several indicators may be characterized by too high / low values for sub-samples relative to the aggregate average of the indicator for the sample, which may be due to a significant number of outliers in the sample. To reduce the effect of outliers for each of the sub-samples, it is proposed to apply Chebyshev's inequality, and assume that an outlier is the value of an indicator that satisfies the following condition:

$(x_i - M_{X_i})\rangle^3 \times \sigma_{x_i}$, for the upper border
$(x_i - M_{X_i})\rangle^{-3} \times \sigma_{x_i}$, for the lower bound of the indicator value
where:

M_{X_i} – the mathematical mean of the i-th explanatory variable
σ_{x_i} – the standard deviation of the i-th explanatory variable.

In this case, the identified outliers are replaced by the upper / lower value of the interval, respectively. For the purposes of standardization and sample smoothing, the entire population of observations was normalized relative to the standard deviation as follows:

$$x_{ij}^{norm} = \frac{x_{ij} - M_{x_j}}{\sigma_{x_j}}$$

where:

x_{ij}^{norm} – normalized value of the j-th explanatory variable of the i-th observation
x_{ij} – value of the j-th explanatory variable of the i-th observation
M_{x_j} – mathematical mean of the j-th explanatory variable
σ_{x_j} – standard deviation of the j-th explanatory variable.

3. RESULTS

3.1 Analysis of multicollinear dependence and pairwise correlations

One of the important stages of multivariate analysis is multicollinearity analysis. It is possible to identify the multicollinearity of variables using the analysis of pair wise correlations, which will help to exclude the possibility of including indicators with strong interdependence in the model. In the framework of this work, the analysis of correlations was carried out using the analysis of Spearman`s correlation coefficients, which were calculated as:

$$\rho = 1 - \frac{6}{n(n-1)(n+1)} \sum_{i=1}^{n} (R_i - S_i)^2$$

Where:

R_i, S_i – the ranks of the corresponding n observations.

Spearman's coefficient takes values from -1 to 1. The coefficient, which takes a value equal to one, indicates that there is a strict direct linear relationship between the indicators, and vice versa, a coefficient equal to -1 indicates the presence of a strict inverse relationship.
In table 1 the initial data of main economic indicators of Argentina in 2001-2020 for modelling the probability of default are systematized by the authors.

Table 1. Initial data of main economic indicators of Argentina in 2001-2020 for modelling the probability of default

Year	*Agricultural products export, mln USD*	*Import of goods, mln USD*	*Export of goods, mln USD*	*Capital Inflow / Outflow, mln USD*	*Total debt mln USD*	*GDP deflator, inflation, %*	*Investments in fixed assets, mln USD*	*TOTAL outstanding bonds, mln USD*
2001	12653,21	20321,13	26610,06	2166,14	144453	-1,10	38098,83	419,28
2002	12758,75	8989,55	25709,37	2148,91	137320	30,56	11688,42	5340,44
2003	15644,77	13850,77	29938,75	1652,01	178821	10,50	19313,49	6461,27
2004	18034,4	22445,25	34575,71	4124,71	191296	18,36	26170,38	4245,83
2005	20001,83	28688,64	40106,39	5265,25	128630	10,32	34483,17	2925,39
2006	22779,6	34153,54	46546,22	5537,35	136725	13,74	42630,51	782,01
2007	30286,57	44707,04	55779,58	6473,16	144729	14,94	56114,68	1640,58
2008	38818,05	57461,77	70018,85	9725,55	145975	23,17	68732,76	2231,43
2009	29509,08	38786,16	55672,12	4017,16	147119	15,38	51883,57	828,14
2010	36546	56792,38	68174,45	11332,72	164331	20,92	70497,81	704,76
2011	46276,93	73960,66	82981,09	10839,93	178963	23,70	91444,07	1517,27
2012	44649,99	67973,97	79982,38	15323,93	197464	22,31	86579,29	11883,35
2013	43446,9	74441,75	75962,98	9821,66	223439	23,95	89922,20	3441,81
2014	39218,99	65735,99	68404,35	5065,34	239325	40,28	84105,64	0,00
2015	35380,33	60202,84	56783,95	11758,99	240665	26,58	92571,21	6344,13
2016	38038,33	55910,81	57879,35	3260,16	275446	41,12	79572,90	2394,70
2017	36354,11	66899,3	58384,19	11516,86	320935	26,01	97588,26	11223,79
2018	34380,78	65440,97	61558,36	11872,86	332192	40,01	75883,50	5199,43
2019	39037,36	49125,03	65114,13	6663,06	323065	50,62	60331,49	22018,27
2020	36130,15	42355,51	54883,82	N/A	335582	39,84	51246,10	2701,73

Source: authors

The results of the analysis of Spearman's correlations for the macroeconomic indicators are presented in table 2. It is necessary to analyze the level of correlation dependence for the selected macro indicators. This analysis must be carried out to test the hypothesis of high interdependence of macro indicators and to exclude multicollinear data.

According to the results obtained, the closest relationship is characteristic of the indicators of Export of goods and Agricultural products export, Nominal GDP and Investments in fixed assets, Bonds and Import of goods, Investments in fixed assets and Bonds, Capital Inflow / Outflow and Import: the correlation of indicators is 97.3%, 97.3%, 97.1%, 88.4%, 80.2% accordingly. The following is a frequent impact of factors such as Agricultural products export and Bonds.

Moreover, these indicators are highly correlated with each other: Agricultural products export and bonds 89.4%. These results indicate the high importance of the indicator of the cost of agricultural products in terms of influencing the value of other macro parameters and general trends in the Argentina economy. Inflation indicators also show a high correlation: total debt have a correlation with GDP (77.7%). The Total Debt and GDP deflator also have a high correlation (77.7%), Capital inflow/outflow and Agricultural products export (74.5%), Capital inflow/outflow and Total Export of goods (76.7%).

Analysis of Spearman`s correlations for Capital/Inflow and GDP deflator (inflation) did not reveal a high correlation dependence for them since the value of the correlation coefficient is less than 30% (22.9%). As a result, to exclude the effect of multicollinearity and high correlation between the indicators under consideration, it is proposed not to use combinations of indicators with a correlation coefficient of more than 70% in the framework of multivariate regression analysis at the next stages of modeling.

Selected factors for the integration of the defaults modeling showed the impact on the resultant position.

Table 2. Spearman correlation matrix for macroeconomic indicators

Indicator	*1. Agricultural products export*	*2. Import of goods,*	*3. Export of goods*	*4. Capital Inflow / Outflow*	*5. Total debt*	*6. GDP deflator, inflation*	*7. Bonds*	*8. Investments in fixed assets*	*9. Nominal GDP*
1. Agricultural products export	1,000	x	x	x	x	x	x	x	x
2. Import of goods	0.945	1,000	x	x	x	x	x	x	x
3. Export of goods	**0.973**	0,935	1,000	x	x	x	x	x	x
4. Capital Inflow / Outflow	0.745	**0,802**	0,767	1,000	x	x	x	x	x
5. Total debt	0.475	0,458	0,312	0,349	1,000	x	x	x	x
6. GDP deflator, inflation	0.551	0,442	0,428	0,229	0,777	1,000	x	x	x
7. Bonds	0.894	**0,971**	0,859	0,769	0,45	0,435	1.000	x	x
8. Investments in fixed assets	0.864	0,928	0,791	0,712	0,625	0,401	**0,884**	1,000	x
9. Nominal GDP	0,709	0,935	0,8	0,703	0,612	0,402	**0,112**	0,973	1.000

Source: authors.

3.2 Testing the hypothesis about the significance of macroeconomic indicators

For choosing the final model, considering macro factors, for each possible combination of financial indicators selected at the previous stage (based on testing for descriptive strength, stepwise selection and ROC analysis), one of the selected macro factors was alternately included, and the influence of this macro-factor on the value of the coefficient of determination of the model. This analysis also considered the results of the multicollinearity analysis of financial and macroeconomic indicators carried out earlier. Mathematical apparatus and purpose of binary logistic regression – a popular tool for solving regression and classification problems. ROC analysis is closely related to binary logistic regression and is used to assess the quality of models: it allows an analyst to select a model with the best predictive power, analyze the sensitivity and specificity of models, and select a cut-off threshold. Logistic regression is a useful classical tool for solving the problem of regression and classification. ROC analysis is an apparatus for analyzing the quality of models. When constructing multivariate models, it was also assumed that no more than 8-10 different indicators were simultaneously included at the same time, guided by the principle that to build a model for each explanatory indicator, there must be at least 30 default observations.

Model options based on a multivariate binary choice model considering macro factors within the first, second approaches to the selection of indicators are presented in table 3. Table shows the values of the regression coefficients and the coefficients of determination of the corresponding models. As a result, for all approaches to the selection of risk-dominant macroeconomic indicators, the best results (the highest coefficient of determination and the significance of the selected indicators at the 5-8% level) were observed when the macroeconomic indicator of the Agricultural products export was included in the model. The analysis of ROC curves and AR coefficients for the macroeconomic indicators under consideration also confirmed the high-risk significance of this indicator for the considered sample; in comparison with other macroeconomic indicators, this indicator has the highest AR value.

Table 3. Results of multivariate analysis, considering macroeconomic factors in the framework of the statistical selection approach for the indicator

No. model	*Selected macroeconomic indicators*									R^2
	1. Agricultural products export	*2. Import of goods*	*3. Export of goods*	*4. Capital Inflow / utflow*	*5. Total debt*	*6. GDP deflator, inflation*	*7. Bonds*	*8. Investments in fixed assets*	*9. Nominal GDP*	
1. Agricultural products export	0.928	x	x	x	x	x	x	x	x	0.862
2. Import of goods	x	0.911	x	x	x	x	x	x	x	0.830
3. Export of goods	x	x	0.902	x	x	x	x	x	x	0.814
4. Capital Inflow / outflow	x	x	x	0.733	x	x	x	x	x	0.538
5. Total debt	x	x	x	x	0.963	x	x	x	x	0.928
6. GDP deflator, inflation	x	x	x	x	x	0.820	x	x	x	0.673
7. Bonds	x	x	x	x	x		0.494	x	x	0.244
7. Investments in fixed assets	x	x	x	x	x	x	X	0.878	x	0.771
8. Nominal GDP	x	x	x	x	x	x	x	x	0.966	0.934

Source: authors.

3.3 Comparative analysis and quality assessment of the final models

Thus, when choosing indicators based on a statistical selection of variables, the following model shows the best results (R^2 = 93%) – Total Debt and Nominal GDP.

$$P(Y_i = 1) = \frac{1}{1 + e^{-(b_0 + b_1 X_{i1} + b_2 X_{i2} + \cdots + b_n X_{in}}}$$

where:

$Y_i = \{^{1, default}_{0, undefault}$

Table 4. Main indicators and its value of the regression coefficient

Indicator	*Value of regression coefficient*
1. Agricultural products export	0.8284-0.8622
2. Import of goods	0.7016-0.8299
3. Export of goods	0.7192-0.814
4. Capital inflow / outflow	0.4184-0.5383
5. Total debt	0.7912-0.9277
6. GDP deflator, inflation	0.5178-0.6727
7. BONDS	0.1586-0.2439
8. Investment in fixed assets	0.6037-0.7714
9. Nominal GDP	0.8151-0.9337

Source: authors.

Next, we move on to checking the quality of the models using a classification table (following two tables), in which the observed indicators of belonging to one or another of the two considered samples (default and non-default) are compared with the predicted outcomes based on the resulting model.

Table 5. Classification table: selection of indicators based on statistical selection of variables

Classification table		*Based on model*	
		Not default	*Default*
Really	Not default	84% (TN)	54% (FP)
	Default	16% (FN)	46% (TP)

Source: authors.

Table 6. Classification table: selection of indicators based on the phased inclusion of factors

Classification table		Based on model	
		Not default	Default
Really	Not default	84% (TN)	53% (FP)
	Default	16% (FN)	47% (TP)

Source: authors.

Note:

The first:

TN – true negative (correctly classified case of default),
TP – true positive (correctly classified case of non-default),
FP - false positive (falsely classified case of not default),
FN - false negative (falsely classified default case).

The second:

All indicators are significant at the 5-8% significance level. See Table 3. All indicators normalized according to $x_{ij}^{norm} = (x_{ij} - M(x_j))/\sigma(x_j)$.

Based on the results obtained, it can be concluded that the model built based on statistical selection of factors shows similar results in terms of predicting non-default cases, and worse in terms of predicting default cases, compared to the model built based on the phased inclusion of variables.

The ability to better identify non-defaults than to identify cases of defaults, in general, is a characteristic of this class of models, in part this fact can be explained by the fact that the models were built based on a sample in which the number of non-default cases is greater than the number of default variants (based on the ratio of 3 to 1).

3.4 Predictive validity of main macroeconomic indicators of Argentina in 2001-2020

Following tables presents the dynamics analysis of macroeconomic indicators of Argentina in 2001-2020.

Table 7. Dynamics of main economic indicators of Argentina in 2001-2020

Year	*Export mln USD*	*Changes of export*		*Default, mld USD*	*Agri export total, mln USD*	*Debt, mlnl USD*	*External debt, mln USD*
		In absolute terms, mln USD	*In relative terms, rate of increase/decrease, %*				
2001	26610,06	-900,68	...	x	12653,21	144453	84564
2002	25709,37	4229,38	-3,38	90	12758,75	137320	87604
2003	29938,75	4636,95	16,45	x	15644,77	178821	102008
2004	34575,71	5530,68	15,49	x	18034,40	191296	111628
2005	40106,39	6439,84	16,00	x	20001,83	128630	60926
2006	46546,22	9233,36	16,06	x	22779,60	136725	56247
2007	55779,58	14239,27	19,84	x	30286,57	144729	62132
2008	70018,85	-14346,73	25,53	x	38818,05	145975	55733
2009	55672,12	12502,33	-20,49	x	29509,08	147119	55007
2010	68174,45	14806,64	22,46	x	36546,00	164331	61145
2011	82981,09	-2998,71	21,72	x	46276,93	178963	60585
2012	79982,38	-4019,40	-3,61	x	44649,99	197464	60171
2013	75962,98	-7558,63	-5,03	x	43446,90	223439	60758
2014	68404,35	-11620,39	-9,95	1,3	39218,99	239325	67303
2015	56783,95	1095,39	-16,99	x	35380,33	240665	74085
2016	57879,35	504,85	1,93	x	38038,33	275446	91815
2017	58384,19	3174,16	0,87	x	36354,11	320935	129848
2018	61558,36	3555,77	5,44	x	34380,78	332192	161461
2019	65114,13	-10230,31	5,78	323	39037,36	323065	...
2020	54883,82	-54883,82	-15,71	x	36130,15	335582	...

Source: authors

Table 8. Dynamics of main economic indicators Agri Export and GDP of Argentina in 2001-2020

Year	*Agri export total, mln USD*	*Changes of agri export*		*GDP, mln USD*	*Changes of GDP*	
		in absolute terms, mln USD	*in relative terms, rate of increase (decrease), %*		*in absolute terms, mln USD*	*in relative terms, rate of increase (decrease), %*
2001	12653,21	…	…	289860,61	…	…
2002	12758,75	105,54	0,83	258281,79	-31578,82	-10,89
2003	15644,77	2886,02	22,62	281106,26	22824,47	8,84
2004	18034,4	2389,63	15,27	306488,95	25382,69	9,03
2005	20001,83	1967,43	10,91	333618,31	27129,36	8,85
2006	22779,6	2777,77	13,89	360465,08	26846,77	8,05
2007	30286,57	7506,97	32,95	392934,52	32469,44	9,01
2008	38818,05	8531,48	28,17	408876,79	15942,27	4,06
2009	29509,08	-9308,97	-23,98	384677,31	-24199,48	-5,92
2010	36546	7036,92	23,85	423627,42	38950,11	10,13
2011	46276,93	9730,93	26,63	449061,81	25434,39	6,00
2012	44649,99	-1626,94	-3,52	444452,55	-4609,26	-1,03
2013	43446,9	-1203,09	-2,69	455143,07	10690,52	2,41
2014	39218,99	-4227,91	-9,73	443707,07	-11436,00	-2,51
2015	35380,33	-3838,66	-9,79	455825,42	12118,35	2,73
2016	38038,33	2658,00	7,51	446342,76	-9482,66	-2,08
2017	36354,11	-1684,22	-4,43	458922,94	12580,18	2,82
2018	34380,78	-1973,33	-5,43	447149,96	-11772,98	-2,57
2019	39037,36	4656,58	13,54	437813,40	-9336,56	-2,09
2020	36130,15	-2907,21	-7,45	394446,95	-43366,45	-9,91

Source: authors

Stochastic relationships are investigated using correlation-regression analysis. In socio-economic forecasting, this method is used to construct contingent forecasts and forecasts based on the assessment of stable cause and effect relationships. The correlation-regression model of the relationship is a regression equation. Linear regression is a function that binds the mean values of X (independent variable) and Y (dependent variable). The coefficient of determination (R^2) shows how many percent of the variation Y is due to variation X (Karpenko and Filyppova, 2016). Following figures present probabilistic forecasts of the main macroeconomic indicators until 2026, provided that the trend of the previous period continues.

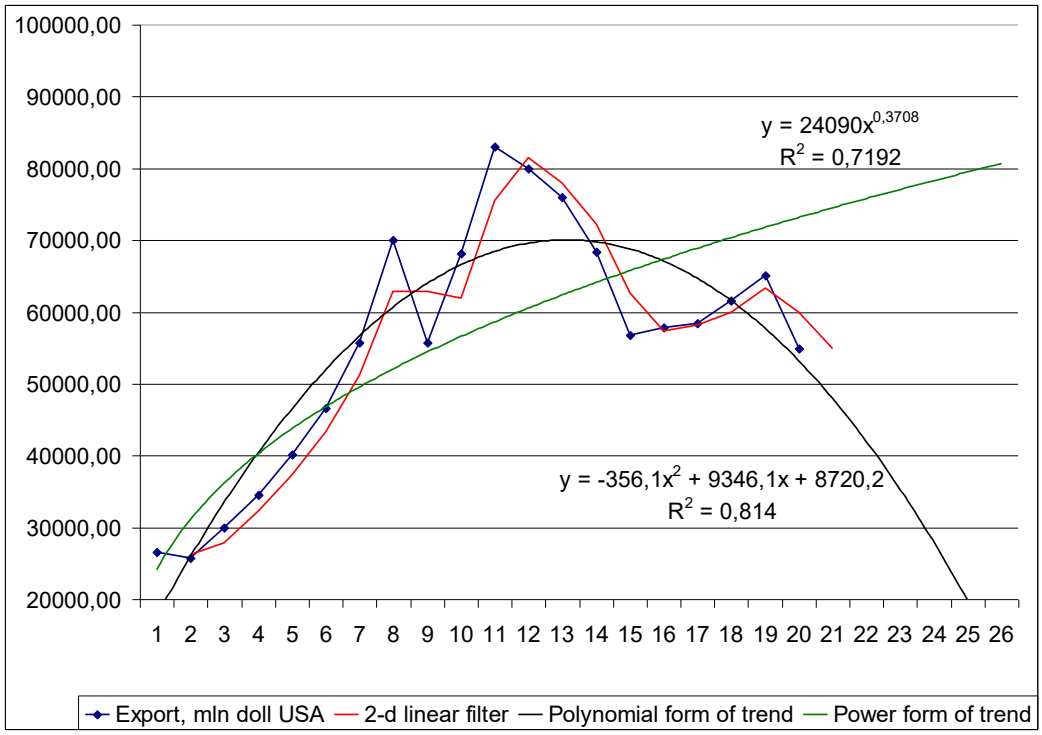

Figure 3. Forecasted estimation of Export Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors.

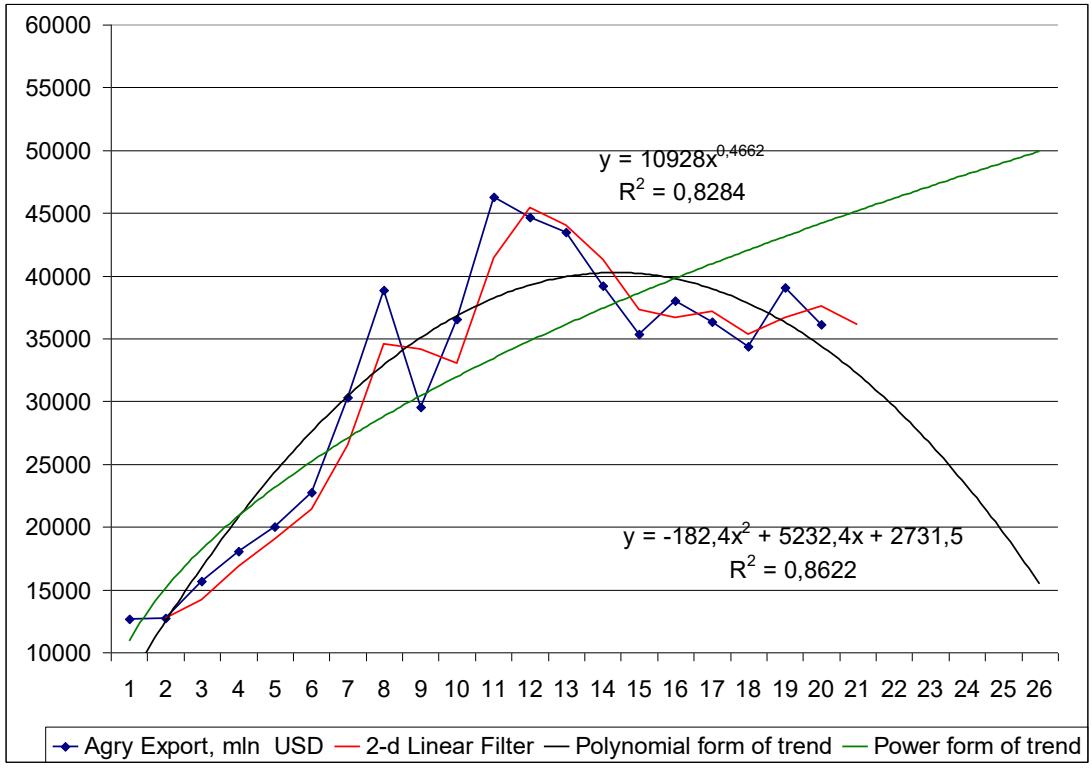

Figure 4. Forecasted estimation of Agry Export Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

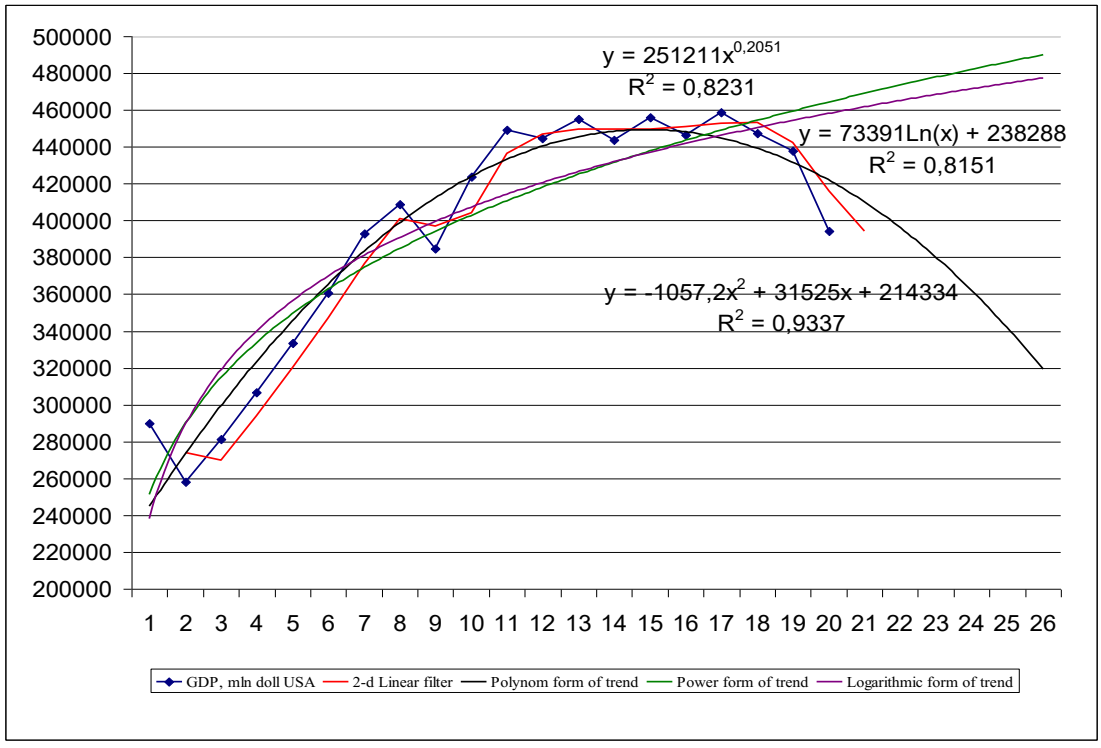

Figure 5. Forecasted estimation of Nominal GDP Argentina by the trend extrapolation method for 2021-2026: predic tive validity

Source: authors

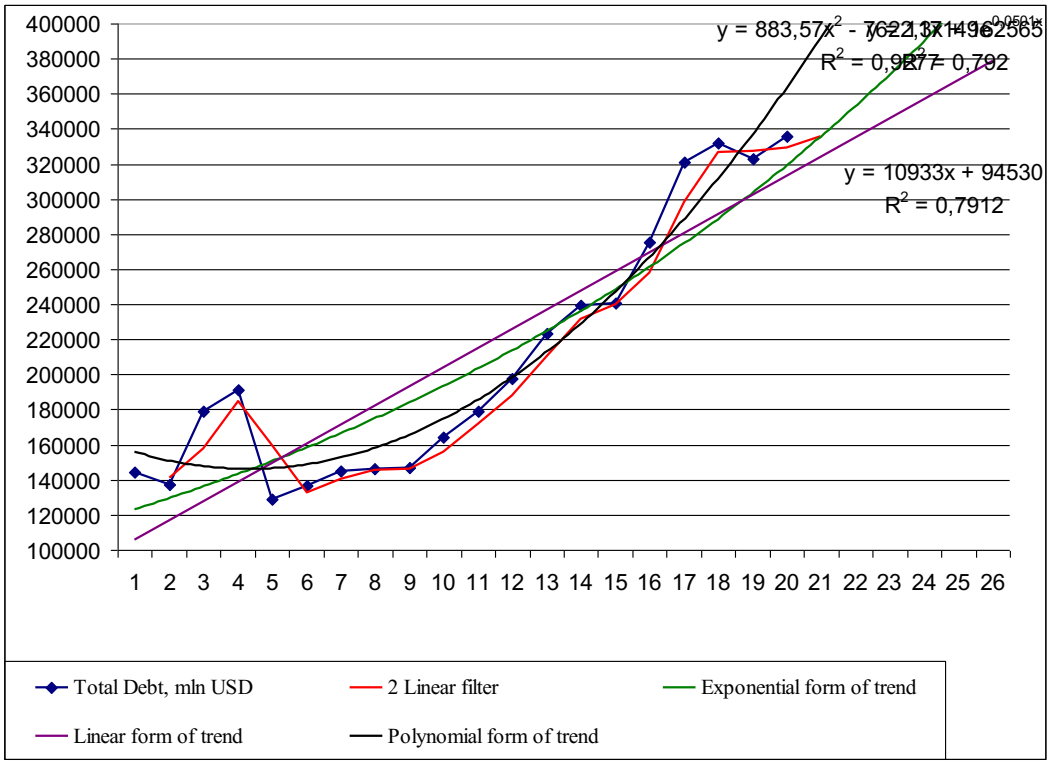

Figure 6. Forecasted estimation of Total Debt Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

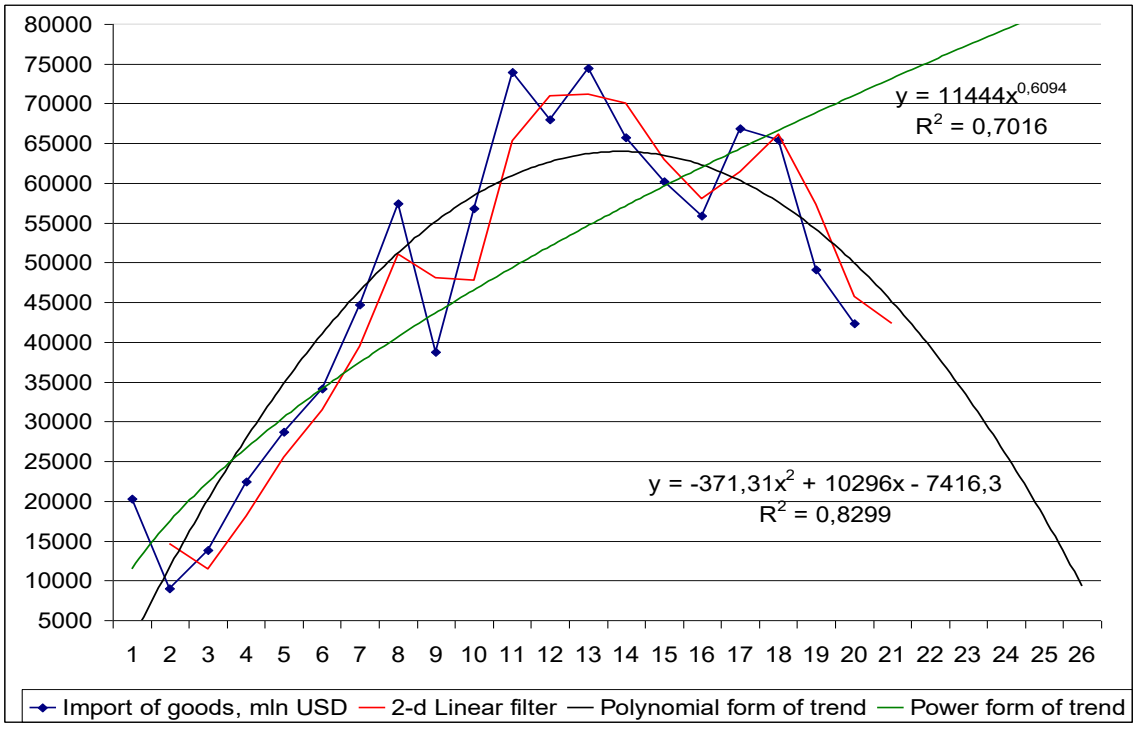

Figure 7. Forecasted estimation of Import Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

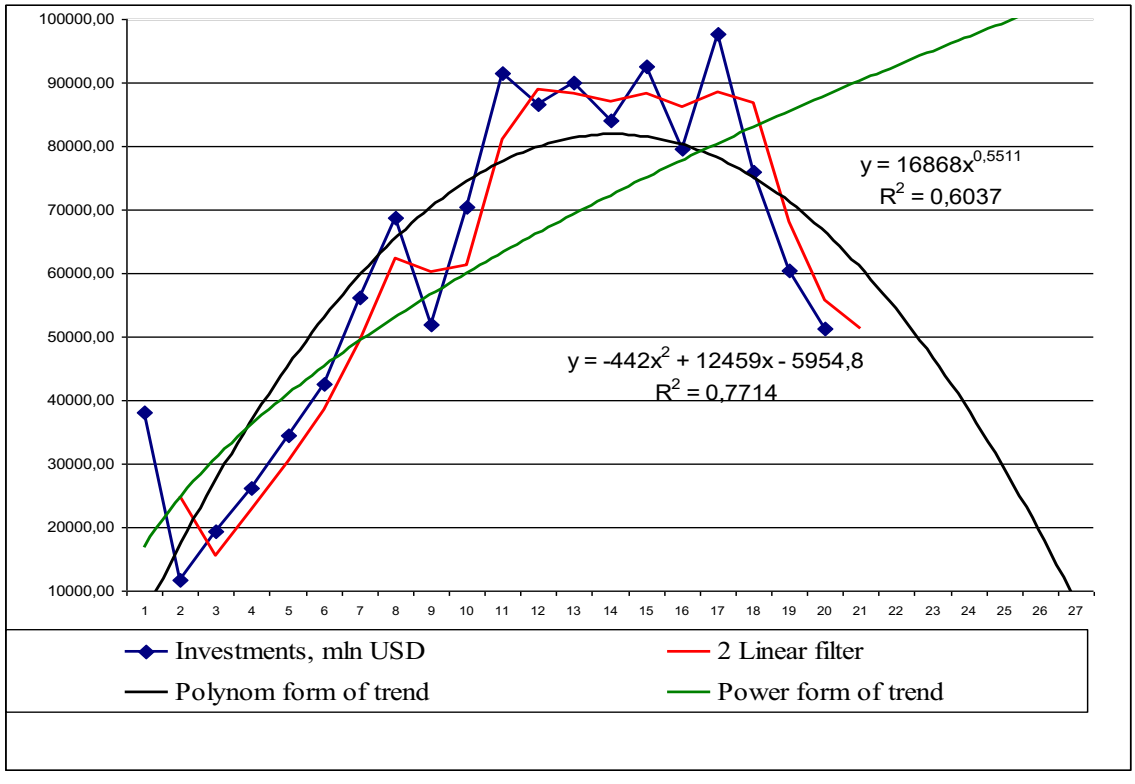

Figure 8. Forecasted estimation of Investments Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

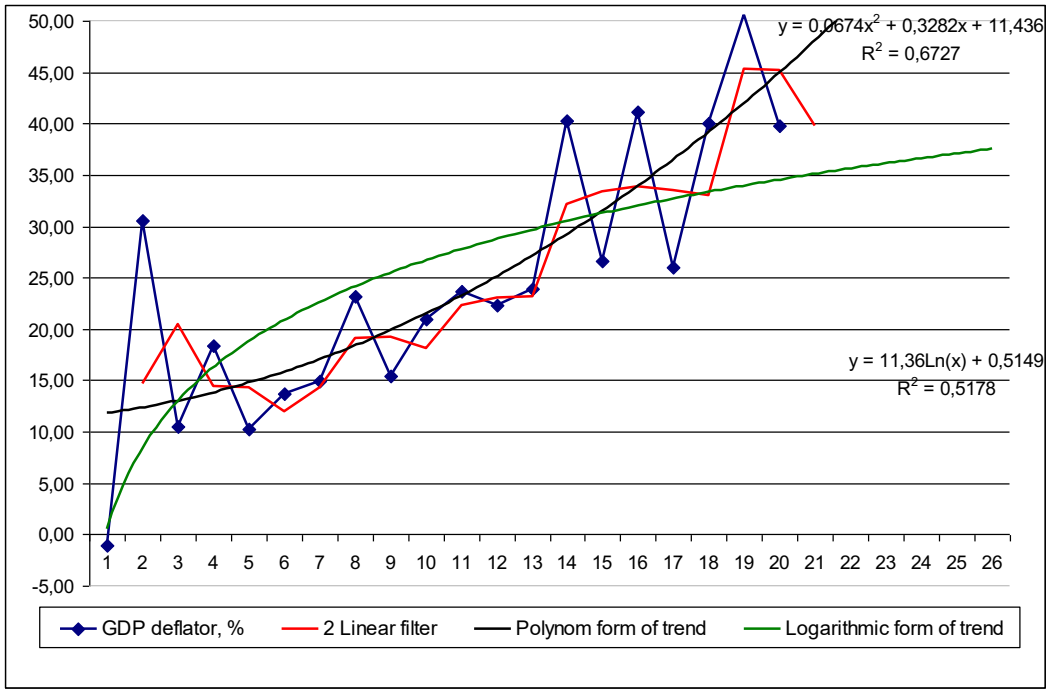

Figure 9. Forecasted estimation of GDP deflator Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

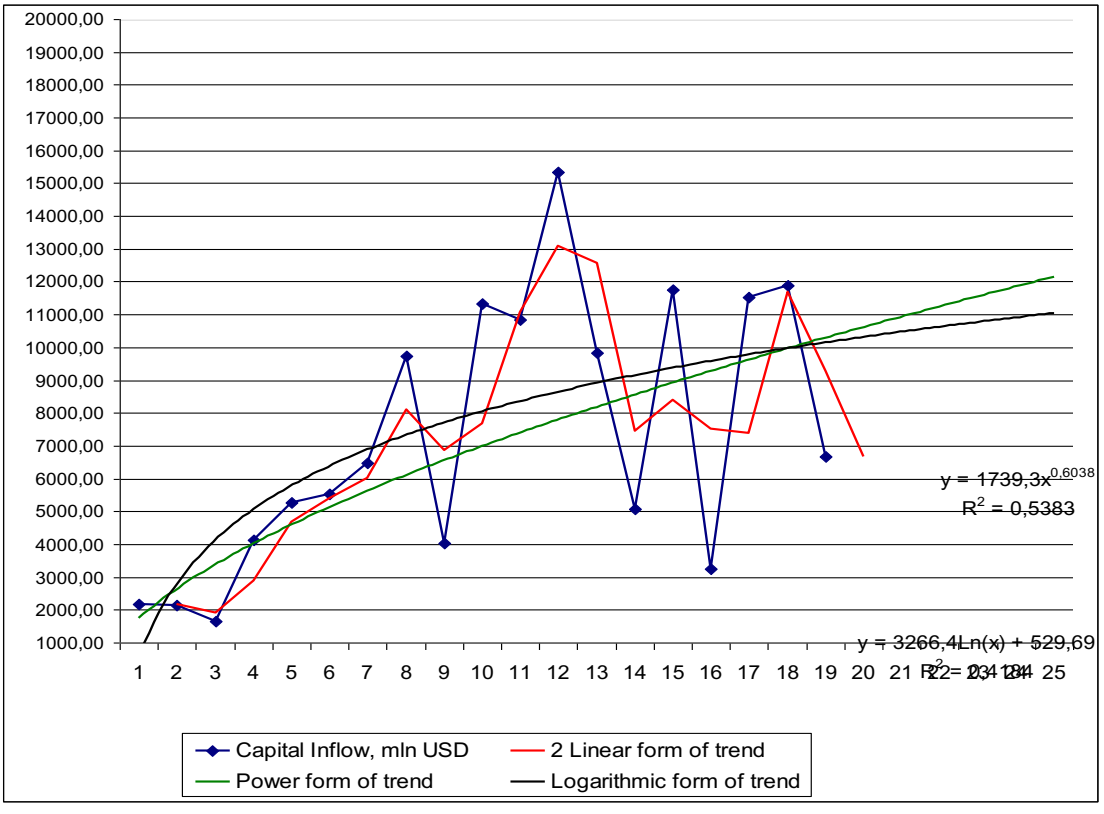

Figure 10. Forecasted estimation of Capital Inflow Argentina by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

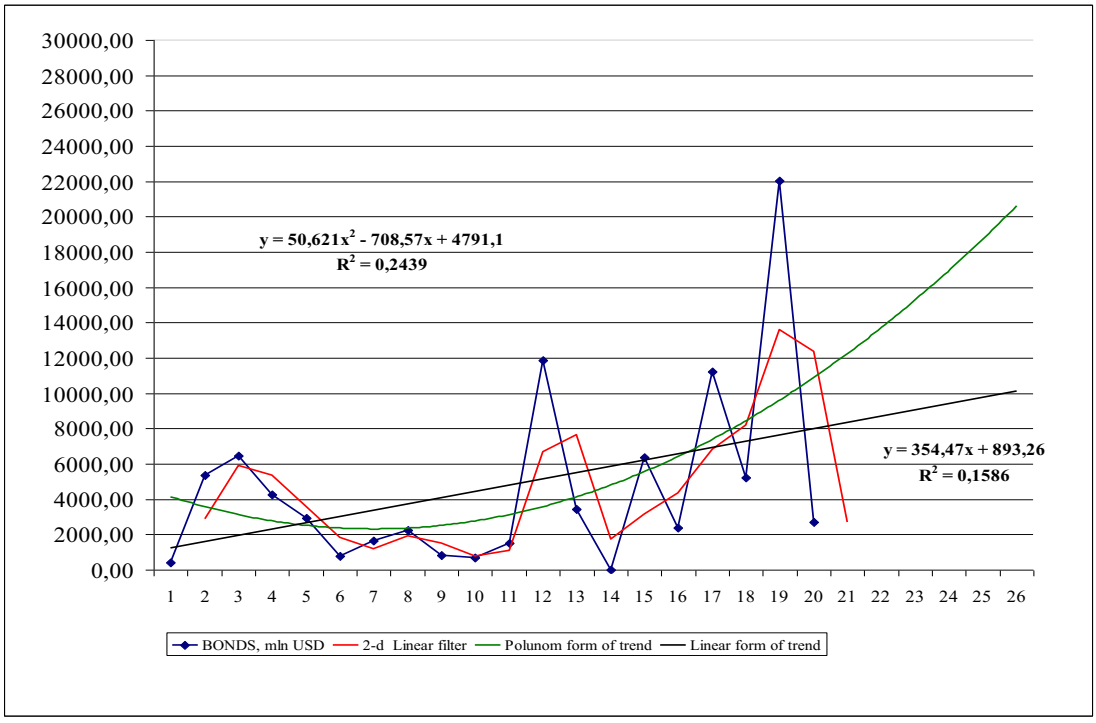

Figure 11. Forecasted estimation of BONDS by the trend extrapolation method for 2021-2026: predictive validity

Source: authors

CONCLUSION

Argentina's historical development since the second third of the 20th century is an example of a long-standing failed economic policy that has led to uneven growth, inflation, exchange rate devaluations and frequent defaults. As recently as the second half of the 20th century, Argentina was still one of the rich countries; this position has been steadily deteriorating. Argentina's economic development since the Great Depression has been described as a lost century. At the turn of the 19th and 20th centuries, Argentina had sufficient resources to modernize and restructure its economy. At the root of Argentina's economic problems are macroeconomic and structural imbalances. In the past, attempts have been made to address the imbalances by implementing stabilization programs. Their successes had only a short-term positive effect. There are several causes that ultimately led the country to default. The economy has been very slow to restructure and has lagged behind the world's economic vanguard. The economies that are modernizing and restructuring are relegating Argentina to the bottom ranks of the world economy. The reluctance of the population to undergo structural changes in the economy is worsening the country's position in world competition, but also the economic and social situation of the entire population.

The 9 factors selected to model the probability of default show the impact and extent of the event. Based on the results obtained, it can be concluded that the model built based on statistical selection of factors shows similar results in terms of predicting non-default cases, and worse in terms of predicting default cases, compared to the model built based on the phased inclusion of variables. The ability to better identify non-defaults than to identify cases of defaults, in general, is a characteristic of this class of models, in part this fact can be explained by the fact that the models were built based on a sample in which the number of non-default cases is greater than the number of default variants.

The final part of the paper was the forecasting of several dynamics by the method of trend extrapolation by the main macroeconomic indicators that were used in modeling the probability of default, in particular: total exports, agricultural exports, nominal Gross Domestic Product, Total Debt, import, investment, GDP deflator, Capital inflow, Bonds. Since the prehistory period is 20 years, it seems possible to give a

forecast estimate for 1/3 of the initial series of dynamics, that is, for 6 years ahead (from 2021 to 2026), provided that the previous trend continues. The predictive validity of the studied indicators is justified. Despite Argentina's frequent economic crises and recessions, the country remains one of the most developed and highly educated among Latin American countries.

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Understanding Inequality Throughout Production and Financial Activities

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ABSTRACT

The relationships between inequality and economic activities with a financial system as a financing source is analyzed. An endogenous growth model with human, physical, and financial capitals, diminishing returns, constant scale effects, and heterogeneous agents is outlined. Heterogeneity comes from capital endowments in agents, allowing to introduce a financial system into the economy. Macroeconomic equilibrium, distributional dynamics, and long-run shocks due to the interaction between economic growth, inequality, and financial system are characterized. An empirical study is conducted to test the theoretical findings using LS Panel Data techniques with fixed and random effects estimations. The econometric model is fed with information drawn from the Penn World Table for 81 countries during 1970 – 2019. Main results are: a) in the absence of a financial system, poor households will allocate less time to leisure if they want to consume more, increase human capital or both; b) physical and human capital ratio of the economy relies only in one sector when there is none financial system. Consequently, economic growth rate is lower since only one sector performs production activities; c) increases in output lead to increases in inequality; d) inequality decreases when human capital goes up; e) physical capital generates small and positive changes in inequality; f) financial capital causes positive impacts on inequality; g) inequality decreases if total factor productivity increases; h) empirical evidence verifies theoretical findings.

INTRODUCTION

Income inequality has been a very important issue within economic theory, particularly the relationship with economic growth. Kuznets (1955) performed one of the first papers addressing this topic; he argued that the economic growth rate and income inequality connection could be described as an inverted-U shape. Nevertheless, several other studies have found different types based on the theoretical economy setting. One thing is certain; the relation between economic growth and inequality is dynamic. There is a significant positive relationship between financial inclusion and economic growth (Raza, Tang, Rubab, Wen, 2019). In that sense, the Ramsey (1928) model has become a standard framework for analyzing

macro dynamics and growth theory, in where all agents are treated as identical because there are the same endowments and preferences across agents.

Nonetheless, inequality and economic growth studies must feature heterogeneity in agents as Piketty and Saez (2014), Krusell and Smith (2015), Carroll and Young (2018) papers claim. The Ramsey model can incorporate heterogeneity if preferences remain homothetic as Chatterjee (1994), and Krusell and Smith (1998) stand. From the empirical point of view, the connection between inequality and growth has been studied by Alesina and Rodrik (1994), Persson and Tabellini (1994), and Perotti (1996) with findings that prove a negative link. On the other hand, Sorger (2000), Ehrlich and Kim (2007), and Turnovsky (2015) found a positive relationship.

What these studies have in common is the notion of inequality been generated within companies exclusively, but the objective of the present research is to analyze the relationships between inequality and economic activities along with a financial system as a financing source. The reason is that the financial system could be another source of inequality. The existing financial system structure is, for various reasons, a determinant for growing inequality (de Vries, 2019). The way the financial system is introduced into the economy is as simplest as possible, all financial instrument types, services or investments nowadays exist are not considered in the analysis, since this research wants to highlight that by the very essence of the financial system as a reallocator of resources, could be more than enough to affect inequality. Based on this idea, one can perfectly expect that the more developed a financial system could be, the greater the impact on inequality is. Introducing the financial system modifies macroeconomic dynamics and especially the distributional kind, and more specifically the shares of earned output, which are the input to define inequality. More even, it is empirically tested the distance between the shares as an inequality measurement. The last two ideas represent the difference between the way inequality is usually analyzed and this research.

To be more precise, most studies use Gini coefficient as inequality measurement since incorporates income distribution across households. This coefficient has two versions: the gross and the net one, the latter measures income after taxes. The gross Gini coefficient allows analyzing inequality by not considering the distributional effects of taxes and government spending, and according to Hann and Sturm (2017) it is the better proxy variable for inequality. At the same time, Gini coefficient captures income inequality across percentiles, across regions, etc. In consequence, a decomposition technique could be applied when analyzing inequality through Gini coefficient, particularly when households are classified by income; which represents a disaggregated approach, see Azam and Bhatt (2018), Gradin (2018) and Mansouri et al. (2018).

This research differs from those two perspectives. First, it is proposed that the distance between the shares of output is another possibility for measuring inequality as well, and simultaneously it keeps the property of avoiding distributional effects due to transfers and taxes. This reason relays on the fact that shares of output are defined when investment and production decisions generate output, which occurs before paying taxes. Second, the measure proposed is the result of shares of output that reflect the domestic market conditions for an entire economy, therefore allows an aggregated analysis. Now, the dynamics of investment, production, human capital and financial system are affecting both shares of output and, therefore inequality.

In this sense, the present research deals with the relationship between financial development and income inequality according to Hann and Sturm (2017), since it is assumed that an increase in the volume of financial activity is affecting economic growth and, therefore, income inequality. For instance, miss information, high transaction costs and credit constraints that could be generated by the financial development, may inhibit economic activities in poor sectors and so capital accumulation, this idea is the opposite to what Beck et al. (2007) stand for. In consequence, financial services are only improving quality of life in rich sectors, which is consistent with Greenwood and Jovanovic (1990) ideas.

Empirically speaking, studies have shown that there are always two sides of the history. On one side, Beck et al., (2007), Kunieda et al., (2014) and Naceur and Zhang (2016) prove a positive relationship between the financial development and income inequality. On the other side, Denk and Cournede (2015), Jaumotte et al., (2013), Li, and Yu (2014), show a negative relationship, in which the present research inserts itself.

To analyze the link between income inequality and the financial development throughout economic growth, an endogenous growth model with human, physical and financial capitals, diminishing returns, constant scale effects and heterogenic agents is outlined. Heterogeneity comes from capital endowments in agents, which also allows introducing the financial system into the economy. First, an economy without financial system is examined and then the financial system is introduced. Macroeconomic equilibrium, distributional dynamics and long-run shocks due to the interaction between economic growth, inequality and financial system are characterized. At the same time, an empirical study is conducted in order to test the theoretical findings by using LS Panel Data techniques with fixed and random effects estimations; these techniques have advantages for estimating relations between finance, real economic variables and inequality. Several studies have analyzed inequality determinants by using panel data techniques, see Bahmani-Oskooee and Zhang (2015), Hann and Sturm (2017), Beck et al, (2007), Bumann and Lensink (2016). The econometric model is fed with information drawn from the Penn World Table for 81 countries during the time interval 1970 – 2019.

Main results are:

- in the absence of a financial system, poor households will allocate less time to leisure if they want to consume more or increase human capital or both;
- physical and human capital ratio of the economy relies only upon one sector when there is none financial system. Consequently, the economic growth rate is lower since only one sector performs production activities;
- increases in output lead to increases in inequality;
- inequality decreases when human capital goes up;
- physical capital generates small and positive changes in inequality;
- financial capital causes positive impacts on inequality;
- inequality decreases if total multifactorial productivity increases;
- empirical evidence verify theoretical findings.

1. MODELLING INEQUALITY

Consider a closed economy where there is no uncertainty, physical and human capital are accumulated, with heterogeneous households and total population normalized, so $N = 1$, which remains constant over time. Since the economy is closed, production is intended either to invest or to consume according to equation (1); for simplicity in notation sub-index *t* is not considered:

$$y = k + c. \tag{1}$$

Where y, k and c measure production, physical capital and consumption respectively. Taxation is not considered in this economy since the objective is to analyze inequality dynamics before having modifications because of taxes and transfers. Which allows keeping the same property when Gini coefficient is taken into account at empirical studies.

1.1 Heterogeneous households

Heterogeneity on households comes from different physical capital endowments; there are two types of households: rich (R) and poor (P), so the total population is $N = n_R + n_P$. Rich households possess enough physical capital for the production process and a share of capital as a surplus (ϕk), the latter being as a result of economic activities in previous periods, or it was inherited, etc. Poor households do not possess enough capital to produce, thus capital satisfies:

$$K = k^R + k^P, \quad K_0 > 0 \tag{2}$$

$$k^R = k + \phi k, \quad 0 < \phi < 1 \tag{3}$$

$$k^P < k. \tag{4}$$

Households seek to maximize their utility based on the consumption of a perishable commodity and on leisure l, at any time t, in the presence of decreasing marginal yields on both. Utility can be measure by:

$$\mathcal{U}^i = \int_0^\infty [\ln c + \theta \ln l]\, e^{-\rho t} dt, \tag{5}$$

for $i = R, P$, with ρ as the subjective discount rate and θ the share of utility due to leisure. If poor households want to increase their economic activities, they need to allocate less time to leisure in order to consume more or to produce.

1.2 Industry

The industry is to produce a perishable commodity. Production is performed by using physical capital, k, and human capital, $h = 1 - l$ in the presence of constant returns to scale in both factors. All firms face identical competitive production conditions while satisfying the following given technology:

$$y = \alpha k^\beta h^{1-\beta}, \tag{6}$$

where α is the total factor marginal productivity and β a technological parameter. From a macroeconomic point of view, the consumer sector owns all production means.

1.3 Human capital dynamics

All households have the same initial allocation of human capital, $H_0 > 0$. Accumulation of human capital follows the dynamic:

$$\dot{h} = \gamma h. \tag{7}$$

In this equation γ symbolizes the growth rate of human capital. The higher the amount of physical capital is allocated, the higher γ will be. The stock of human capital in the economy, therefore, is $H = h^R + h^P$. Not investing in production activities is the opportunity cost of increasing human capital.

1.4 Financial system

Rich households can allocate their capital surplus to loans or spend it on education to increase human capital. These options create a financial system in this economy so idle resources are reassigned, thus allowing households to ask for credit so production process or human capital accumulation can be performed. Let δ be the cost of credit and an additional income to rich households. Assume credits are the only financial instrument households can access to, therefore:

$$\phi k = k(1 + \delta - \gamma). \tag{8}$$

Equation (8) shows possible allocations for capital surplus since it is assumed there are no savings in the economy, hence entire physical capital must be engaged in economic activities. Poor households lack enough capital to produce, but they can use the capital they possess to increase human capital this means they can decide not to ask for credits. Another option is getting additional capital within the credit market to produce or to increase human capital or both:

$$k^P + k = -\delta k - \gamma k. \tag{9}$$

The previous equation indicates that there is always a cost for poor households if they want to accumulate any type of capital. By setting a closed economy, the cost avoids from suffering high volatility

episodes produced within international financial systems, since the main objective is to isolate the effects from the domestic financial system on inequality.

1.5 Investment decisions

Investment, I, can be considered as the allocation of resources to increase either human capital or physical capital by households, so:

$$I = k + h. \tag{10}$$

Returns of investment are marginal productivity of physical capital and salary according to the following market-clearing conditions:

$$\frac{\partial y^i}{\partial k^i} = \alpha\beta k^{\beta-1} h^{1-\beta} = r, \tag{11}$$

$$\frac{\partial y^i}{\partial h^i} = \alpha(1-\beta) k^{\beta} h^{-\beta} = w. \tag{12}$$

When combining equations (11)-(12) and clearing for w, the equilibrium salary is obtained, which is $hw\beta = r(1-\beta)k$. The latter express that salary is directly tied to human capital: the more human capital an individual possesses, the higher the salary is. Therefore, total salaries in the economy can be defined as:

$$\sum W^i = h^i w^i. \tag{13}$$

Consequently, the cost of accumulating human capital defined in equations (8) and (9) will be compensated by salaries of future periods.

1.6 Macroeconomic equilibrium

In this economy, physical capital accumulation relies on production, salary, credit market and consumption conditions. Because heterogeneity of households there are two capital accumulation dynamics:

$$\dot{k}^R = \alpha k^{\beta} h^{1-\beta} + W^R + k(1+\delta-\gamma) - c^R, \tag{14}$$

$$\dot{k}^P = \begin{cases} \alpha k^{\beta} h^{1-\beta} + W^P - k(1+\delta+\gamma) - c^P, & k^P = k \\ W^P - kh - c^P. & k^P < k_t \end{cases} \tag{15}$$

Equation (15) shows poor households to be able to take productions decisions if they access to credit market, in addition to work and increase human capital; or the contrary when no credit is available. This allows the model to analyze income inequality. Households' objective is to maximize (1) subject to (14)-(15). Hence, macroeconomic equilibrium depends on both types of households as follows:

Scenario A: Macroeconomic equilibrium with credit market

$$\lim_{t\to\infty} \lambda k e^{-\rho t} = 0, \tag{16}$$

$$\frac{c^i}{l^i} = \theta\left[\alpha k^{\beta}(1-\beta)(1-l)^{-\beta} + w^i\right], \tag{17}$$

$$\frac{k^i}{h^i} = \frac{\beta w^i}{(1-\beta)r}, \tag{18}$$

$$\alpha - \delta - \gamma = \rho - \frac{\dot{\lambda}}{\lambda}, \tag{19}$$

$$\psi^R = \alpha + 1 + \delta - h - \rho, \tag{20}$$

$$\psi^P = \alpha - 1 - \delta - h - \rho, \tag{21}$$

$$\Psi = \frac{\psi^R + \psi^P}{2} = \alpha - h - \rho, \tag{22}$$

where equation (17) is the intertemporal marginal substitution rate of households if all of them produce, (18) shows the physical and human capital ratio, while (19) stands for the Keynes-Ramsey consumption rule, equations (20) – (22) are the economic growth rates of both sectors and the total economy.

Scenario B: Macroeconomic equilibrium without credit market

$$\lim_{t\to\infty} \lambda k e^{-\rho t} = 0, \tag{23}$$

$$\frac{c^R}{l^R} = \theta\left[\alpha k^{\beta}(1-\beta)(1-l)^{-\beta} + w^R\right], \tag{24}$$

$$\frac{c^P}{l^P} = \theta w^P, \tag{25}$$

$$\frac{k^R}{h^R} = \frac{\beta w^R}{(1-\beta)r}, \tag{26}$$

$$\alpha - \frac{\delta - \gamma}{2} = \rho - \frac{\dot{\lambda}}{\lambda} \tag{27}$$

$$\psi^R = \alpha - h - \rho, \tag{28}$$

$$\psi^P = -h - \rho, \tag{29}$$

$$\Psi = \frac{\psi^R + \psi^P}{2} = \frac{\alpha}{2} - h - \rho. \tag{30}$$

In the absence of a financial system, poor households will allocate less time to leisure if they want to consume more or increase human capital or both, as equation (25) shows. In fact, their intertemporal marginal substitution rate depends only on salary; while the corresponding to rich households on total income: benefits plus salary as equation (25) displays. The physical and human capital ratio of the economy relies only upon one sector. The economic growth rate in this case is lower since only one sector performs production activities.

1.7 Distributional dynamics

In order to analyze the dynamics of this economy is necessary to subtract the stationary growth path, under scenarios A and B, for output, physical capital and human capital. When combining (1), (6), (19) and (22) as well as (1), (6) (27) and (30) we get the following conditions for scenarios A and B respectively:

$$\frac{\dot{y}}{y} = \frac{\dot{k}}{k} = \frac{\dot{c}}{c} = \phi, \tag{31}$$

$$\phi = \frac{y}{k} - \frac{c}{k} + \alpha - h - \rho, \tag{32}$$

$$\phi = \frac{y}{k} - \frac{c}{k} + \frac{\alpha}{2} - h - \rho. \tag{33}$$

Therefore, at the steady-state the gap between output-capital and consumption-capital ratios in both scenarios is:

$$\frac{y}{k}-\frac{c}{k}=h+\rho-\alpha, \tag{32}$$

$$\frac{y}{k}-\frac{c}{k}=h+\rho-\frac{\alpha}{2}. \tag{33}$$

To complete the steady-state is necessary to withdraw the long-run net return to private capital that equals the rate of time preference, so by combining (11) with (19) and (11) with (27) respectively, while considering (7), we get:

$$\frac{1}{\beta}\left(\frac{k}{h}\right)^{1-\beta}=\rho+\delta+\gamma, \tag{34}$$

$$\frac{1}{\beta}\left(\frac{k}{h}\right)^{1-\beta}=\rho+\frac{\delta+\gamma}{2}. \tag{35}$$

In this economy, income is define as:

$$y^{i}=rk+w(1-l). \tag{36}$$

Consequently, by combining (7), (32) and (33) into (36), income dynamics under both scenarios A and B respectively is:

$$\frac{\dot{y}}{y}=r(h+\rho-\alpha)+w\gamma, \tag{37}$$

$$\frac{\dot{y}}{y}=r\left(h+\rho-\frac{\alpha}{2}\right)+w\gamma. \tag{38}$$

Finally, following Turnovsky (2002), the share of output earned by physical capital, ε^{k}, and the share of output earned by human capital, ε^{h}, are:

$$\varepsilon^{k}=\frac{F_{k}K}{Y}=\frac{\beta}{k}\left(\frac{yh^{\beta-1}}{\alpha}\right)^{\frac{1}{\beta}}, \tag{39}$$

$$\varepsilon^{h}=\frac{F_{h}H}{Y}=\frac{1-\beta}{h}\left(\frac{yk^{-\beta}}{\alpha}\right)^{\frac{1}{1-\beta}}. \tag{40}$$

According to income dynamics, it can grow mainly due to an increase in the time preference and the rate of growth of human capital; see equations (37) and (38). Due to the constant returns to scale, is easy to understand that an increase in one share of output will be compensated by a decrease in the other share. Furthermore, to set the equality on shares leads to a no gap that generates inequality within the model. This idea will be tested in section 3, because of two main conditions: shares of output are never equal across countries according to data and inequality is created despite constant returns to scale.

1.8 Long-run shocks

To demonstrate the long-run dynamics in this economy shocks on the intertemporal marginal substitution rate of households, physical and human capital ratio, the growth rate of output, returns of investment and the share of output earned by both physical and human capital are defined. First, long-run adjustments in the intertemporal marginal substitution rate of households are:

$$\frac{\partial\, {}^{c}/_{l}}{\partial \beta} = \beta\theta\alpha k^{\beta-1} - \theta\alpha k^{\beta} + \beta\theta\alpha k^{\beta}, \tag{41}$$

$$\frac{\partial\, {}^{c}/_{l}}{\partial \alpha} = \theta k^{\beta}(1-\beta)(1-l)^{\beta}, \tag{42}$$

$$\frac{\partial\, {}^{c^P}/_{l^P}}{\partial w} = \theta. \tag{43}$$

The rate of substitution between consumption and leisure for households could increase if there is a positive adjustment on the total factor marginal productivity, technological innovation and salary. Therefore, individuals are more likely to consume more under these conditions and to do so they need to devote less time to leisure. Consequently, either they find a job or increase their human capital. Regarding physical-human capital ratio shocks are:

$$\frac{\partial\, {}^{k}/_{h}}{\partial \beta} = \frac{w-r}{[(1-\beta)r]^2}, \tag{44}$$

$$\frac{\partial\, {}^{k}/_{h}}{\partial w} = \frac{\beta}{(1-\beta)r}, \tag{45}$$

$$\frac{\partial\, {}^{k}/_{h}}{\partial r} = \frac{w\beta}{(\beta-1)r^2}. \tag{46}$$

The physical-human capital ratio would increase if the returns of investment or innovation also increase, thus leading to leaps in the total factor productivity and the growth rate of human capital. When considering shocks on the growth rate of output, results show that there is a positive effect on it due to increases in returns of investment or in the growth rate of human capital, as equations (47)-(50) show.

$$\frac{\partial\, {}^{\dot{y}}/_{y}}{\partial r} = h + \rho - \alpha, \tag{47}$$

$$\frac{\partial\, {}^{\dot{y}}/_{y}}{\partial w} = \gamma, \tag{48}$$

$$\frac{\partial\, {}^{\dot{y}}/_{y}}{\partial\, {}^{\dot{h}}/_{h}} = w, \tag{49}$$

$$\frac{\partial\, {}^{\dot{y}^P}/_{y^P}}{\partial r} = h + \rho - \frac{\alpha}{2}. \tag{50}$$

If output increases, consumption will also increase. Therefore, households allocate less time to leisure and if they want to consume more, work will rise. Shocks on the returns of investment due to adjustments in total factor productivity are also positive.

$$\frac{\partial r}{\partial \alpha} = \beta k^{\beta-1} h^{1-\beta}, \tag{51}$$

$$\frac{\partial w}{\partial \alpha} = (1-\beta)k^{\beta} h^{-\beta}. \tag{52}$$

Subsequently, market-clearing conditions in the long-run remain. Finally, shocks on the share of output earned by both types of capital are as follow:

$$\frac{\partial \varepsilon^k}{\partial y} = \frac{y^{1-\beta/\beta} h^{\beta-1/\beta}}{k\alpha^{1/\beta}}, \tag{53}$$

$$\frac{\partial \varepsilon^h}{\partial y} = \frac{y^{\beta/1-\beta} k^{\beta/\beta-1}}{h\alpha^{1/1-\beta}}. \tag{54}$$

Equations (53) and (54) show that when output is rising the share earned by companies and educated workers also increases. The more human capital exists within the economy the highest the share will be earned by it. Along with all the shocks that were analyzed in this section, results proved that inequality could be reduced if households increase their level of human capital.

2. EMPIRICAL EVIDENCE

To analyze if the theoretical model described above is consistent with reality, a panel data was estimated by using information from the Penn World Table, see Feenstra et al (2015), for 81 countries, during the time interval 1970 – 2019. The objective is to test impacts on Inequality (INEQ) due to Real Gross Domestic Output (RGDO), Human Capital (HC), Stock of Capital (K), Capital Services (KS) and Total Factor Productivity (TFP). Variables Employment (EMP), Total Population (POP), Interest Rate (IR), Real National Consumption (RNC) and National Income (NI) control all the estimations, and they were selected as possible enhancers on the causal relation between main indicators and inequality. The following table resume all variables:

Table 1. Variable description

Name	*Description*	*Units*
RGDO	Output-side real GDP, using prices for final goods exports and imports that are constant across countries and over time.	Constant 2017 national prices in US$
HC	Human capital per worker based on the average years of schooling, linearly interpolated and an assumed rate of return for primary, secondary, and tertiary education.	Index
K	Capital stock at constant national prices, based on investment and prices of structures and equipment	At current PPPs in 2017 US$
KS	Capital stock using prices for structures and equipment that are constant across countries	Capital services levels at current PPPs (USA=1)
TFP	TFP level, computed with RGDO, CK, labor input data, and LABSH.	At current PPPs (USA=1)
EMP	Persons engaged in economic activities	Number in millions
POP	Total population	Number in millions
IR	Real internal rate of return	Percentage
RNC	Real household and government consumption at constant national prices	Constant 2017 national prices in US$
NI	Real Gross Domestic Product using prices for goods and services that are constant across countries and over time	Constant 2017 national prices in US$

LABSH	The share of labor income of employees and self-employed workers in GDP	Compensation in GDP at current national prices
KSH	The share of capital income of owners in GDP	Compensation in GDP at current national prices

Source: Own elaboration based on Penn World Table

The Penn World Table (Groningen Growth and Development Centre, 2023) is a consolidated dataset that provides with the same variables being measure exactly the same way for every country. In consequence, heterogeneity across countries comes from their own domestic market conditions and not because different measurements in data. It also offers variability among periods and economic units, which is very suitable for LS techniques on a panel data, since estimating random and fixed effects on the relationships between variables, permits the understanding of macro dynamics at a country and/or time specific level. On the other hand, this technique allows to control unobserved time-series and cross-country data. In particular, creates a feasible analysis on inequality due to the nature of the proposed variable and the way is measure by the Penn World Table. All this conditions represents advantages for estimating relations between finance, real economic variables and inequality, according to Beck et al, (2007) and Hann and Sturm (2017).

Regarding the dataset, it is important to highlight that Real Gross Domestic Output is a variable that measures the amount of goods and services being produced within time intervals and economic units, therefore sets not only the value but also the gap between shares of output. Even when RGDO considers exports and imports, as if the economy was open, what matters is the effect on inequality measure by the gap and not by external sector dynamics. For running the empirical test, the econometric equation is:

$$\mathrm{INEQ}_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + \mu_{it}, \tag{55}$$

where X_{it} stands for the main variables set, Z_{it} the control variables set and μ_{it} the error term. It is proposed Inequality variable be created by using equations (39) and (40) as follows:

$$\mathrm{INEQ} = \varepsilon^k - \varepsilon^h, \tag{56}$$

which measures the distance between the capital and labor shares of output. When the distance is positive capital share is greater than labor share and is negative if vice versa. A positive distance means capital appropriates greater amounts of output than labor, in other words earnings a bigger for owners of production means than for workers. Estimations were performed with fixed and random effects on both cross-section and time analysis as well, and were based on the equation:

$$\mathrm{INEQ}_{it} = \beta_0 + \beta_i + \beta_t + \beta_1 X_{it} + \beta_2 Z_{it} + \mu_{it}, \tag{57}$$

where β_i measures the country fixed/random effects and β_t the time fixed/random effects. Results are presented regarding significant estimations only. The use of fixed/random effects incorporates robust estimations for dynamic panels, which also controls for potential endogeneity, reverse causality, or omission of pertinent variables. It is common to introduce a lagged variable of inequality since previous values could affect the current one. This is particularly true when inequality is measured by income across households, because they can get better or worse in terms of income in a relative easy way. Nevertheless, companies do not change easily from a high level in the capital share of output to a lower one. Theoretical speaking, equations (39) and (40) show that shares tend to be constant over time; statistical speaking the same property can be seeing across time and countries, so lags on inequality are not relevant for this research.

When analyzing individual impacts of main variables, see Table 2, it is found that increases in output, lead to increases in inequality as Estimation I shows, since for every additional dollar in output there is a bigger inequality. Regarding human capital, estimation II shows that an increase in 1% on human capital index generates a decrease in inequality in about -54310.98 units. This result is consistent with the theoretical model, when more human capital exists in the production activities, the higher the marginal productivity is, then salary increases (Firpo, 2018). When salary goes up, the labor share of the product also goes up leading to a decrease in inequality (Panico, 2018). Estimation III displays that on extra dollar invested leads to an increase in 0.01 units on inequality; this result is also consistent since the more physical capital

is available, the greater the product will be; and as previous results stands for, more output leads to higher inequality. Therefore, it is clear evidence that idle resources exist in fact across countries along time. If physical capital is not being used at full capacity, then there is no way to generate positive impacts on production and so on inequality.

On the same estimation, an increase in 1% on capital services (also known as financial capital) causes a direct impact on inequality due to a rise in 912572.4 units; which means that investing in nonproductive sectors makes inequality grow. This result is consistent with the theoretical model as well. Another variable that decreases inequality besides human capital, is total multifactorial productivity for every additional 1% in that index creates a fall in 70989.43 units on inequality; see Estimation IV. Productivity leaps, often associated with increases in human capital, are well known to decrease inequality across specialized literature. Estimation V, verifies that all control variables have a significant effect on inequality by themselves; which replicates across all previous estimations. Estimation VI shows the same previous individual effects in a joint estimation; one additional dollar in RGDO increases inequality in 0.042 units, a 1% growth on human capital leads to a fall in inequality of 48349.93 units. Every new dollar created by the financial services increases inequality in 883687.6 units; the bigger increase so far. An important result is relying on the positive effect of interest rates on inequality in every single estimation.

Table 2. Panel estimations of main variables versus inequality

INEQ	I	II	III	IV	V	VI
RGDO	0.1077 (0.009)***					0.0424 (0.0154)***
HC		-54310.98 (2864.71)***				-48349.93 (2958.36)***
K			0.01 (0.001)***			0.009 (0.002)***
KS			912572.4 (46281.22)***			883687.6 (45514.7)***
TFP				-70989.43 (7957.07)***		-25252.55 (7951.13)***
EMP	-5522.821 (194.69)***	-4161.04 (130.89)***	-4217.17 (143.75)***	-3923.36 (134.94)***	-3906.525 (135.85)***	-4751.33 (202.32)***
POP	2510.273 (83.94)***	2085.48 (64.26)***	2006.22 (68.42)***	1952.1 (66.09)***	1907.54 (66.32)***	2279.73 (83.48)***
IR	461798.3 (21583.79)*** *	388636.2 (21467.9)***	464106.5 (21462.9)***	385471.2 (25276.3)***	474144.8 (21898.9)***	336998.4 (23380.7)***
RNC	-0.3717 (0.011)***	-0.2505 (0.001)***	-0.2382 (0.006)***	-0.2432 (0.001)***	-0.2402 (0.001)***	-0.2711 (0.013)***
LABSH	-83918.13 (6392.22)***	-303536.9 (12885)***	-78512.7 (6298.4)***	-169510.0 (10764.08)***	-89455.55 (6475.01)***	-293201.5 (13177.9)***
R^2	0.8735	0.8803	0.8835	0.8725	0.8696	0.8937
Obs	4050	4050	4014	4014	4050	4014

Source: Own elaboration. *** significance <0.01; ** significance <0.05; *significance <0.10

n.s. = not significant.

It is important to highlight that control variable Employment impacts on inequality with an inverse relation while total population with a positive one, both across all estimations, proving that proposed Inequality measure is consistent. When fixed/random effects are incorporated into the analyses, results regarding human capital, capital services, output, national income, employment, and total population remain, as Table 3 displays. For instance, an increase in one dollar on output generates a rise in inequality, when fixed or random effects are applied to cross sections and period. An increase in 1% in human capital index creates a decrease in inequality among all fixed and random effects specifications. Physical capital and capital services creates an increase in inequality, in particular, an additional dollar created by the financial system, increases inequality in every effect specification but fixed effects on cross-sections.

Table 3. Fixed/Random Effects on full panel estimations

INEQ	*Cross-section Fixed Effects*	*Period Fixed Effects*	*Cross-section Random Effects*	*Period Random Effects*
RGDO	0.093 (0.01)***	0.036 (0.014)***	0.0869 (0.011)***	0.0431 (0.014)***
HC	-54392.55 (4270.99)***	-16882.21 (3635.4)***	-57117.64 (3890.50)***	-24480 (3059)***
K	0.005 (0.001)***	0.007 (0.001)***	n.s.	0.008 (0.001)***
KS	1130712. (100909)***	783306.8 (45644.45)***	705779.1 (59152.15)***	835178.1 (43458.2)***
TFP	-29997.59 (8526.74)***	n.s.	-32428.46 (8146.55)***	n.s.
EMP	-5328.59 (194.05)***	-4343.40 (195.72)***	-5205.82 (187.50)***	-4504.13 (193.27)***
POP	3939.39 (99.58)***	2064.44 (80.84)***	3142.85 (89.30)***	2128.50 (79.94)***
IR	138998.3 (28523.3)***	n.s.	154633.3 (27804)***	n.s.
RNC	-0.359 (0.015)***	-0.255 (0.012)***	-0.3168 (0.011)***	-0.26 (0.01)***
LABSH	-316963.8 (0.015)***	-546163.8 (19284.36)***	-469243.1 (27554.44)***	-563469.3 (18396.5)***
R^2	0.9619	0.9046	0.7687	0.9035
Haussman			0.0000	0.0000
Obs	4014	4014	4014	4014

Source: Own elaboration. *** significance <0.01; ** significance <0.05; *significance <0.10
n.s. = not significant.

As summary, when analyzing the cross-section fixed effects, human capital, consumption, and income have a strong positive relationship with the income inequality while total factor productivity and employment a strong negative relationship. Regarding the period fixed effects, human capital, employment, and consumption have a strong negative impact on inequality, meanwhile financial capital and interest rates a strong positive effect. Therefore, financial development increases income inequality.

3. DISCUSSION

The endogenous growth model with human, physical and financial capitals, diminishing returns, constant scale effects and heterogeneous agents that has been defined allows analyzing the dynamics between income inequality, economic growth and a financial system. First, the setting of an economy without a financial system shows that if idle resources are not reallocated, then economic activities are carried out only by one sector, thus generating lower economic growth rates. Since there is a portion of the economy not participating in economic activities, inequality is rising as a natural result. However, when a financial system appears, and credit cost is accessible for the borrower sector, the economic activities increase. Under a standard analysis, growth will tend to increase inequality if, and only if, the share of output earned by labor and capital remains constant. This research shows that both shares are affected also by the financial system, so inequality depends on the credit cost as well. In both scenarios, marginal productivity influences in a positive way on economic growth at the same time that human capital has a negative effect on growth. The latter effect is present in the short-run since in order to increase human capital investment is require in education, therefore fewer resources are allocated to consumption and investment.

Regardless of human capital and economic growth interactions, macroeconomic equilibrium is better with financial system than without it. Balanced growth is in place and the economy in steady-state, and growth will be positive if $\alpha > h + \rho$. All sectors, households divided in lenders and borrowers, companies and credit markets evolve at the same rhythm and consequently the entire economy. Bank loans have an important role in financing a country's economy. The availability of loans enables households companies to consume better and make investments that cannot be done with their own funds (Ratnawati, 2020). In the long-run the steady state guarantees the net return to private capital to be equal to the rate of time preference. Return to private capital relies on the cost for credit and the human capital growth rate. Income dynamics is defined by human capital, marginal productivity, salary and the subjective discount rate, and will grow as long as $\alpha > h + \rho$ and also fulfills $r(h + \rho - \alpha) + w\gamma$.

Long-run dynamics analyzed through shocks on the intertemporal marginal substitution rate of households, physical and human capital ratio, the growth rate of output, returns of investment and on the share of output earned by both physical and human capital, show that the rate of substitution between consumption and leisure for households could increase, if there is a positive adjustment on the total factor marginal productivity, technological innovation and salary. On the other hand, that physical-human capital ratio would increase if the returns of investment or innovation also increase, thus leading to leaps in the total factor productivity and the growth rate of human capital.

When considering shocks on the growth rate of output, results indicate that there is a positive effect on it due to increases in returns of investment or in the growth rate of human capital. Shocks on the returns of investment due to adjustments in total factor productivity are also positive. Finally, when output is rising the share earned by companies and educated workers also increase. The more human capital exists within the economy the highest the share will be earned by it, thus reducing inequality.

Empirical evidence proves that inequality increases if output increases but decreases when human capital goes up. In addition, that the stock of physical capital generates small and positive changes in inequality. Capital services cause positive impacts on inequality, which means that investing in nonproductive sectors makes inequality grow. When total factor productivity goes up, then inequality goes down. These results are consistent with Sorger (2000), Ehrlich and Kim (2007), and Turnovsky (2015) findings.

Theoretical and empirical results highlight several features of the economy under the established conditions. First, if human capital and marginal productivity remain constant then inequality will tend to grow as output grows since the earnings share of capital will persist the same. Earnings share of labor will only grow if human capital increases and therefore productivity. Marginal productivity could increase due to other factors, as allocating less time to leisure, but it will be a one-time positive shock and only in the short-run. Second, an increase in human capital generates two types of effects: in the short-run a little decrease in economic activities because idle resources are being allocated as an investment in education, but in the long-run will increase productivity leading to a higher level of economic growth rates. Consequently, the earnings share of labor increases while capital's decreases reducing the gap of inequality.

Third, capital services constitute an obstacle when the financial system is inefficient or is less developed. A less-developed financial system generates credit constraints, higher costs on financing projects and diminishes the speed at which firms can start a new project (Kivanc and Yildirim, 2019). When there is credit constraints or higher costs on financing, inefficiency appears since allocations of resources in time and space are not happening, see Merton and Bodie (1995). If this is the case, economic activities decrease since only productive projects are less founded, until the limit in which only the lender sector carries out the production process. This scenario will also tend to increase inequality. That is how the positive relation between capital services and inequality is explained. The financial system would have the main object to reallocate resources and only that. In this sense, the present research follows the idea that a well-developed financial system facilitates economic activities, provides liquidity, allocates capital to highest-return projects and stimulates specialization (Kivanc and Yildirim, 2019), at the same time that corrects information problems and tends to diminish transaction costs (Levine 1997). Nevertheless, in any case, a financial system generates inequality since affects negatively the shares of output earnings.

Regarding interest rates, results stand for having positive effects on inequality because idle resources could be allocated into the financial system as portfolio investment leading to a decrease of economic activities, and if earnings share on both production factors is constant, then inequality grows. There is one additional feature that could be missed, consumption impacts in a negative way to inequality. At first sight, it may not be evident how this works but imagine that a household wants to increase consumption and if leisure remains the same, then it could only be financed by more salary. In order to earn more salary, labor will have to increase human capital and therefore inequality decreases.

When considering the entire set of macroeconomics dynamics, inequality is produced by high distances between labor and capital shares. The shares are affected by how production processes are financed; usually it is through a credit provided by the financial system. The cost for a credit modifies capital accumulations in economic agents, which are compensated by changes in labor and capital shares, and so far, so on. This negative cycle depends on two main phenomena: first, the way earning shares are initially set in the economy and second the way they are adjusted by the development of the financial system. If the financial system would offer low-cost instruments to economic agents, shares distances will be reduced and therefore inequality. This is the only way financial systems can positively affect inequality. Low-cost instruments are the main characteristic of a well-developed financial system, this type of system is usually found in developed economies, which curiously have higher levels of earning labor share and therefore low levels of earning capital share, hence low inequality.

Policy implications are: first, if reducing inequality is an objective, then regulations to financial systems are needed; questions is what type? Reducing bank fees will be a good beginning for instance, otherwise, high-cost of financial instruments will foster inequality. High interest rates is also a cause for high bank fees and costs of instruments, monetary policy could be considered as an instrument for reducing inequality. Second, human capital theory has usually proved that higher education leads to better salary, which can be paid if the owner of a company diminishes the capital share of output, therefore increasing labor share, thus reducing the gap, that is inequality. A very natural implication will be rising employment, but this research has also found (because human capital effects) that a better salary is more effective for reducing inequality than a simple rise on employment.

FINDINGS

The macro dynamics between inequality, growth and financial system were analyzed by exercising an endogenous growth model with human, physical and financial capitals, diminishing returns, constant scale effects and heterogenic agents. Heterogeneity was introduced into capital endowments in agents, particularly households, hence creating the financial system into the economy at the same time. When the economy does not possess a financial system, macro dynamics are in a lower position than if it does. In each scenario, macroeconomic equilibrium, distributional dynamics and long-run shocks during the interaction between economic growth, inequality and financial system were characterized.

Main theoretical results show that in the absence of a financial system, poor households will allocate less time to leisure if they want to consume more or increase human capital or both; the physical and

human capital ratio of the economy relies only upon one sector when there is none financial system; the economic growth rate is lower when only lender sector is doing production activities (Dhrifi, 2014); increases in output lead to increases in inequality especially because earnings share of production factors remain constant. But when a financial system is introduced, capital accumulations change since production is financed by credit instruments, capital and labor shares of output will adjust depending on the cost of credit instruments. Consequently, income inequality relies on the financial system development as well. This is the main contribution of the research.

Inequality decreases when human capital goes up in the long-run; physical capital generates small and positive changes in inequality; financial capital causes negative impacts as increases inequality and inequality decreases if total multifactorial productivity increases. Empirical evidence verifies theoretical findings. Thru the use of information of the Penn World Table for 81 countries during the time interval 1970 – 2019, LS Panel Data techniques with fixed and random effects estimations were performed.

Based on the interpretation previously made, the economic policy recommendations should be directed towards promoting human capital accumulation, fostering consumption, encouraging salary increases and diminishing financial capital accumulation. The last two recommendation will directly affect the gap between labor and capital share, which naturally will reduce inequality. In this sense, investment in education is needed at the same time as salary rises, which will lead to a higher income so consumption will increase. If rises in income comes from salary, capital accumulation will also increase creating superior economic conditions for the use of financial services. However, to expect financial services to directly decrease income inequality is an outcome that is very unlikely to occur. The main limitations of the research are: a simple outlined for the financial system activities, assuming there is no government, to consider a closed economy, avoiding technological and financial innovation. For sure, the pending agenda would have to consider analyzing these macro dynamics under the conditions already described.

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Critical Policies Affecting Economic Development in Vietnam

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ABSTRACT

Economic development is an activity aimed at the country's economic growth and is always required in association with a rational, progressive, and social economic structure. Economic development is a significant and necessary factor in the current period. Thus, this article aims to identify the key policy factors affecting economic development and proposed policy recommendations in Vietnam. The primary data is collected through focus group discussions and surveys of 550 experts in the economic field to clarify the impact of the policy on economic operations in Vietnam. The article applied the qualitative and quantitative methods using structural equation modeling (SEM) and SPSS 20.0, Amos software. The article finds five factors affecting Vietnam's economic development with a significance level of 0.01, and five hypotheses are accepted. The article's novelty is determining the tax policy factor that most substantially impacts economic development. Finally, the article's value proposes vital policy recommendations for Vietnam's economic development in the following years.

INTRODUCTION

The economic development of a country today is conceived not only as an increase in economic size but also as a connotation of progressive economic structural change and ensuring that people All have equal opportunities to participate in the development process and, therefore, all enjoy the fruits of development following three things: (1) Economic growth is increased wealth (assets) in a given period. This concept of economic growth applies to all sizes: Economy, industry, business or family, and individual. Wealth can be measured in kind or money (value). For a country, the growth rate of gross national product - GNP (or domestic - GDP) per capita, reflects the level of production growth over a given period. For growth, the increase in output must be more significant than the increase in population (Batrancea et al., 2020; Aevoae et al., 2018). (2) There is a fundamental change in the economy's structure. The share of the industry and service sectors in GDP and the total social labor force increases while the percentage of agriculture decreases. At the same time, the urban population increased, and the rural population decreased. The change in economic structure reflects the shift in production methods towards becoming more modern.

Areas with high labor productivity and high added value have higher development rates and gradually replace production-business regions with low labor productivity and added value (Yakubu et al., 2020; Khaliq et al., 2017). (3) People are subjects participating in and enjoying the fruits of development, reflecting the level of fairness, democracy, and quality of life of the population and their participation in the development process. The critical factor of economic development is that the people of that country must be the prominent participants in the process of structural change... Participation in the development process means participating in the enjoyment of it, reaping the benefits of development, and creating those benefits (Hlavacek & Bal-Domańska, 2016).

Economic development is a concept that falls within a broader concept than economic growth. Today, it is said that economic development is an overarching concept of economic growth, growth structure, and social justice; sometimes, in some cases, economic development is also added in terms of institutions involving multiple development policies. The middle research article clarifies the nature of economic development problems, how to evaluate economic development, an in-depth analysis of some significant economic development theories that have been influencing the design of economic development models in countries around the world, and consider some new issues of economic development thinking as well as issues raised with related policies such as land policy, human resource policy, tax policy, digital transformation policy and infrastructure investment policy in Vietnam.

1. LITERATURE EMPIRICAL REVIEW

1.1 Economic development (ED)

Economic development is a progressive change in all aspects of the economy, including changes in quantity and quality in each country. Economic growth and development are two concepts, the most obvious of which is that economic growth reflects a purely quantitative change in the economy (Dogan & Akyuz, 2017; Aevoae et al., 2018). Meanwhile, economic development not only reflects changes in quantity but also in the quality of the economy; it reflects not only the economic progress but also the social change in the development process of each country (Batrancea et al., 2020; Bakari, 2017; Ulasan, 2015). However, they are also closely related: Economic growth is necessary for economic development. The economy's quantitative accumulation is a condition for creating a qualitative leap in the economy and an essential requirement for improving people's lives. High and long-term economic growth is the basis for enhancing the endogenous capacity of the economy, opening up opportunities for attracting resources into economic activities, thereby creating conditions for everyone to participate. Economic activity generates income and improves living standards (Choe, 2003; Iyke, 2017; Pilinkiene, 2016; Roman & Padureanu, 2012).

In inclusion, economic development is a means to achieve human development goals, including Fuller material welfare, better health, longer life expectancy, and education to improve intelligence and life spirit. In other words, the economic development of a country today is conceived not only as an increase in economic size but also as a connotation of progressive economic structural change and ensuring that people all have equal opportunities to participate in the development process; thus, all enjoy the fruits of development.

1.2 Land finance policy (LFP)

Land finance policy not only directly affects the operating costs of enterprises, but it is also a key input to conducting production and business. Especially in countries where land ownership and regulations on land finance, such as land rental unit price, rental stabilization period, etc., are governed by the Government, the policies on land finance are special attention from enterprises with foreign direct investment (Mohamed et al., 2017; Silajdzic & Andmehic, 2018). Land financial policy is a system of viewpoints, lines, policies, and solutions regarding the State's economic and financial relations with land users issued in each period and context. In terms of land finance policy: it can be seen that the cost of renting real estate, such as offices, factories, etc., often accounts for a large proportion of the total costs of the business, so

investors are very interested in choosing this option (Menyah et al., 2014; Prochniak, 2011). choose an investment location with a reasonable rental price and a long-term rental stability period so that they can easily plan their investment activities, thereby creating resources to help promote economic and social development. Thus, the author gave hypothesis H1 below:

Hypothesis H1: Land finance policy affects the economic development in Vietnam.

1.3 Human resource policy (HRP)

Human resources, especially high-quality human resources, play a decisive role in the socio-economic development of each country. Since the Fourth Industrial Revolution is taking place firmly, our Party and State attach particular importance to the construction and development of high-quality human resources to meet the requirements of the cause of industrial promotion. Industrialization and modernization of the country and international integration (Tah et al., 2021; Nair-Reichert & Weinhold, 2001; Hermes & Lensink, 2003). To concretize the Party's guidelines, human resource development policies in general and finance policies, in particular, have been completed, contributing to the development of human resources in both quantity and quality, step by step, to meet the increasing human demand of the economy. However, the percentage of trained workers is still low, skilled workers are lacking, and labor productivity is lower than in other countries in the region (Nannicini & Billmeier, 2011; Simionescu, 2018). One of the main reasons for the above situation is that mechanisms and policies, including financial policies for human resource development, are still limited; the policy institutionalization and implementation processes are still inadequate. Thus, the author gave hypothesis H2 below.

Hypothesis H2: Human resource policy affect the economic development in Vietnam.

1.4 Tax policy (TP)

Tax policy is a part of fiscal policy. Tax policy is a collection of views, guidelines, and solutions concretized by provisions in the system of legal documents on tax, used as a basis for implementing tax management. State tax. Sometimes the concept of tax policy can be identified with the concept of tax law, but strictly speaking, tax law is the manifestation form of tax policy (Durham, 2004; Armeanu et al., 2019; Abdul-Razak & Adafula, 2013). In essence, the tax policy for enterprises is the Government's intervention and regulation of enterprises' activities through tax instruments. The practical and appropriate use of tax instruments in each development stage of the economy will help speed up the integration process and promote economic restructuring, especially in attracting foreign investors (Albulescu, 2015; Bruszt, 2002). Tax policies include tax bases, tax rates, incentives, tax exemptions, deductions, and tax administration regulations. Depending on the goal and level of the policy law countries want, the Government can adjust specific rules for each detailed content (Caporale et al., 2014; Dombi, 2013; Almfraji & Almsafir, 2014)). In the precise adjustments mentioned above, the tax base, tax rate, and tax exemption and reduction incentives directly impact the tax obligations of enterprises in economic development. Thus, the author gave hypothesis H3 the following:

Hypothesis H3: Tax policy affects the economic development in Vietnam.

1.5 Digital transformation policy (DTP)

Digital transformation and the application of digital technology platforms will be essential, creating a driving force for Vietnam's economic recovery and development. Digital technology businesses have been and will help industries and sectors to recover and develop. The digital transformation of the economy in general and the digital transformation of companies, in particular, is an inevitable development trend globally (Ghazali, 2010; Hlavacek & Bal-Domańska, 2016). Digital transformation brings turning point changes, helping to improve competitiveness between businesses and economies in the region and the world. Integrating technologies such as artificial intelligence, robotics, and robotic process automation solutions makes the business line continuously automated with minimal human supervision. Not only that, but these

tools also help workers reduce repetitive tasks that don't generate revenue to focus on the parts that create more value (Khaliq et al., 2017; Lean & Tan, 2011; Gurgul & Lach, 2014). Digital transformation helps reduce operating costs and continuously collects information for economic actors. Therefore, the current digital transformation of the digital economy is the most critical goal in the development process of the Vietnamese economy. The author proposes the final hypothesis H4 as follows:

Hypothesis H4: Digital transformation policy affects the economic development in Vietnam.

1.6 Infrastructure policy (IP)

The policy of spending budget on infrastructure has a positive impact on attracting and increasing the operational efficiency of enterprises, contributing to increasing budget revenue and creating motivation for economic development. The quality of infrastructure is a fundamental factor for enterprises' production and business activities. In addition, infrastructure is one of the significant determinants of reducing transportation costs for businesses and the most vital determinant of direct investment in developing countries. A good infrastructure creates favorable conditions for businesses' production and activities and helps companies reduce unnecessary investment risks (Makki & Somwaru, 2004; Nwaogu & Ryan, 2015; Teixeira & Queiros, 2016). It can be said that the development of infrastructure in each country is a necessary condition for making investment decisions for enterprises. The essential infrastructure system of a government includes the transportation system, such as the system of roads, railways, airways, waterways... information systems, post offices, etc... electricity and water supply systems, schools and hospitals supporting financial service systems such as banks, insurance, auditing, and financial consulting firms contribute to economic development (Upreti, 2015; Yakubu et al., 2020; Hanushek, 2013; Li & Liu, 2005). Thus, the author gave hypotheses H5 following:

Hypothesis H5: Infrastructure policy affecting the economic development in Vietnam.

Based on research results at home and abroad, plus references to some theories on economic development in some countries, the author records in the form of a linear structural model as follows:

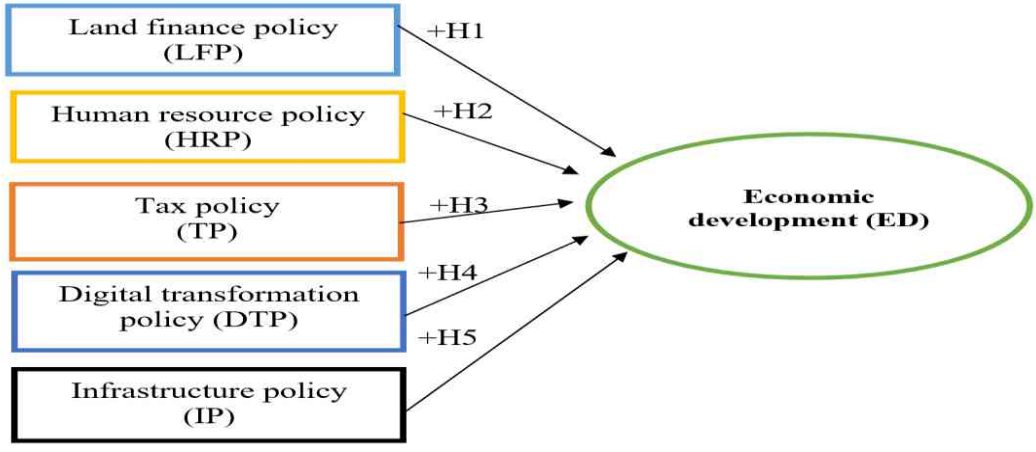

Figure 1. A research model for critical factors affecting the economic development in Vietnam

Source: The authors proposed

Figure 1 showed that the research model for five factors affecting the economic development in Vietnam, Five factors including Land finance policy (LFP), human resource policy (HRP), tax policy (TP), digital transformation policy (DTP), and infrastructure policy (IP).

2. METHODOLOGY AND DATA

The research process is carried out through the following steps:

First, the author will conduct a theoretical review, including two essential research contents: (i) study the theoretical basis of financial policy for foreign direct investment and (ii) conduct a review of relevant empirical studies to design an outline of expert interviews and group discussions with survey subjects to adjust the model and the observed variables used to measure research concepts. Next, conducting preliminary quantitative research on a sample size of 45 survey subjects by convenient sampling through detailed questionnaires (Hair et al., 2021).

Secondly, the author analyzes the reliability of the data through the Cronbach'Alpha coefficient, then analyzes the exploratory factors by the EFA method to refine the scale and determine the scale structure for official research. Finally, the author conducts formal research to evaluate the scale, test the model, and research hypotheses. The official analysis was conducted through a survey of 550 economists using the convenient sampling method through detailed questionnaires. After verifying the scale's reliability and analyzing the factors, the author used a structural linear regression model (SEM) to test the model and research hypothesis (Hair et al., 2021).

Thirdly, research sample size: To ensure representativeness and reliability for the sample and EFA analysis, at least 5 samples are required for each observed variable. Therefore, with 24 observed variables, the sample size should be at least 24 x 5 = 120 samples. Based on the two theories and experiences of the above researchers, the author conducted a survey and collected 550 samples to serve the research process. The survey sample is entirely representative of economic experts. The survey results were analyzed using the techniques of SPSS and AMOS software. The author conducts Cronbach's Alpha reliability analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation model (SEM) to see the influence of the variables.

Finally, the author designed all questions in part of the questionnaire arranged on a scale of 1 to 5 (5-point Likert scale), showing the increasing level of agreement of the respondents to the issue of the author's business interview. The specific meanings are as follows: (1) disagree entirely. (2) Disagree. (3) Normal. (4) Agree. (5) agree entirely (Hair et al., 2021). The author surveyed 550 experts in the economic field in Vietnam. The article applied the quantitative method using structural equation modeling (SEM) and SPSS 20.0, Amos software, from January 2023 to June 2023. The sampling method is convenient and mailed to each individual, but 517 samples were processed. Finally, the author discusses the results and policy recommendations for economic development in Vietnam.

3. EMPIRICAL RESULTS

3.1 Analysis of descriptive statistics, Cronbach's alpha, and confirmatory factor analysis for factors affecting the economic development in Vietnam

Table 1. Testing descriptive statistics and Cronbach's alpha for critical factors affecting economic development in Vietnam

Code	*Items*	*Cronbach's alpha*	*Mean*	*Std. Deviation*
Land finance policy (LFP)		*0.948*	-	-
LFP1	Stable time for reasonable land rental price	0.919	3.0793	0.99197
LFP2	Attractive land rent exemption/reduction regulations	0.934	3.0890	1.00185
LFP3	Reasonable rental price	0.929	3.1199	0.96706
LFP4	Long rental period	0.946	3.0213	1.02372
Human resource policy (HRP)		*0.942*	-	-

HRP1	Easily recruit good local managers	0.786	3.4371	0.86626
HRP2	The number of workers who have received vocational training in the locality is high	0.788	3.5358	0.94273
HRP3	Skilled and skilled labor to meet business needs	0.838	3.3288	0.96258
HRP4	Recruitment policy, salary bonus, and training	0.785	3.3965	0.88453
Tax policy (TP)		*0.947*	-	-
TP1	The appropriate corporate income tax rate	0.928	3.0986	0.99219
TP2	Attractive corporate income tax exemption/reduction regulations	0.937	3.1064	1.01075
TP3	Attractive import tax exemption regulations	0.919	3.1509	0.96673
TP4	Stable tax policy, little change	0.939	3.0928	0.99177
Digital transformation policy (DTP)		*0.955*	-	-
DTP1	Administrative centers applying digital technology	0.935	3.0271	0.99963
DTP2	Simple, transparent, and online administrative procedures	0.943	3.0116	1.02103
DTP3	Time to complete administrative procedures is quick and accurate	0.947	3.0812	.97507
DTP4	Look up legal documents, land information, and resources related to force easily through the electronic portal	0.938	3.0271	1.04513
Infrastructure policy (IP)		*0.852*	-	-
IP1	Convenient transportation system	0.824	2.3424	0.69103
IP2	The power supply system meets the demand	0.785	2.4004	0.61964
IP3	Convenient contact information	0.838	2.3965	0.67012
IP4	Low freight cost	0.800	2.4333	0.70291
Economic development (ED)		*0.824*	-	-
ED1	There is economic growth	0.709	3.4662	0.96314
ED2	The change in economic structure	0.746	3.2766	1.03190
ED3	The life of the majority of the population in society will become more beautiful	0.817	3.1683	1.07685

Source: Authors collected and processed from SPSS 20.0

Table 1 shows that Cronbach's alpha for various factors affecting the tax compliance behavior of individual business households is higher than 0.7. Five factors include Land finance policy (LFP), human resource policy (HRP), tax policy (TP), digital transformation policy (DTP), and Infrastructure policy (IP). Besides, 1 dependent factor shows economic development (ED).

In summary, testing the suitability of the research model through the indexes and tests of reliability and convergence value, as well as the discriminant value of the scale system used in the research for this study, confirms the fit of the research model with the survey data. At the same time, the concepts can be used well in the subsequent analysis.

Table 2. Testing confirmatory factor analysis for factors affecting the economic development in Vietnam

Indicators	*CR*	*EVA*	*MSV*	*Results*
LFP	0.907	0.673	0.072	Good
HRP	0.965	0.871	0.365	Good
TP	0.966	0.875	0.043	Good
DTP	0.957	0.853	0.074	Good
IP	0.954	0.834	0.025	Good
ED	0.891	0.671	0.307	Good

Source: Authors collected and processed from SPSS 20.0, Amos

Table 2 shows that all AVE is more significant than 0.5. To ensure the convergence of the scales, the extracted variance value (AVE) must be >= 0.5. The results of CFA analysis show that the AVE value corresponding to the factors ranges from 0.671 to 0.875, therefore, satisfying the requirement of convergence, and the MSV is smaller than EVA to ensure the discriminant. In addition, all CR outputs are more significant than 0.7, so the overall reliability of this scale is good and acceptable. Aggregated confidence is calculated for each unidirectional factor, similar to the application of Cronbach's alpha, which will be run separately for each element. The composite reliability formula is based on the Standardized Regression Weight value.

3.2 Testing critical factors affecting the economic development in Vietnam

Table 3. Testing critical factors affecting the economic development in Vietnam

Relationships			*Standardized estimate*	*S.E*	*C.R*	*P*	*Result*
ED	<---	LFP	0.129	0.025	3.532	0.0008	Accepted
ED	<---	HRP	0.158	0.038	3.941	0.0006	Accepted
ED	<---	TP	0.582	0.040	11.642	0.0003	Accepted
ED	<---	DTP	0.137	0.030	4.094	0.0005	Accepted
ED	<---	IP	0.108	0.061	3.375	0.0009	Accepted

Source: Author collected and processed from SPSS 20.0, Amos

Table 3 shows five factors affecting the economic development in Vietnam, with a significance level of 0.01. The article's novelty is finding out the tax policy factor that has the most substantial impact on the economic development in Vietnam, with a standardized estimate of 0.582. This is the most influential factor and also the priority for policy implementation.

Table 4. Testing Bootstrap 40.000 samples for factors affecting the economic development in Vietnam

Parameter			*SE*	*SE-SE*	*Mean*	*Bias*	*SE-Bias*	*CR*
ED	<---	LFP	0.025	0.000	0.084	-0.003	0.004	0.750
ED	<---	HRP	0.050	0.001	0.143	-0.008	0.006	1.333
ED	<---	TP	0.051	0.001	0.464	-0.002	0.002	1.000
ED	<---	DTP	0.043	0.000	0.115	-0.010	0.007	1.429
ED	<---	IP	0.079	0.001	0.190	-0.006	0.005	1.200

Source: Author collected and processed from SPSS 20.0, Amos

Table 4 shows that testing Bootstrap with 40.000 samples for factors affecting the economic development in Vietnam, with a significance level of 0.01. Thus, the Bootstrap method performed with the number of repeated instances N is 40.000 times. Estimates from N samples are averaged, and this value tends to be close to the population estimate. The smaller the difference between the mean estimated by Bootstrap and the model estimate with the original sample, allowing the conclusion that the model estimates can be trusted.

3.3 Result discussion

Currently, the Covid-19 pandemic in the world and in Vietnam is still complicated and unpredictable, with the risk of new strains appearing; The recovery of the world economy is uneven, with many uncertainties. Internally, the Vietnamese economy is still facing many difficulties and challenges. To

recover and develop the economy in the context of safe, flexible adaptation and effective control of the Covid-19 pandemic, Vietnam needs to focus on implementing the following solutions:

First of all, the result showed that tax policy affects the economic development in Vietnam. The standardized estimate is 0.582 and with a significance level of 0.01. This result is consistent with previous studies (Durham, 2004; Armeanu et al., 2019; Abdul-Razak & Adafula, 2013). This is the most impactful of the five factors and needs to be prioritized first. Thus, Vietnam Government continues to control the epidemic situation well. This is a prerequisite and core condition for creating the foundation for economic recovery, minimizing losses caused by the pandemic, and sustainable economic development. It is necessary to be more determined in implementing measures to control and repel the Covid-19 epidemic, especially in big cities and localities with many industrial parks. Promote the vaccination strategy, using all resources to have enough free Covid-19 vaccine for the entire population soon; complete the 3rd dose, the booster dose of the Covid-19 vaccine, as quickly as possible. This is a condition for effectively controlling the epidemic and transforming the economy into a new stage of development that can safely and flexibly adapt to the epidemic. Implement the recognition of vaccine passports with other countries; maintain efficiency. Regularly update the information and data system on Covid-19 vaccination to enhance disease prevention and ensure social safety. Promoting the development of research and development activities production of vaccines and drugs to treat diseases in the country is enough to ensure the control and adaptation to the development of the disease; Moving forward to make Covid-19 become an endemic disease.

Secondly, the result showed that human resource policy affects economic development in Vietnam. The standardized estimate is 0.158 and with a significance level of 0.01. This result is consistent with previous studies (Nannicini & Billmeier, 2011; Simionescu, 2018). This is the second impactful of the five factors and needs to be prioritized secondly. Thus, the Vietnam Government maintains macroeconomic stability, stabilizes financial and monetary markets, and ensures significant economic balances. Continue to implement the expansionary fiscal, credit, and economic policies reasonably and flexibly to make the most of and effectively use resources, ensure national financial safety, control inflation, and price raw materials and input materials for production. It is necessary to keep inflation and interest rates low, exchange rates stable, and large balances guaranteed so the economy recovers quickly after the epidemic. Strengthen monitoring, updating, and assessment of international trade trends and forecasts. Effectively implement free trade agreements to boost exports, especially to markets with plenty of room; Newly signed free trade agreements promise to create significant changes in supply chains. Take advantage of world economic trends' opportunities while proactively responding to the adverse effects of trade competition and conflicts. Attracting and encouraging the labor force to return to the workplace in industrial parks and big cities to restore production. At the same time, localities must actively develop plans to create jobs for returning workers who are not ready to return to industrial parks and big cities due to the fear of the pandemic; focus on security and order issues, avoiding social instability.

Thirdly, the result showed that the digital transformation policy affects the economic development in Vietnam. The standardized estimate is 0.137 and with a significance level of 0.01. This result is consistent with previous studies (Khaliq et al., 2017; Lean & Tan, 2011; Gurgul & Lach, 2014). This is thirdly impactful of the five factors and must be prioritized thirdly. Thus, Vietnam Government effectively deploys business support packages that have been issued, regularly evaluates the results of the implementation of support packages, and immediately removes obstacles in the implementation process. The study considers the additional overall support package based on considerations, calculating the fiscal and monetary policy space, the impact of the epidemic, the new context, and opportunities to design appropriate policies. The implementation of business support packages must be drastic, firm, continuous, smooth, public, transparent, right audience, timely, and easily accessible; the scale of support must be commensurate with the impact of the epidemic; conditions and standards of support packages must be feasible; processes and procedures to receive approval must be simplified to the maximum; at the same time, there is a mechanism to closely monitor and inspect the implementation and handle sanctions to avoid taking advantage of,

Fourthly, The result showed that land finance policy affects the economic development in Vietnam. The standardized estimate is 0.129 and with a significance level of 0.01. This result is consistent with previous studies (Mohamed et al., 2017; Silajdzic & Andmehic, 2018). This is the fourth impactful of the

five factors and must be prioritized fourthly. Thus, Vietnam Government continues to promote the implementation of public investment projects - this is an essential factor in promoting economic growth in the coming time. Due to the impact of the Covid-19 pandemic, the demand for spending from the business sector and the people dropped sharply. The State needs to play a role in stimulating demand. However, the promotion of public investment must not be spread out and hastily; It is necessary to focus on investing in large and important projects, developing critical infrastructure, having a spillover effect, creating a driving force for socio-economic development, especially inter-regional projects, projects to prevent, combating and mitigating the impacts of climate change and natural disasters, national digital transformation projects. Continue to perfect institutions, reform administrative procedures, improve the investment and business environment, remove difficulties and obstacles in production and business, and improve the government apparatus's capacity, effectiveness, and efficiency at all levels, creating a new driving force for economic growth. This is a strategic breakthrough for Vietnam in the next 10 years and one of the driving forces for economic recovery with low cost but efficiency and high sustainability. Focus on strongly developing the domestic market through policies to stabilize the market, promote trade and reduce taxes and fees. Effectively implement solutions to stimulate domestic consumption; strengthen information and propaganda work in response to the campaign Vietnamese people give priority to using Vietnamese goods. Focus on stimulating demand in several industries and fields, such as tourism, retail, transportation, accommodation, and food and beverage. Developing the tourism industry towards disease safety and environmental friendliness.

Finally, the result showed that infrastructure policy affects the economic development in Vietnam. The standardized estimate is 0.108 and with a significance level of 0.01. This result is consistent with previous studies (Makki & Somwaru, 2004; Nwaogu & Ryan, 2015; Teixeira & Queiros, 2016). This is the fifth impactful of the five factors and must be prioritized fifthly. Thus, Vietnam Government continues to promote digital transformation and develop a digital Government, digital economy, digital society, and contactless economy. The Covid-19 pandemic has put our country's economy in front of enormous challenges and simultaneously brought opportunities to accelerate the digital transformation of the economy. To develop the digital economy, it is necessary to create its infrastructure and implement policies to change the habit of using cash, building a solid foundation for e-commerce development with three decisive factors: logistics, e-payment, and network security. The Government should soon issue a policy to manage the development of the digital economy, creating a basis for the practical implementation of new business models, new business products, electronic money, E-banking services, and financial technology (FinTech)... Besides, the Government needs to have solutions to support.

CONCLUSIONS

Vietnam's economy in 2022 takes place in the context of the world economy's rapid and unpredictable changes, increasing risks to financial markets, currency, energy security, and global food security. With the determination to recover and develop the economy, creating momentum to complete the socio-economic goals of 2022. In addition, this article surveyed data from 550 experts in the economic field to clarify the impact of the policy on businesses operating in Vietnam. The paper applied the qualitative and quantitative methods using structural equation modeling (SEM) and SPSS 20.0, Amos software. The article finds five factors affecting Vietnam's economic development after the Covid-19 Pandemic with a significance level of 0.01, and five hypotheses are accepted. Based on the research results, to cope with the above challenges, it is necessary to implement several solutions synchronously:

First of all, innovating the macro foundations. Focus on reviewing and evaluating implementation results, proposing specific solutions to the resolutions of the Central Executive Committee meetings on renewing the growth model, and effectively implementing the process of economic integration. International economic development, private economic development, orientation to attract foreign investment, the Fourth Industrial Revolution, regional development, industrialization, and modernization. Continue to guide and organize the effective implementation of laws, such as the Law on Enterprises (amended), the Law on Investment (amended), the Law on Bidding (amended); the Law on Public Debt Management; Law on Public Investment (amended); Law amending the Law on Insurance Business; Intellectual property law; Competition Law (amended); Law on Cybersecurity, etc. Accelerate the research

and promulgation of Government decrees on pilot mechanisms in financial technology (Fintech) and circular economy.

Secondly, implement a flexible monetary policy. Continue to operate monetary policy proactively, flexibly, cautiously, and synchronously to maintain macroeconomic stability, control inflation, remove difficulties for production and business activities and support the economy and economic growth recovery. Flexible exchange rate management in line with market movements, macro balance, and monetary policy objectives. Communication about priority orientation to protect VND value, not to devalue VND to support export. Closely monitor the exchange rate movements of USD, RMB, Euro, and Japanese Yen, as well as the prices of some essential commodities on the world market, to manage the exchange rate in association with other policy tools flexibly, to limit the impact on inflation and the macroeconomic environment of Vietnam. Explain the effectiveness of exchange rate management for the US.

Thirdly, implement proactive fiscal policy. In particular, strictly implement the state budget expenditure discipline to ensure the implementation of the set targets for 2023 and reduce pressure on state budget revenue. Review and assess revenues from petroleum and consider the space to minimize these revenues. Further consider the possibility of not adjusting the tax on gasoline, but focusing on providing support for disadvantaged groups that are heavily affected by the increase in petrol prices. Research the possibility of changing corporate and personal income tax rates for many suitable target groups. Research and consult commercial banks on continuing to reduce lending interest rates for priority areas. Flexibly manage the liquidity of the commercial banking system to support credit activities, issue government bonds, and prevent and respond to fluctuations in indirect investment capital flows and remittances.

Fourthly, continue accelerating the components of the 2022-2023 Socio-Economic Recovery Program, national target programs, and disbursement of public investment. Implement synchronously, drastically, and effectively the details that are being deployed slowly; accelerate the distribution of public investment capital; timely and effectively deploy a 2% interest rate support package with a scale of VND 40 trillion to provide financial support to businesses, increase the spread, reduce the pressure of credit capital, and reduce outstanding debts; striving for the end of the year, reaching about 85-90% of the plan for disbursement of public investment capital.

Finally, improve institutions, strengthen inspection and supervision, improve transparency, professionalism, and efficiency for the financial market, pay attention to controlling risks in the financial system: 1- Research and issue Law on Investor Protection and establishment of Investor Protection Fund; 2- Amendment of decrees and circulars directly and indirectly related to the securities market; 3- Research and amend some criteria of VN30 to ensure the quality, scale, and efficiency of large enterprises, leading the market; 4- Developing derivative products to prevent and limit risks such as VNX50 index futures contract (VNX50 futures); 5- Pay attention to controlling risks of the financial system (especially the inter-relationship between banks - securities - real estate - insurance). Operating agencies must strengthen their forecasting ability and proactively develop scenarios with response actions. Once the system has been created, there will be an adaptive, non-passive plan with timely policies; corresponding to each design will be appropriate policies. Thereby minimizing policy delay, shortening the time from policy discussion to policy issuance, and creating a quick response to the economy.

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The Influences of Financial Leverage and Ownership Structure on Performance of Listed Firms in Vietnam: A Quantile Regression Approach

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ABSTRACT

This study uses quantile regression analysis to examine the interplay among financial leverage, ownership structure, and firm performance within the context of Vietnam, using financial data of listed firms from 2015 to 2022. Evaluating return on assets (ROA) and return on equity (ROE), the study reveals consistent negative coefficients for total debt across all quantiles, indicating a detrimental association between debt levels and firm performance. Moreover, the analysis uncovers adverse impacts of government ownership on firm performance across all percentiles, except for the 10th percentile, underscoring governance challenges within state-owned enterprises. Interestingly, foreign ownership initially significantly positively influences firm performance, except at the 90th percentile, suggesting potential complexities at higher ownership concentrations. These findings carry crucial policy implications, highlighting the need for targeted reforms to optimize financial leverage and ownership dynamics, enhance governance mechanisms within state-owned enterprises, and mitigate the adverse effects of concentrated foreign ownership.

INTRODUCTION

Theoretical perspectives on the relationship between financial leverage, ownership structure, and firm performance have been subjects of extensive study and debate within the realm of corporate finance. The Trade-Off Theory (TOT) and Agency Theory (AT) propose a positive correlation between financial leverage and firm performance. TOT asserts that leveraging debt can exploit tax shield benefits, consequently enhancing profitability and firm value (Modigliani & Miller, 1963; Kraus & Litzenberger, 1973; Myers, 1984). Similarly, AT suggests that debt can serve as a disciplinary mechanism for managers, aligning their

interests with those of shareholders (Jensen & Meckling, 1976; Shleifer & Vishny, 1986). These theoretical frameworks have garnered empirical support from various studies across different countries and industries, indicating positive effects of debt on operational efficiency and profitability (Rashid Amedi and Mustafa, 2020; Kim, 2022). However, TOT also warns against excessive leverage due to associated costs such as interest payments and financial distress. Studies have shown diminished operational performance with higher debt levels, particularly in riskier investments (Abubakar, 2020; Nguyen & Nguyen, 2020; Nguyen et al., 2022; Muhammad et al., 2021; Ghardallou, 2023; Tran et al., 2023).

Similarly, the influence of ownership structure on firm performance has been a topic of theoretical and empirical investigation, revealing diverse findings regarding its impact on corporate profitability. Ownership concentration, especially among large shareholders, has been suggested to empower effective managerial behavior monitoring, thus enhancing corporate performance (Shleifer & Vishny, 1986; Nashier & Gupta, 2020; Itan & Chelencia, 2022). However, the effects of government or foreign ownership diverge due to their distinct objectives (Ali et al., 2022). Government-owned enterprises often exhibit higher performance levels owing to strong governmental connections, while state-owned enterprises (SOEs) may prioritize social welfare over earnings, potentially resulting in sustained losses (Kumar & Zattoni, 2015; Wehrheim et al., 2020; Nguyen et al., 2023). Imperfect state monitoring systems further compound these issues, leading to lower firm performance in enterprises with higher state ownership levels (Vu & Pratoomsuwan, 2019; Laporšek et al., 2021; Queiri et al., 2021; Aboagye-Otchere & Boateng, 2023). Furthermore, the growing trend of foreign ownership has introduced additional complexities. Increasing foreign ownership can activate the monitoring role of foreign investors, potentially positively impacting firm performance by influencing managerial behavior to maximize shareholder wealth (Phung & Mishra, 2016). However, the entrenchment effect may arise when foreign investors hold sufficient ownership concentration, potentially leading to lower firm performance (Gibson, 2003). These theories and empirical studies collectively provide insights into the multifaceted nature of capital structure and ownership structure decisions, offering avenues for optimizing firm performance and value. However, the complexity and diversity of capital and ownership structures have rendered this area a subject of ongoing debate, especially in recent years.

In light of these arguments, this study aims to address the research gaps by investigating the influences of financial leverage and ownership structure on the corporate performance of listed firms in Vietnam. This region is an intriguing case study as its financial markets as well as corporations are developing rapidly, with diverse funding instruments, while managing and supervising are comparatively weaker than those of developed nations. Following this introduction, this study is structured as follows: Section 2 presents a concise review of relevant literature and formulates hypotheses. Section 3 outlines the methodology employed and describes the data. The empirical findings are presented in Section 4, followed by the conclusion.

1. LITERATURE REVIEW

This section elaborates on related literature on financial leverage – ownership structure – firm performance nexuses. Afterward, corresponding hypotheses for each case of these nexuses are developed.

Theoretical perspectives on capital structure have evolved over time, starting with Modigliani and Miller's proposition in 1958 that a firm's capital structure has no bearing on its value under certain ideal market conditions (Modigliani & Miller, 1958). However, their subsequent work in 1963 revealed the potential value-enhancing aspect of debt through the utilization of tax shields (Modigliani & Miller, 1963). This revelation spurred further research into the relationship between financial leverage and firm performance to validate the benefits of the tax shield. Kraus and Litzenberger contributed to this discourse in 1973 by introducing the trade-off theory (TOT), which advocates for an optimal level of financial leverage to maximize firm value, emphasizing the trade-offs between tax shield benefits and debt-related costs (Kraus & Litzenberger, 1973; Myers, 1984). Conversely, Myers and Majluf in 1984 introduced the Pecking Order Theory (POT), which highlights the influence of asymmetric information on financing decisions, suggesting that firms prefer internal financing initially, resorting to debt only when internal funds are exhausted (Myers & Majluf, 1984). In a different vein, Jensen and Meckling in 1976 proposed the Agency Theory (AT), which addresses conflicts arising from the separation of ownership and control, suggesting

that high ownership concentration can mitigate agency costs by aligning interests and enhancing monitoring (Jensen & Meckling, 1976; Shleifer & Vishny, 1986). Moreover, large shareholders may use debt to minimize agency costs and capitalize on tax shield benefits (Jensen, 1986). These theories collectively provide insights into the complex dynamics of capital structure decisions, offering avenues for optimizing firm performance and value. However, the diversity and complexity of capital structures have made this area controversial in recent years, leading to ongoing debates.

1.1 Financial leverage and Firm performance

Theoretical perspectives, TOT and AT, posit a favorable impact of financial leverage on firm performance. TOT contends that leveraging debt exploits tax shield benefits, enhancing profitability and firm value (Modigliani & Miller, 1963), while AT suggests debt disciplines managers to align with shareholder interests (Jensen & Meckling, 1976). Consequently, shareholders utilize debt to discipline managers, reducing free cash flow and potentially enhancing firm performance. Empirical studies support these notions; for example, positive impacts of leverage on firm performance were noted in studies by Rashid Amedi and Mustafa (2020), and Kim (2022) in the US, Jordan, Vietnam, and Vietnamese stock exchanges, respectively. However, TOT warns against excessive leverage due to associated costs such as interest payments and financial distress (Myers, 1984), supported by studies indicating diminished operational performance with higher debt levels, particularly in corroborated in studies from Nigeria, Vietnam, Italy, Thailand, Saudi Arabia, and Vietnam again (Abubakar, 2020; Nguyen & Nguyen, 2020; Nguyen et al., 2022; Muhammad et al., 2021; Ghardallou, 2023; Tran et al., 2023). These findings stress the necessity of balancing tax benefits against costs to optimize capital structure and mitigate adverse effects on firm performance. While the impact of financial leverage remains debated globally, it is expected that higher financial leverage may decrease the performance of Vietnamese enterprises due to debt's role as a monitoring mechanism for managers and potential discretionary behavior (Le & Phan, 2017; Tran et al., 2024). Hence, in typical emerging markets such as Vietnam, it is hypothesized. Therefore, the first hypothesis is stated as follows:

H1: There is a negative relationship between financial leverage and firm performance

1.2 Government ownership and Firm performance

The effect of ownership structure on firm performance is a subject of both theoretical and empirical inquiry, with diverse findings suggesting varied influences on corporate profitability (Stubelj et al., 2017; Ali et al., 2022). Ownership structure serves as a significant corporate governance mechanism, potentially mitigating agency costs within firms by aligning shareholder and managerial interests (Jensen & Meckling, 1976). Higher ownership concentration, particularly among large shareholders, may empower them to monitor managerial behavior effectively, thereby enhancing corporate performance (Shleifer & Vishny, 1986; Nashier & Gupta, 2020; Itan & Chelencia, 2022). However, the impact of government or foreign ownership differs due to their distinct objectives (Ali et al., 2022). Government-owned enterprises often exhibit higher performance levels, facilitated by their solid governmental connections, providing access to resources such as easier bank loans at reduced costs (Kumar & Zattoni, 2015; Nguyen et al., 2023). This advantage translates into enhanced operational efficiency (Din et al., 2021; Bui & Nguyen, 2021), potentially supplemented by reduced firm risk-taking due to monitoring mechanisms (Tran et al., 2024). Conversely, state-owned enterprises (SOEs) may prioritize social welfare over earnings, guided by political and social interests, resulting in sustained losses (Wehrheim et al., 2020; Nguyen et al., 2023). Higher government ownership can also exacerbate agency costs, leading to conflicts between large and minority shareholders and potentially diminishing governance quality and operational efficiency (Nguyen et al., 2023). This discord may encourage opportunistic behaviors among executives, diverting resources away from profit maximization and undermining firm performance (Nguyen et al., 2023). Imperfect state monitoring systems further compound these issues, resulting in lower firm performance in enterprises with higher state ownership levels (Vu & Pratoomsuwan, 2019; Laporšek et al., 2021; Queiri et al., 2021; Aboagye-Otchere & Boateng, 2023). In the context of Vietnam, the research hypothesis suggests that high state ownership may diminish firm performance, reflecting the continued focus of SOEs on economic, social,

and political objectives rather than maximizing shareholder value. Therefore, based on the evidence and arguments, this study proposes the following second hypothesis:

H2: There is a negative relationship between government ownership and firm performance

1.3 Foreign ownership and Firm performance

Increasing foreign ownership transforms foreign investors into significant shareholders (Phung & Mishra, 2016), activating their monitoring role and impacting firm performance by influencing managerial behavior to maximize shareholder wealth (Phung & Mishra, 2016). Moreover, high foreign ownership can lead to managerial replacements and pressure on current managers, thereby reducing agency costs between managers and shareholders (Shleifer & Vishny, 1986). Additionally, foreign investors, particularly institutional ones, contribute management skills, access to capital markets, and advanced technology to listed corporations, enhancing corporate profitability (Choi et al., 2012; Phung & Mishra, 2016; Ciftci et al., 2019). Furthermore, foreign ownership fosters connections with the external environment, reducing resource dependence and improving firm efficiency through increased advisory services and board advice quality (Ciftci et al., 2019). However, when foreign investors hold sufficient ownership concentration, their monitoring effect may be overshadowed by the entrenchment effect, potentially leading to lower firm performance (Gibson, 2003; Phung & Mishra, 2016). Therefore, the participation of foreign investors is expected to impact firm performance significantly. Therefore, the third hypothesis is proposed as follows:

H3: There is a positive relationship between foreign ownership and firm performance

2. DATA AND METHODOLOGIES

2.1 Data

The research sample was constructed by collecting data from listed corporations on the Hanoi Stock Exchange (HNX) and the Ho Chi Minh Stock Exchange (HSX) for over a decade, from 2015 to 2022. After eliminating firms with insufficient continuous data, we have a panel data set of 471 non-financial corporations. All studied variables are summarized in Table 1 below.

Table 1. Summary of studied variables

Variables	*Explanation*	*Sources*
Firm performance (ROA)	The ratio of net income to total assets (%)	HOSE & HNX
Firm performance (ROA)	The ratio of net income to total assets (%)	HOSE & HNX
Total leverage (TDTA)	The ratio of total debt to total assets (%)	HOSE & HNX
Short-term leverage (SDTA)	The ratio of short-term debt to total assets (%)	HOSE & HNX
Long-term leverage (LDTA)	The ratio of long-term debt to total assets (%)	HOSE & HNX
Government ownership (GO)	The percentage of ownership by government shareholders (%)	HOSE & HNX
Foreign ownership (FO)	The percentage of ownership by foreign shareholders (%)	HOSE & HNX
Cash flow (CF)	The ratio of operating cash flow on total assets (%)	HOSE & HNX
Capital expenditure (CAP)	The ratio of capex expenditure on total assets (%)	HOSE & HNX
Firm age (AGE)	Natural logarithm of the number of years since its establishment	HOSE & HNX
Quality audit (BIG4)	A binary dummy takes on the value of one if the firm is audited by one of the four Big 4 corporations.	HOSE & HNX
Dividend (DIV)	A binary dummy takes on the value of one if the firm pays a cash dividend	HOSE & HNX
Economic growth (GDPGR)	The percentage change in GDP in year t from year t-1 (%)	World Bank
Inflation (INFL)	The percentage change in CPI in year t from year t-1 (%)	World Bank

Source: own

2.2 Model

According to previous studies, such as Phung & Mishra (2016) and Aboagye-Otchere & Boateng (2023), we construct the empirical model, which investigates the effect of financial leverage and ownership structure on firm performance, followed as:

$$FP_{it} = \alpha + \beta_1 * FL_{it} + \beta_2 * GO_{it} + \beta_3 * FO_{it} + \gamma * \sum Firm - Specific\ Factors_{it} + \delta * \sum Macroeconomic_{it} + \varepsilon_{it} \quad (1)$$

where, FP_{it} is the dependent variable proxied by ROA_{it} (the ratio of net income on total assets) and ROE_{it} (the ratio of net income on equity). FL_{it} is the financial leverage of corporations, which is proxied by $TDTA_{it}$ (the ratio of total debt on total assets), $SDTA_{it}$ (the ratio of short-term debt on total assets), and $LDTA_{it}$ (the ratio of long-term debt on total assets). GO_{it} and FO_{it} reflect ownership structure, corresponding to the percentage of ownership by government and foreign shareholders. Other control variables are firm-specific factors and macroeconomic variables. i means identity, t means year, ε_{it} is the error term (see Table 1). Moreover, we decompose component total leverage (TDTA) into short-term debt (SDTA) and long-term debt (LDTA) as a robustness check. Eq.(1) is re-written followed as:

$$FP_{it} = \alpha + \beta_1 * LDTA_{it} + \beta_2 * SDTA_{it} + \beta_3 * GO_{it} + \beta_4 * FO_{it} + \gamma * \sum Specific\ Factors_{it} + \delta * \sum Macroeconomic_{it} + \varepsilon_{it} \quad (2)$$

2.3 Method

In this study, we employ quantile regression (QR) instead of the OLS method utilized by previous researchers in Vietnam to examine the impact of financial leverage and ownership structure on firm performance. QR offers a deeper understanding of variable relationships by considering points across the distribution beyond the mean (Nguyen et al., 2024), facilitating the interpretation of non-normally distributed outcomes and nonlinear associations with predictor variables (Koenker & Bassett, 1982; Nguyen et al., 2024). Additionally, QR does not necessitate homoscedasticity of errors, providing a comprehensive view of how independent variables influence the dependent variable and ensuring robustness in the presence of outliers (Nguyen et al., 2024). We investigate the impact across the 10th to 90th quantiles (Q10 to Q90) of the dependent variables ROA and ROE, considering specific points within the distribution based on value rankings. However, prior to QR implementation, the normality of data distribution is assessed through distribution graphs and related tests. If the proxies of firm performance exhibit a non-normal distribution, QR regression is applied to equations (1) and (2), as discussed.

3. EMPIRICAL FINDINGS

3.1 Descriptive statistics

Descriptive statistics are summarized in Table 2. As measured by ROA, corporate performance indicates an average after-tax profit of approximately 5.463% of total assets. Similarly, ROE shows an average after-tax profit of about 10.24% of total equity. Financial leverage is represented by SDTA, LDTA, and TDTA, with average values of 6.429, 15.708, and 22.210, respectively. These values imply that corporations in the sample borrow approximately 6.429%, 15.708%, and 22.210% of their total assets as short-term, long-term, and total debt, respectively. Regarding ownership structures, the mean values for foreign ownership (FO) and government ownership (GO) are 8.577 and 20.154, suggesting a higher inclination towards government ownership than foreign ownership in Vietnamese firms.

Table 2. Descriptive statistics

Variable	*Obs*	*Mean*	*Std. dev.*	*Min*	*Max*
ROA	3,768	5.463	6.429	-12.662	29.445
ROE	3,768	10.242	11.828	-37.830	45.316
TDTA	3,768	22.210	17.821	0.000	64.124
LDTA	3,768	15.708	14.895	0.000	58.163
SDTA	3,768	6.429	10.565	0.000	49.173
LNTA	3,768	27.218	1.612	22.891	31.477
FO	3,768	8.577	13.289	0.000	54.263
GO	3,768	20.154	24.955	0.000	79.562
CF	3,768	5.116	12.512	-32.519	40.458
CAP	3,768	4.069	5.936	0.000	30.461
AGE	3,768	3.235	0.508	2.079	4.159
BIG4	3,768	0.274	0.446	0.000	1.000
DIV	3,768	0.527	0.499	0.000	1.000
GDPGR	3,768	6.111	1.999	2.562	8.020
INFL	3,768	2.671	0.928	0.631	3.540

Source: own

3.2 Normality test

Table 3 reports normal distribution tests, such as Skewness, Kurtosis, Shapiro–Wilk, Shapiro–Francia, and Doornik-Hansen. The p-values of tests for ROA and ROE are smaller than 10%, indicating that the test's null hypothesis is rejected, implying that ROA as well as ROE do not have a normal distribution.

Table 3. Normality test

Normal distribution test	*ROA*	*ROE*
Skewness	0.0000***	0.0000***
Kurtosis	0.0000***	0.0000***
Shapiro–Wilk	0.0000***	0.0000***
Shapiro–Francia	0.0000***	0.0000***
Doornik-Hansen	0.0000***	0.0000***

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. The null hypothesis implies normal distribution of variables.

Source: own

3.3 Total leverage and ownership structure on firm performance

After quantile regression with ROA and ROE, the results of influences between total leverage and firm performance are presented in Table 4 and Table 5. The analysis reveals statistically significant negative coefficients for total debt (TDTA) at the 10% level across all quantiles, indicating a negative association between financial leverage and corporate performance, suggesting that firms utilizing higher levels of debt experience a decline in firm performance. This finding aligns with prior research by Nguyen et al. (2020), Din et al. (2021), Laporšek et al. (2021), and Muhammad et al. (2021) found in their studies. Corporations with higher debt ratios may have to bear higher potential costs, such as interest costs, financial distress costs, and bankruptcy risk costs, leading to lower firm performance. Moreover, in the case of low-return investment, high debt levels may cause corporations to have insufficient cash flow to fulfill financial

obligations. Additionally, leveraged firms may face difficulties securing further external financing due to perceived higher future risks by creditors and investors. Therefore, if the company has profitable investment opportunities, it does not have enough capital to finance these projects, leading to the abandonment of these opportunities, known as underinvestment. In other words, corporate performance may be lower due to higher financial leverage.

Table 4. The effect of total leverage and ownership structure on ROA

Quantile regression	*Q10*	*Q25*	*Q50*	*Q75*	*Q90*
TDTA	-0.0678***	-0.0615***	-0.0886***	-0.1203***	-0.1924***
	(-7.69)	(-14.28)	(-16.28)	(-15.55)	(-15.85)
GO	-0.0073	-0.0092***	-0.0126***	-0.0237***	-0.0359***
	(-1.26)	(-3.23)	(-3.50)	(-4.62)	(-4.48)
FO	0.0086	0.0145***	0.0332***	0.0270***	-0.0147
	(0.77)	(2.68)	(4.85)	(2.77)	(-0.96)
LNTA	0.6171***	0.4834***	0.6022***	0.7165***	1.0650***
	(5.82)	(9.31)	(9.19)	(7.69)	(7.28)
CF	0.0351***	0.0403***	0.0683***	0.1097***	0.1401***
	(3.00)	(7.05)	(9.45)	(10.67)	(8.69)
CAPEX	0.1096***	0.0993***	0.1017***	0.0905***	0.1016***
	(4.53)	(8.39)	(6.80)	(4.26)	(3.04)
LNAGE	-0.1793	0.0651	0.4010**	0.2943	0.3648
	(-0.65)	(0.48)	(2.35)	(1.21)	(0.96)
DIV	3.6785***	3.0545***	3.4906***	3.7902***	3.6687***
	(11.95)	(20.28)	(18.35)	(14.01)	(8.65)
BIG4	-0.2655	-0.0107	0.1553	0.0364	-0.4836
	(-0.76)	(-0.06)	(0.72)	(0.12)	(-1.00)
GDPGR	0.1631**	0.1145***	0.1940***	0.2812***	0.2246**
	(2.33)	(3.34)	(4.48)	(4.57)	(2.33)
INFL	0.1214	0.0399	-0.0156	-0.0824	-0.0898
	(0.79)	(0.53)	(-0.16)	(-0.61)	(-0.42)
Constant	-18.0579***	-12.5481***	-14.7139***	-14.0128***	-17.3471***
	(-6.37)	(-9.05)	(-8.40)	(-5.63)	(-4.44)
Observations	3768	3768	3768	3768	3768

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. t-statistics in brackets

Source: own

Table 5. The effect of total leverage and ownership structure on ROE

Quantile regression	*Q10*	*Q25*	*Q50*	*Q75*	*Q90*
TDTA	-0.0981***	-0.0568***	-0.0696***	-0.0754***	-0.1344***
	(-4.55)	(-6.28)	(-7.31)	(-5.51)	(-7.00)
GO	-0.0015	-0.0073	-0.0166***	-0.0262***	-0.0506***
	(-0.10)	(-1.22)	(-2.63)	(-2.89)	(-3.98)
FO	0.0028	0.0101	0.0310***	-0.0033	-0.0681***
	(0.10)	(0.88)	(2.58)	(-0.19)	(-2.81)
LNTA	1.7811***	1.1935***	1.6915***	2.0960***	2.6951***
	(6.85)	(10.95)	(14.74)	(12.71)	(11.64)
CF	0.0673**	0.0728***	0.1019***	0.1316***	0.2020***
	(2.35)	(6.06)	(8.06)	(7.24)	(7.92)
CAPEX	0.1930***	0.1599***	0.1526***	0.2197***	0.3107***
	(3.25)	(6.43)	(5.83)	(5.84)	(5.88)
LNAGE	-0.4096	0.0672	0.2957	0.3051	0.3888
	(-0.60)	(0.24)	(0.99)	(0.71)	(0.64)
DIV	8.3347***	6.5662***	6.9615***	7.2275***	6.8102***

	(11.05)	(20.77)	(20.91)	(15.11)	(10.14)
BIG4	-1.3218	-0.2409	-0.3230	-0.7686	-0.7910
	(-1.54)	(-0.67)	(-0.85)	(-1.41)	(-1.03)
GDPGR	0.5023***	0.3528***	0.4685***	0.5029***	0.3516**
	(2.92)	(4.90)	(6.18)	(4.62)	(2.30)
INFL	0.1025	0.0829	-0.0232	-0.0898	-0.3583
	(0.27)	(0.52)	(-0.14)	(-0.38)	(-1.07)
Constant	-52.1747***	-32.8678***	-43.1977***	-48.8270***	-55.3963***
	(-7.51)	(-11.29)	(-14.09)	(-11.09)	(-8.96)
Observa-tions	3768	3768	3768	3768	3768

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. t-statistics in brackets

Source: own

Based on the findings presented in Tables 4 and 5, which showcase the effects of government (GO) and foreign ownership (FO) on firm performance, it's evident that GO has a consistently negative impact on both return on assets (ROA) and return on equity (ROE) across most percentiles, except for the 10th percentile. This underscores a decline in firm performance for enterprises with moderate to high levels of government ownership, corroborating previous research (Laporšek et al., 2021; Queiri et al., 2021; Aboagye-Otchere & Boateng, 2023). State-owned enterprises tend to prioritize social welfare over earnings, potentially leading to conflicts among shareholders and suboptimal governance, thereby diminishing corporate performance (Nashier & Gupta, 2020; Nguyen et al., 2023).

Similarly, the impact of foreign ownership on firm performance, while significantly positive at lower quantiles (25th, 50th, and 75th), becomes insignificant at the 90th percentile, signaling a shift from positive to potentially negative effects on corporate performance in firms with high ROA (Nguyen et al., 2020; Din et al., 2021; Aboagye-Otchere & Boateng, 2023). Foreign investors play a monitoring role and influence managerial behavior to maximize shareholder wealth, but at higher ownership concentrations, this effect may be overshadowed by initiatives leading to potential managerial replacements and entrenchment effects that hinder firm performance (Suu et al., 2021). Thus, companies with substantial foreign ownership might exhibit lower corporate performance due to these governance dynamics (Ghahroudi, 2011; Al-Thuneibat, 2018).

3.4 Short-term, long-term leverage and ownership structure on firm performance

Additionally, this study employed Equation (2), replacing total leverage (TDTA) with short-term (SDTA) and long-term leverage (LDTA), and the results presented in Tables 6 and 7 for both ROA and ROE echo the findings in Tables 4 and 5, suggesting robustness in our conclusions. Notably, the impact of long-term debt to total assets (LDTA) and short-term debt to total assets (SDTA) on firm performance across quantiles indicates a negative relationship, particularly pronounced at extremes (0.10, 0.75, and 0.90), implying that both excessively low and high debt levels negatively affect business performance. Interestingly, SDTA appears to be less influential than LDTA at lower quantiles but more so at higher quantiles, suggesting the importance of striking a balance in debt utilization to minimize risks to business performance.

Furthermore, the influence of ownership structure on corporate performance remains consistent across all tables, with GO exhibiting a negative impact on both ROA and ROE, while FO shows negative impacts on ROA and ROE starting from the 75th percentile. Control variables in our model significantly affect firm performance across ROA quantiles, highlighting the importance of factors, such as cash flow, capital expenditure, dividend payout, and economic growth, in driving corporate performance. These findings underscore the nuanced interplay between ownership structure, debt utilization, and firm performance, emphasizing the need for prudent decision-making to optimize corporate outcomes.

Table 6. The effect of short-term, long-term leverage and ownership structure on ROA

Quantile regression	*Q10*	*Q25*	*Q50*	*Q75*	*Q90*
LDTA	-0.0664***	-0.0591***	-0.0859***	-0.1139***	-0.1852***
	(-6.18)	(-11.60)	(-13.30)	(-12.49)	(-12.54)
SDTA	-0.0715***	-0.0670***	-0.1021***	-0.1391***	-0.2050***
	(-4.97)	(-9.83)	(-11.82)	(-11.41)	(-10.38)
GO	-0.0070	-0.0091***	-0.0128***	-0.0231***	-0.0351***
	(-1.15)	(-3.17)	(-3.54)	(-4.51)	(-4.23)
FO	0.0107	0.0158***	0.0360***	0.0280***	-0.0130
	(0.93)	(2.91)	(5.22)	(2.88)	(-0.83)
LNTA	0.6126***	0.4657***	0.6195***	0.7334***	1.0510***
	(5.57)	(8.94)	(9.39)	(7.87)	(6.96)
CF	0.0359***	0.0399***	0.0675***	0.1110***	0.1496***
	(2.96)	(6.96)	(9.28)	(10.81)	(9.00)
CAPEX	0.1117***	0.1019***	0.1076***	0.1029***	0.1151***
	(4.35)	(8.37)	(6.97)	(4.72)	(3.26)
LNAGE	-0.2360	0.0557	0.3490**	0.1851	0.2659
	(-0.82)	(0.41)	(2.03)	(0.76)	(0.68)
DIV	3.6760***	3.0260***	3.4249***	3.7180***	3.6756***
	(11.58)	(20.11)	(17.96)	(13.81)	(8.43)
BIG4	-0.2304	0.0304	0.1512	0.0100	-0.5159
	(-0.64)	(0.18)	(0.70)	(0.03)	(-1.04)
GDPGR	0.1613**	0.1151***	0.1798***	0.2563***	0.2217**
	(2.23)	(3.36)	(4.15)	(4.19)	(2.24)
INFL	0.1381	0.0371	-0.0140	-0.0716	-0.1231
	(0.87)	(0.49)	(-0.15)	(-0.53)	(-0.57)
Constant	-17.8433***	-12.0764***	-14.8908***	-13.9843***	-16.6880***
	(-6.07)	(-8.67)	(-8.44)	(-5.61)	(-4.14)
Observa-tions	3768	3768	3768	3768	3768

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. t-statistics in brackets

Source: own

Table 7. The effect of short-term, long-term leverage and ownership structure on ROE

Quantile regression	*Q10*	*Q25*	*Q50*	*Q75*	*Q90*
LDTA	-0.1224***	-0.0529***	-0.0592***	-0.0460***	-0.0906***
	(-4.75)	(-4.97)	(-5.24)	(-2.96)	(-3.91)
SDTA	-0.0887**	-0.0659***	-0.0993***	-0.1225***	-0.2017***
	(-2.58)	(-4.63)	(-6.57)	(-5.89)	(-6.52)
GO	-0.0060	-0.0082	-0.0150**	-0.0224**	-0.0504***
	(-0.41)	(-1.37)	(-2.36)	(-2.56)	(-3.88)
FO	-0.0029	0.0107	0.0400***	-0.0104	-0.0824***
	(-0.11)	(0.94)	(3.31)	(-0.63)	(-3.34)
LNTA	1.8452***	1.2147***	1.6541***	1.9968***	2.6605***
	(7.01)	(11.16)	(14.32)	(12.57)	(11.25)
CF	0.0580**	0.0755***	0.0970***	0.1456***	0.2196***
	(2.00)	(6.30)	(7.63)	(8.32)	(8.42)
CAPEX	0.1937***	0.1737***	0.1734***	0.2268***	0.2787***
	(3.15)	(6.82)	(6.42)	(6.10)	(5.04)
LNAGE	-0.4841	0.0518	0.2530	0.1645	0.0253
	(-0.71)	(0.18)	(0.84)	(0.40)	(0.04)
DIV	8.5486***	6.5532***	6.9901***	7.2129***	6.5160***
	(11.24)	(20.83)	(20.95)	(15.71)	(9.53)
BIG4	-1.3729	-0.2864	-0.3523	-0.4625	-1.0592

	(-1.58)	(-0.80)	(-0.93)	(-0.88)	(-1.36)
GDPGR	0.4961***	0.3538***	0.4333***	0.5051***	0.2851*
	(2.87)	(4.95)	(5.71)	(4.84)	(1.83)
INFL	0.1241	0.1032	-0.0407	-0.1993	-0.4463
	(0.33)	(0.66)	(-0.24)	(-0.87)	(-1.31)
Constant	-	-	-	-	-
	53.5018***	33.5157***	41.9187***	45.7414***	52.4902***
	(-7.60)	(-11.51)	(-13.57)	(-10.77)	(-8.30)
Observations	3768	3768	3768	3768	3768

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. t-statistics in brackets.

Source: own

CONCLUSION

The findings of this study shed light on the intricate relationship between financial leverage, ownership structure, and firm performance in Vietnam through quantile regression. Return on assets (ROA) and return on equity (ROE) reveal significant negative coefficients for total debt across all quantiles. Furthermore, the analysis reveals the detrimental effects of government ownership on firm performance across all percentiles, except for the 10th percentile, while foreign ownership initially exhibits a significantly positive impact on firm performance, excluding the 90th percentile. Then, policy implications can be drawn from these results.

Firstly, managers should prioritize initiatives to promote responsible borrowing practices among firms, encouraging them to maintain optimal debt levels that minimize financial risks and enhance corporate performance. Secondly, addressing governance challenges within SOEs, such as conflicts of interest, inefficient resource allocation, and the appointment of inexperienced managers, is crucial for enhancing their operational efficiency and overall performance. Thirdly, regulatory frameworks should be tailored to facilitate foreign investment while safeguarding against adverse governance dynamics associated with high levels of foreign ownership. Moreover, policymakers should consider implementing reforms to improve transparency, accountability, and governance mechanisms to mitigate the negative impact of leverage structure and ownership structure on corporate performance.

This study underscores the critical implications of financial leverage and ownership structure on firm performance. Prudent decision-making regarding debt utilization and ownership structure is essential for optimizing corporate outcomes and sustaining long-term competitiveness in dynamic business environments in Vietnam.

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The Importance of Research and Development Investments in Boosting Organisational Performance and Resilience in the Context of Overlapping Crises

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ABSTRACT

This research explores the role of investment in research and development (R&D) as a driver of innovation and performance in high-tech and medium-tech sectors in the context of various crises. Therefore, the study aims to analyse the impact of R&D investment on organisational performance under crisis conditions, providing a detailed perspective on different sectors. The research is based on the application of statistical and econometric methods to evaluate financial data from various high-tech and medium-tech sectors. Through this approach, the study identifies the correlation between R&D investment and organisational performance, with a particular focus on the period 2018-2022. The results show a positive and significant correlation between R&D investment and the performance of companies in high-tech industries such as information technology and computers, and semiconductors. In contrast, the pharmaceutical, biotech, and medical products sector shows an atypical pattern that does not reflect a significant direct correlation between the variables analysed, largely due to the special conditions generated by the COVID-19 pandemic. On the other hand, in medium-tech sectors such as energy and chemicals, R&D investments have not led to significant performance improvements in the context of crises. Looking at the overall results of the research, we can therefore see that the importance of investment in R&D for the performance of a company or an industry - regardless of the existing economic context - has been underlined, but it also depends on the nature of the crises, the level of technology, the long- or short-term orientation and many others. Therefore, company management must be responsive not only to the internal context of the company, but also to the opportunities and challenges generated by the economic cycle from which it cannot evade, and seek and implement methods, policies and strategies to capitalise on them and thus generate an optimal

level of return on investment in innovation, research and development. These insights provide a valuable basis for investors and managers in designing innovation and investment strategies, highlighting the importance of adapting to the economic and crisis context to maximise profitability and organisational success.

INTRODUCTION

The instability of national and international markets marked by paradigm shifts generated by overlapping crises (economic, health, energy, social and military) with profound repercussions on all dimensions of social and economic life, puts significant pressure on the resilience and sustainable development of economic entities, regardless of their field of activity and geographical area in which they operate. In this turbulent environment, the need for a high level of adaptability and innovation becomes essential to maintain competitiveness and boost performance and resilience. Success in these conditions requires an optimal level of domain-specific expertise, where the ability to apply knowledge becomes a key factor in achieving competitive advantages. The acquisition, use, and integration of knowledge is the mainstay of innovation capability and is imperative to successfully navigate the challenges of a competitive environment (Hao et al., 2020) in crises.

In this context, where knowledge and information are perceived as valuable resources capable of continuously generating added value and where the maxim "knowledge is power" is gaining increasing resonance in the world of international business, it becomes essential to promote sustainable development. This imperative is reflected in the strategies of corporations and beyond, underlining the need for a constant source of innovation fuelled by R&D funding. The results of these investments are key to increasing the level of innovation and efficiency, which contribute to increasing the firm's performance and resilience. However, the degree of commitment to R&D funding varies considerably across sectors. Industries such as pharmaceuticals, aerospace, healthcare, and education, by their nature, are prone to significant investment in research and innovation. On the other hand, sectors such as finance, real estate, retail, and construction appear to devote fewer resources to R&D. This distribution does not necessarily imply a poorer performance of the latter but highlights the diversity of sectoral approaches to innovation and research. A comparative analysis of R&D investment and its impact on the competitiveness, profitability, and resilience of firms in different high-risk contexts is therefore needed.

The study aims to analyse the impact of R&D investment on organisational performance in crisis conditions, providing a detailed perspective on different sectors. The Thus, the following objectives have been set to achieve the goal: 01: Conducting a literature review in the field of study for foundation of research hypotheses; 02: Identifying the role of R&D in increasing company performance and resilience in times of crisis; 03: Determining the impact of R&D on the performance of high, medium, and low-tech companies. The research is based on the application of statistical and econometric methods to evaluate financial data from various high-tech and medium-tech sectors. Through this approach, the study identifies the correlation between R&D investment and organisational performance, with a particular focus on the period 2018-2022. To substantiate the research hypotheses, a literature review was conducted, and the research results were overlaid with results obtained by other researchers.

The novelty and originality of our article is distinguished by its detailed approach to the impact of investment in research and development (R&D) on organisational performance in the context of economic crises. While there are previous studies examining the link between R&D and company performance, our article adds value to the literature by focusing specifically on the ability of companies to navigate through periods of economic uncertainty. We analyse this impact not only at the aggregate level, but also by technology intensity across sectors, providing a granular and contextualized perspective that is missing in much previous research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In today's world, where global crises and paradigm shifts in the economic environment are common issues, the ability of companies to remain competitive and sustain their growth becomes a major challenge. Investment in R&D plays a key role in shaping the future of these entities, providing them with the means to innovate and adapt, as well as to increase resilience. From a sectoral perspective, these investments are not evenly distributed, with differences between sectors reflecting the degree of innovation and technologisation (Montresor & Vezzani, 2015), access to government or local funding (Cruz-Castro et al., 2018; Teplykh, 2018), ownership structure (Wu et al., 2020), level of R&D outsourcing (Berchicci, 2013) and internal development strategies (Medda, 2020). Thus, exploring the dynamics of R&D investment becomes essential for understanding how companies in various industries manage to navigate through the fluctuating economic landscape and respond to the challenges brought by multiple crises.

There are a multitude of studies in the literature analysing the level of investment in research and development for different sectors of economic activity such as information and communication (Hunady et al., 2020; Hong, 2017), pharmaceutical (Xu et al., 2021), manufacturing (Singh & Chakraborty, 2021; Shen & Lin, 2020), energy (Lee & Yang, 2020), agriculture (Silva Júnior et al., 2019) and many others, identifying their characteristics according to the national or international level of analysis and its scope.

Regarding the impact of investment in R&D on increasing the performance and sustainability of economic sectors and hence of companies in those sectors in crisis situations, Spescha & Woerter (2019) identified several factors that could determine the level of correlation between them, namely: the sector to which they belong, the size of the company, the extent to which the results of R&D activities were applied and the persistence of R&D activities, to which we can also add the nature of the crisis, which can manifest itself in several areas such as financial, health, agricultural, social, political and others, and there is usually a causal relationship or chain effects between them. Due to the influence of these factors, there is also research that identifies a weak or non-existent correlation between the two variables mentioned above, although most of it points to the opposite. Thus, in the study of 25 European countries, Paramati et al, (2021) have identified that an increase in R&D investment has a positive impact on renewable energy consumption in the countries analysed, which means that companies would operate in more sustainable conditions, which is one of the global objectives in the context of the climate change crisis, the authors suggesting that more active involvement of government authorities in financing R&D activities related to this area would generate added value and make the management of this crisis more efficient. Consistency in R&D investments during crisis periods leads to a significant increase in company performance during the crisis (Dimitropoulos, 2020), as well as after the end of the crisis, regardless of the size of the companies (Park et al., 2019), this being an effective survival strategy in recessionary times for innovative and intellectual property-capable firms (Jung et al., 2018). Also, Roper & Turner (2020) identified that companies that were able to maintain the level of investment in R&D during downturns have higher chances of market survival, as well as stronger growth and higher profitability. Fan et al, (2020) identified a positive moderating effect of an adverse economic environment on the relationship between R&D and performance, and research results show that a one-unit increase in R&D investment in a crisis generates 9% company growth.

H1: Persistent investment in R&D in times of crisis has the potential to generate an increase in the performance and resilience of companies.

In their research on 1112 European and US companies for the period of 2004-2012, which aimed to identify the correlation between R&D and productivity, Castellani et al, (2019) identified that R&D investments made by companies in high-tech industries had a higher impact on productivity - in the sense of productivity growth - than those made by companies in medium or low-tech industries, which rely more on process innovation - evidenced by physical capital accumulation - than on product innovation. The same results were also obtained by Lee & Kwon (2023) who identified a positive effect of R&D on short-term performance for high-tech firms, but a negative effect for low-tech firms. These differentiations can also exist between industries in the same economic sector, such as manufacturing, as both high-tech and medium or low-tech industries can be included, which means that R&D activities are a tool for differentiation between companies as well as a real driver of their performance. This is also confirmed by Biswas, (2021) who identified that there is a positive correlation between the level of R&D investment in the pre-pandemic

COVID-19 period and the return on sales and total revenue recorded during the crisis period in the listed manufacturing firms that were analysed, with those that made an effort in this direction performing better than those that did not. The same is true for Lome et al, (2016) whose research results - conducted on 247 Norwegian manufacturers - underline the importance of funding R&D activities during downturns, highlighting once again that manufacturing firms that invested in R&D during downturns performed better than those that did not. Results in the literature suggest that companies in high-tech industries are less adaptive in their R&D investments depending on the stage of the business cycle in which they operate, compared to medium or low-tech companies (Stephan, 2004), as they have a high level of technological sophistication in their business and long-term oriented policies and projects related to R&D investments, which allows them to react less to the economic crisis conditions manifested at a given time (Cincera et al., 2012).

H2: In the case of high-tech sectors, investment in R&D has a more significant positive impact on their performance than in medium or low-tech sectors.

2. RESEARCH METHODOLOGY

To achieve the objectives set out in the study, a comprehensive and detailed research methodology was chosen, based on the analysis of secondary data collected from the Damodaran database. In particular, data on the volume of R&D investments together with various performance indicators were extracted for a total sample of 1867 listed companies in Western Europe. The sample was structured into five sectors of activity: pharmaceuticals, biotechnology and medical products (673 companies); information technology (IT) and computers (727 companies); chemicals (169 companies); energy (234 companies); and semiconductors (64 companies), for the period 2018-2022. This period was purposely chosen to assess company behaviour in the context of the multiple crises induced by the COVID-19 pandemic.

The methodology adopted for the data analysis involved the application of statistical and econometric processing techniques, using version 26 of the Statistical Package for the Social Sciences (SPSS) software. The analysis process included preliminary data preparation and processing steps, followed by exploratory analysis to identify trends and relevant patterns in the data.

To test the research hypotheses, specific econometric models were constructed for each of the industries analysed, integrating a variety of explanatory and dependent variables defined according to the specifics of each sector and the hypotheses of the study. These variables were selected based on a thorough review of the literature and included both direct measures of R&D investment and indicators of financial and operational performance to capture the effects of investment on the success of companies during the crisis period under analysis.

To ensure the robustness and validity of the results, the analysis included diagnostic tests to assess the adequacy of the econometric models as well as verification of underlying statistical assumptions. Thus, multiple regression techniques, correspondence analysis, and other relevant statistical methods were applied, depending on the nature of the data and the specific research objectives. Through this methodologically rigorous approach, the study aims to provide valuable insights and well-founded conclusions on the impact of R&D investment on company performance in a difficult economic context marked by multiple crises.

In this order of ideas, the research strategy is designed as follows (see Figure 1.):

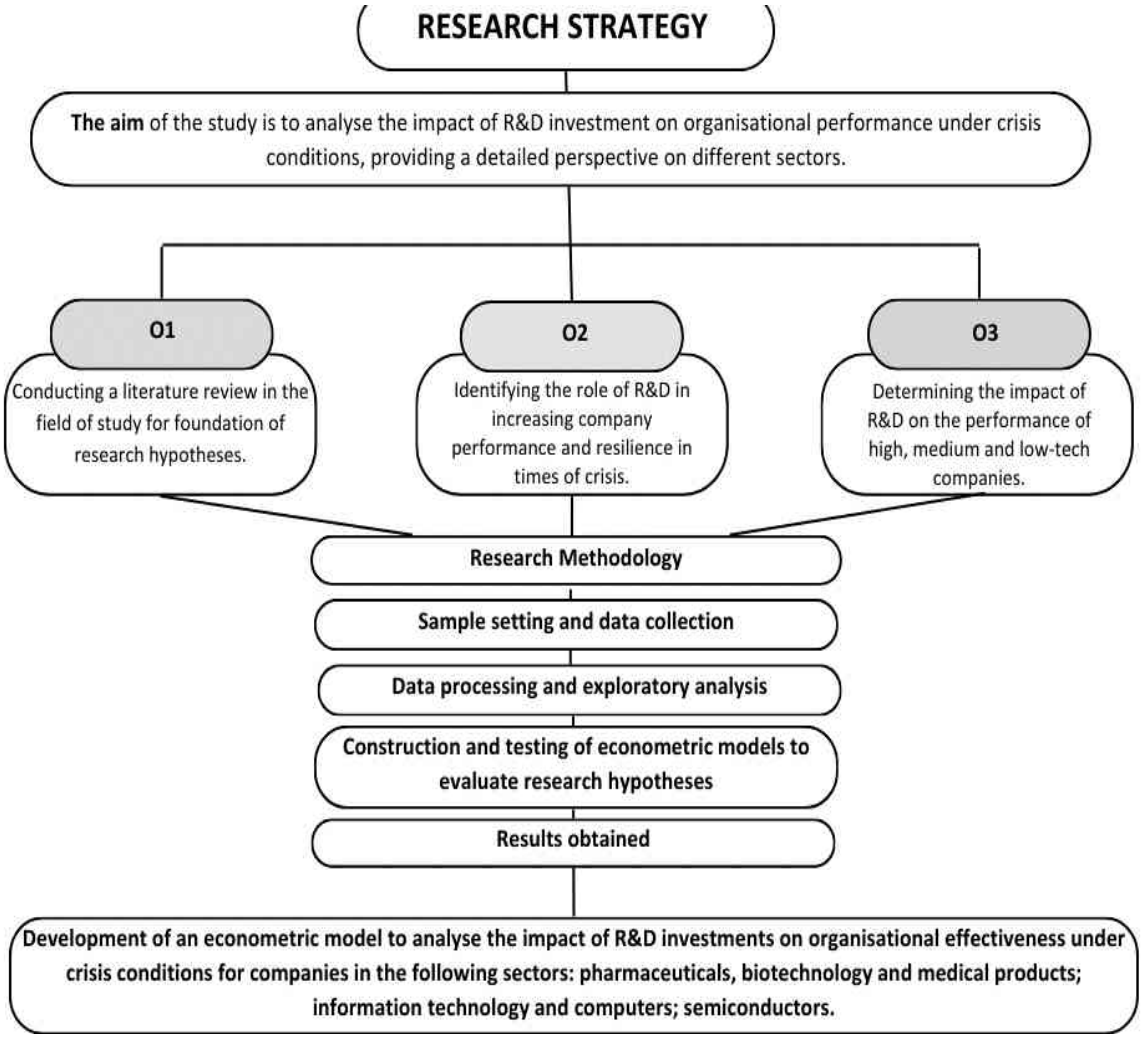

Figure 1. Research strategy

Source: developed by authors

Details of the variables used in the construction of the econometric models are presented in Table 1, thus providing a transparent and structured basis for interpreting the obtained results.

Table 1. Presentation of the econometric model and the dependent and independent variables

Description of the econometric model	*Description of variables*	
$EVA_y = \alpha_1 + \beta_1 * R\&Dexp_y + \beta_2 * ROE_y + \beta_3 * ROIC_y + \varepsilon_1$	Dependent variable	***EVAy*** - Economic Added Value** ;
	Independent variables	***R&Dexpy*** - research and development expenditure;
		ROEy - Return on Equity;
		ROICy - Return on Invested Capital

Notes. This table presents the econometric model and the dependent and independent variables considered when constructing the econometric models to confirm or disprove the formulated research hypotheses.

* y refers to the industry for which the econometric model is determined and can take the following forms: P - pharma; C - computer; Ch - chemical; E - energy; S - semiconductors;
** can be defined as a measure of a company's financial performance, being based on residual wealth calculated by deducting the cost of capital from net operating profit; it is also referred to as economic profit, as it attempts to capture the true economic profit of a company (Chen, 2022).

The Economic Value Added (EVA) indicator, also known as economic profit, was selected as the dependent variable in the study because of its ability to provide a broad perspective on a company's performance. This indicator not only measures profit but also the value added by a company's activities, thus reflecting the efficiency with which the company generates returns for its shareholders. EVA differs from other financial measures by including the cost of capital in its calculation, giving a more complete picture of a company's true economic performance.

By focusing on value created over the cost of capital employed, EVA emphasises the importance of generating a sustainable return that goes beyond simple accounting profits. This highlights the company's ability to operate not only efficiently, but also in a way that ensures long-term value growth for shareholders. In this way, EVA aligns with the concept of financial sustainability, emphasising the need to add ongoing value rather than focusing solely on maximising short-term profits. Using EVA as a dependent variable in our analysis allows for a more nuanced appreciation of the impact of R&D investment on company performance and resilience. By assessing how these investments contribute to increasing economic value added, the study aims to identify whether and to what extent R&D activities can be considered a key driver of long-term success and financial sustainability in various sectors. EVA thus becomes a vital tool in understanding the dynamics between innovation, value-added, and financial performance, highlighting the importance of strategic investment in R&D for strengthening competitive position and ensuring sustainable growth of value for shareholders.

3. RESULTS AND DISCUSSION

In the global context marked by the COVID-19 pandemic, energy, economic, and military crises, economic sectors have been under intense pressure, resulting in significant fluctuations in financial performance, with these crises being a true test of companies' resilience.

a) The first econometric model is presented for the pharmaceuticals, biotechnology, and medical products sectors. In this tumultuous landscape, this sector has attracted attention with its positive momentum, recording notable increases in profits from both an accounting and economic perspective. This suggests a potential role of investment in R&D as a factor of resilience and growth during crises. In light of these observations, we present below our analysis, which aims to explore the link between the performance of this sector and the increase in R&D activities between 201-2022. The analysis has been carried out based on the econometric model detailed in Table 1 and aims to bring clarity to the correlation between these variables and provide valuable insights into the dynamics of R&D investment and the financial success of the companies from these industries.

Table 2 below shows the results of the ANOVA test carried out to statistically validate the econometric model presented above.

Table 2. Model 1 ANOVA[a] Test

Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	27985,242	3	9328,414	125,596	,065[b]
	Residual	74,273	1	74,273		
	Total	28059,516	4			
a. Dependent Variable: EVA$_P$						
b. Predictors: (Constant), ROIC$_P$, R&Dexp$_P$, ROE$_P$						

Source: processed by the authors in SPSS v26

To ensure the rigor and reliability of the econometric model developed in our study, a significance threshold of 0.05 was set. This value represents a standard in statistical research for determining the significance of observed meanings. According to the data presented in Table 2, the significance indicator value (Sig.) reached 0.065 points, exceeding the predetermined threshold by a margin of 0.015 points. This moderate overshooting of the threshold does not validate the statistical significance of the model,

suggesting that the relationships between the variables studied are not as strong as would have been anticipated. The interpretation of this result leads us to reflect on the unique circumstances generated by the COVID-19 health crisis, in which pharmaceutical and healthcare companies recorded extraordinary profits. These profits, observed against the backdrop of the pandemic, do not appear to be directly correlated with the intensity of R&D activities undertaken during the same period. Interestingly, it appears that these companies have benefited from exceptional conditions that have allowed them to achieve outstanding financial performance in a way that exceeds expectations based on their R&D activities or on the efforts they would have had to make in a normal market environment to achieve comparable results. This underlines the complexity of the impact that the COVID-19 crisis has had on different industries, particularly in the pharmaceutical sector. In this context, our model highlights not only the relationship between R&D investment and financial performance but also how extraordinary events, such as a global pandemic, can influence these dynamics in unexpected ways. Thus, our results invite a deeper analysis of the external factors and special conditions that enabled these corporations to achieve significant returns, highlighting the need for a flexible and adaptive approach in assessing the impact of R&D investment on corporate success in times of crisis.

Table 3. Model 1 Coefficients[a]

Model		*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*
		B	Std. Error	Beta		
1	(Constant)	-159,099	22,514		-7,067	,089
	R&Dexp$_P$	13,927	3,142	,285	4,432	,141
	ROE$_P$	-27,074	2,148	-,971	-12,606	,050
	ROIC$_P$	39,800	3,381	1,019	11,770	,054
a. Dependent Variable: EVA$_P$						

Source: processed by the authors in SPSS v26

Based on the non-standardized coefficients provided in the table above, the regression equation for the dependent variable (company's Economic Value Added) and the R&D expenditure (R&Dex$_P$), return on equity (ROE$_P$) and return on invested capital (ROIC$_P$) is projected as follows:

$$\boldsymbol{EVA_P} = -159.099 + 13.927 * R\&Dexp_P - 27.074 * ROE_P + 39.800 * ROIC_P + \varepsilon_1$$

The analysis of the regression equation presented above shows that the relationship between R&D investment (R&Dexp) and economic value added (EVA) does not reach statistical significance in our specific context, as the significance value (Sig.= 0.141) exceeds the conventional threshold of 0.05. This suggests that, within our sample and the period analyzed, R&D investment does not significantly influence the financial performance of companies measured by EVA, contrary to initial expectations and pre-existing literature.

This finding is in stark contrast to the results of previous studies, such as those conducted by Nord (2011) during the great economic recession of 2007-2009 for major US pharmaceutical companies, which found a positive and statistically significant relationship between R&D investment levels and company performance. Similarly, the research of Nandy (2020), Xu et al., (2021), and Wang et al., (2022) in pre-pandemic periods corroborated this positive correlation, highlighting the importance of R&D investment as a driver of corporate growth and innovation. Interestingly, the difference between our results and those of previous research can be attributed to the unique characteristics of the global health crisis caused by COVID-19. The peculiarities of this period, such as rising prices of drugs and medical devices without a sound cost base, and production and marketing of vaccines at exorbitant prices and in disproportionate quantities, contributed to a remarkable expansion of the EVA indicator, with an increase of more than 115% in 2021 compared to 2020. This happened despite the fact that R&D investment remained relatively stable, with an annual fluctuation of a maximum of 1.5% in 2017-2021, followed by a decrease of almost

2.8% in 2022, according to data collected for our sample. This highlights the profound and atypical impact of the COVID-19 crisis on the pharmaceuticals, biotechnology and medical products industries, highlighting how extraordinary conditions can distort traditional relationships between economic and financial variables. The results point to the need for a more nuanced and critical approach when interpreting the dynamics between R&D investment and financial success in unprecedented crisis contexts, highlighting the importance of considering the broader economic and social context in economic analyses.

b) The following econometric model, specific to the IT and computer industry, presents an in-depth analysis of the dynamics between R&D investment and financial performance, as illustrated in Table 4. Remarkable is the level of perfect correlation, 1.000, between the variables selected for model construction. This absolute correlation indicates a direct and unequivocal link between the variables, a rare phenomenon in economic analysis, suggesting a perfect alignment between the increase or decrease in R&D investment and changes in calculated economic value added for companies in this sector. Moreover, the R Square coefficient, or the ratio of determination, which reaches a near-perfect level of 99.9%, demonstrates that almost all of the variation in economic value added (EVAc) can be explained by observed variations in the independent variables of the model. In practical terms, this suggests that our model is able to explain fluctuations in financial performance in the IT and computer industry based on R&D investment data with extraordinary accuracy. This highlights the critical role of innovation and technology investment in increasing the success of the this sector. The IT and computer sector, known for its dynamism and accelerated pace of innovation, seems to demonstrate that sustainable and well-targeted R&D investments are directly correlated with value-added growth, providing a solid basis for corporate strategies focused on technology and innovation.

Table 4. Model 2 Summary

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	1,000[a]	,999	,997	1,893832
a. Predictors: (Constant), ROICc , R&Dexpc , ROEc				

Source: processed by the authors in SPSS v26

According to the data in Table 5, the Sig. value is 0.035 and is below the significance threshold set at 0.05. This indicates that the model exceeds the conventional criteria for statistical significance, indicating that the relationships and effects identified between the selected variables are not only real but also statistically relevant. Particularly, by reaching a Sig. value of 0.035, our model demonstrates that there is a low probability of 3.5% that the observed relationships are the result of randomness, thus strengthening the credibility and statistical relevance of the research. It can also be stated that the results validate the applicability of the model in assessing and understanding the complex dynamics between economic value added and the increase or decrease in R&D investment.

Table 5. Model 2 ANOVA[a] Test

Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	4632,298	3	1544,099	430,519	,035[b]
	Residual	3,587	1	3,587		
	Total	4635,885	4			
a. Dependent Variable: EVAc						
b. Predictors: (Constant), ROICc , R&Dexpc , ROEc						

Source: processed by the authors in SPSS v26

Table 6 presented below provides a detailed overview of the regression coefficients to be integrated into the construction of the econometric model for the IT and computer industry. In addition, this table

reveals the nature of the relationships between the dependent and independent variables, highlighting the types of correlations that link them.

Table. 6. Model 2 Coefficients[a]

Model		*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*
		B	Std. Error	Beta		
1	(Constant)	-13,535	6,596		-2,052	,289
	R&Dexpc	6,432	,318	,820	20,201	,031
	ROEc	4,338	,633	,474	6,849	,092
	ROICc	-3,038	,593	-,305	-5,121	,123
a. Dependent Variable: EVAc						

Source: processed by the authors in SPSS v26

According to the regression coefficients presented in the table above and that were obtained from the statistical processing, the regression equation is completed as follows:

$$\boldsymbol{EVA_C} = -13{,}535 + 6{,}432 * R\&exp_C + 4{,}338 * ROE_C - 3{,}038 * ROIC_C$$

Statistical analysis of data from the IT and computer industry reveals a significant and positive relationship between the economic performance of the sector, expressed by the EVAc indicator, and the volume of investment in research and development (R&Dexpc). This finding indicates that increasing R&D efforts in the sector has the potential to boost economic performance, reflecting a directly proportional dynamic: increasing investment in R&D leads to an improvement in financial performance while decreasing such investment anticipates a decrease in performance.

The link between return on equity (ROEc) and economic performance (EVAc) in the computer industry is also positive, suggesting that efficiency in the use of equity is a key factor in generating economic profit for companies in this sector. However, the relative statistical significance of this correlation, suggested by a Sig. value of 0.092 points, indicates a moderate influence of ROEc on EVAc in the specific context of the IT industry. Also of interest is the finding of a negative correlation between the cost of capital (ROICc) and EVAc, which shows that an increase in the cost of capital, in the absence of a concomitant increase in profit, leads to a decrease in economic performance as measured by EVAc. This link suggests that financial efficiency and financing structure play an important role in shaping the economic performance of companies in this sector, although the impact of this effect is found to be statistically insignificant for the computer industry in our study. Therefore, according to the results, hypothesis H_1 is confirmed, according to which the persistence of investment in R&D, even in times of crisis, contributes to the performance growth of companies in the IT industry. This conclusion aligns with the findings of Hunady et al., (2020) who, after analyzing IT companies in 24 European countries during the 2008 financial crisis, observed a positive and significant correlation between R&D spending and labor productivity, as well as the added value generated by these businesses.

These findings underline the strategic importance of continued investment in research and development to strengthen and expand economic performance in the IT industry, highlighting the sector's ability to adapt and thrive through innovation, even in challenging economic environments. Thus, investment in R&D is confirmed to be not only a driver of growth and innovation but also a pillar of resilience and sustainable development for IT companies.

c) *The econometric model dedicated to the semiconductor industry* and presented in Table 7, shows a perfect correlation - with a coefficient of 1.000 - between the variables selected for analysis. This level of correlation indicates a direct and absolute relationship between the variables included in the model, a rare and significant phenomenon in econometric studies. Furthermore, the R Square coefficient, or the ratio of determination, reaches the maximum threshold of 100%, demonstrating that the variations observed in the independent variables can fully explain the variations recorded in the dependent variable EVAs (Economic Value Added for the semiconductor sector). Thus, the results of the econometric model

for the semiconductor industry provide a solid basis for understanding the mechanisms by which strategic investments and efficient resource management directly influence financial performance.

Table 7. Model 3 Summary

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	1,000[a]	1,000	,999	12,845718
a. Predictors: (Constant), ROICs , R&Dexps , ROEs				

Source: processed by the authors in SPSS v26

Table 8 validates the econometric model developed for the semiconductor industry, by the fact that the Sig. indicator does not exceed the 0.05 value threshold established for its significance - being 0.02 - which reinforces its statistical significance.

Table 8. Model 3 ANOVA[a] Test

Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	678788,576	3	226262,859	1371,186	,020[b]
	Residual	165,012	1	165,012		
	Total	678953,589	4			
a. Dependent Variable: EVAs						
b. Predictors: (Constant), ROICs , R&Dexps , ROEs						

Source: processed by the authors in SPSS v26

Table 9 shows the regression coefficients that will be used to complete the econometric model developed for the semiconductor industry, as well as the types of correlation between the dependent and independent variables.

Table 9. Model 3 Coefficients[a]

Model		*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*
		B	Std. Error	Beta		
1	(Constant)	733,097	50,743		14,447	,044
	R&Dexps	5,925	,179	,777	33,124	,019
	ROEs	384,112	8,345	5,921	46,028	,014
	ROICs	-477,799	11,707	-5,538	-40,814	,016
a. Dependent Variable: EVAs						

Source: processed by the authors in SPSS v26

According to the coefficients presented in the table above, the regression equation is projected as follows:

$$\boldsymbol{EVA_S} = 733{,}097 + 5{,}925 * R\&exp_S + 384{,}112 * ROE_S - 477{,}799 * ROIC_S$$

According to the data in Table 9, it can be stated that all correlations explored in the econometric model for the semiconductor industry show statistical significance, with values of Sig. being below the conventional threshold of 0.05. This findings highlight that the impact of the independent variables on the dependent variable EVAs, is not only detectable but also statistically significant, giving an undeniable relevance to the effects observed in the context of the semiconductor industry. Specifically, the positive relationship between research and development expenditures (R&Dexps) and economic performance measured by EVAs, indicates that investment in R&D is essential for the growth and development of this sector. This phenomenon is similar to that observed in the IT and computer industry, suggesting that the positive dynamics generated by increased R&D expenditure are reflected in improved economic performance, a trend that remains consistent even when R&D investment declines. The analysis also reveals a positive correlation between return on equity (ROEs) and EVAs, once again highlighting the importance of the efficient use of financial resources in generating superior economic returns for companies in the semiconductor industry. This link reinforces the idea that optimizing return on equity is a critical factor in sustaining economic growth in this sector. In contrast to the IT and computer industry, the relationship between the cost of capital (ROICs) and EVAs in the semiconductor industry is negative and statistically significant, illustrating that an increase in the cost of capital, without a commensurate increase in profits, can have an adverse impact on organisational performance. This finding shows that effective management of financing costs is vital for maintaining robust economic performance in this sector.

The findings for the semiconductor industry on the link between R&D investment and economic performance reiterate hypothesis H_1 and confirm the continued importance of R&D investment as a driver of growth, even in difficult economic environments. These results are aligned with Chen & Wu's (2020) study, which analysed Taiwanese semiconductor companies from 2004-2016 and found that higher levels of R&D spending contribute significantly to human capital accumulation and improved financial performance indicators. The findings therefore highlight the critical role of continuous innovation and strategic R&D investments in promoting sustainability and growth in the semiconductor industry, illustrating how these investments can serve as a driver of economic development and a pillar of long-term competitiveness.

Analysis of data collected from the energy and chemical sectors has identified contrasting results on the impact of investment in R&D on organisational performance. For the energy sector, the negative but statistically insignificant correlation suggests a lack of direct and relevant influence of R&D expenditure on the performance of this sector. In contrast, for the chemical industry, a positive but still statistically insignificant correlation was observed, also indicating a weak link between R&D investment and financial performance. Given the lack of validation of the econometric models by ANOVA tests, these findings sugest that R&D investments to dot add significant value in the business of these sectors. This reflects the peculiarities of medium-tech sectors, as classified by EUROSTAT (2022), where the link between R&D investment and economic growth is not as obvious or direct as in high-tech sectors. These results therefore support and validate hypothesis H_2: *In the case of high-tech sectors, investment in R&D has a more significant positive impact on their performance than in medium or low-tech sectors,* with the notable exception of the pharmaceutical industry. These findings are consistent with existing literature in the field, including studies of Castellani et al. (2019) and Lee & Kwon (2023), which demonstrated that the effect of R&D investment on short-term performance (i.e. return on investment) is positive in high-tech firms, but tends to be negative in low-tech firms.

This dynamic highlights the role of innovation and research in stimulating growth and competitiveness in technologically advanced sectors, while underlining the challenges and limitations associated with generating added value through R&D in less technologically advanced sectors. These findings emphasise the need for different and sector-specific strategies to optimise the impact of R&D investment on economic performance, reiterating the importance of the sectoral context in assessing the benefits of R&D.

CONCLUSIONS

The research shows that companies behave differently in terms of their R&D investment in times of crisis depending on the industry in which they operate and that this difference may be due to the level of technological sophistication of the companies, the importance of the work carried out in managing the nature of the crisis, their long-term or short-term planning of innovation projects, the possibility of accessing financial resources to fund these projects and much more. The data collected showed that the high-tech sectors like pharmaceuticals, biotechnology, and medical products, computers and digital communication and semiconductors, saw increases in R&D investment during the period of the COVID-19 crisis, while the medium-tech sectors, i.e. energy and chemicals, saw decreases in the funds allocated to these investments. From another perspective, it can be seen that companies in the sectors that had significant relevance in managing and combating the COVID-19 crisis continued to increase their R&D investments, while those that were not so relevant in the given context experienced decreases in the funds allocated to this direction. Therefore, we can appreciate that the allocation and return on R&D investment under crisis conditions is also influenced by the nature of the crisis in question (economic, social, political, health, etc.) as well as by the sector of activity, since the same amount invested in R&D in the construction sector for example, has a different overall level of return for the same amount invested in the digital communication sector under the same market conditions.

As can be seen, investment in knowledge and innovation has generated an increase in performance for some of the analysed industries during the crisis period under review, which reinforces the importance of the consistency of such investments, regardless of the economic conditions and context existing at any given time, since all of them will pass according to the theory of economic cyclicality, and the added value through R&D will not be long in bringing returns, especially since it represents a remarkable competitive advantage. Thus, for the high-tech industries of information technology and computers and semiconductors, a positive and statistically significant correlation was found between the level of R&D investment and the level of economic profit over the period analysed. The same correlation could not be identified for the pharmaceutical, biotechnology, and medical products industries, although they recorded steady increases in R&D investment over the period analysed, but not in correlation with the increase in performance expressed by the EVA indicator, which recorded steep upward trends of almost 85% in 2020 compared to 2019 and more than 115% in 2021 compared to 2020, with a drop of almost 82% in this performance indicator in 2022 - after the official end of the pandemic. Therefore, we consider that for this sector it was not possible to find a statistically significant correlation precisely because of the peculiarities of the COVID-19 health crisis that generated special contexts and events (unjustified high cost of medicines and medical equipment, excessive sales of vaccines and at unjustifiably high prices, the social feeling of fear caused by the general quarantine that influenced citizens' medicine purchasing behaviour etc.) although in other crisis contexts (such as the 2008 financial crisis), a positive and significant correlation between the level of investment in R&D and the level of performance in the industry has been identified.

As regards the medium-tech sectors analysed, i.e. energy and chemicals, no statistically significant correlation could be identified between the level of investment in R&D and the level of performance recorded, as for the former there were constant decreases during and after the COVID-19 crisis, while the performance expressed by the EVA indicator also showed some fluctuations, with a significant increase for both industries in 2021 compared to 2020 and then a significant decrease in the following year. Of course, a company's economic profit can also be boosted by other internal or external factors, not only by the level of investment in innovation.

Looking at the overall results of the research, we can therefore see that the importance of investment in R&D for the performance of a company or an industry - regardless of the existing economic context - has been underlined, but it also depends on the nature of the crises, the level of technology, the long- or short-term orientation and many others. Therefore, company management must be responsive not only to the internal context of the company, but also to the opportunities and challenges generated by the economic cycle from which it cannot evade, and seek and implement methods, policies and strategies to capitalise on them and thus generate an optimal level of return on investment in innovation, research and development.

However, our research has certain limitations that need to be exposed. One of these is the predominant focus on the correlations between R&D and economic performance, without exploring in depth other factors that may influence this relationship, such as the specifics of the innovations generated or the macroeconomic context. In addition, the use of generic performance measures such as EVA may not fully capture the subtle or long-term impact of R&D investment on innovation and market competitiveness. Future research directions could include a more detailed analysis of the types of innovations generated by R&D investments and their specific impact on company performance in different sectors. It would also be relevant to explore the interaction between R&D investment and other factors, such as market strategies, goodwill value, organisational culture and adaptability to change, to provide a more nuanced understanding of the dynamics between innovation and business success.

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Migration Processes in the Labor Market Related to the Level of Development of Self-Employed Youth

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ABSTRACT

The relevance of the study is due to a number of factors that currently have a significant impact on the labor market and social relations, requiring deeper analysis and understanding. The study of migration processes will allow us to better understand how the use of freelancing affects the economic situation of young people. The purpose of this study is to analyze and assess the impact of the level of development of freelancing and self-employment on the migration processes of young people in the labor market. To achieve this goal, current trends in the development of freelancing, self-employment and migration among young people will be examined, as well as an analysis of the factors influencing these processes. The results obtained will make it possible to formulate recommendations for optimizing employment policies and migration strategies, taking into account the characteristics of this category of workers. The research hypothesis lies in the assumption of a relationship between migration processes in the labor market and the level of development of freelancing among self-employed youth. The results of the study indicate that freelancing remains an important and promising area for professional development, and freelancers continue to play a significant role in the modern economy. Statistics show that a significant part of the services provided by freelancers is related to areas of knowledge, such as programming, IT services and business consultations.

INTRODUCTION

In recent decades, migration processes in the labor market have become an increasingly pressing topic in the context of economic and social development. Of particular interest are migrations associated with freelancing and self-employment of young people. The growing number of young people choosing to work for themselves rather than in an office is introducing significant changes in the structure of labor relations and requires an in-depth analysis of the consequences of such processes for the labor market and society as a whole.

In this study, we focus on migration flows caused by freelancing and self-employment among young people. We examine the impact of these processes on employment levels, incomes and quality of life of young workers, as well as on labor market dynamics in different regions. It is important to identify factors that contribute to the strengthening or weakening of migration flows in this category of the population and to identify strategies that contribute to the effective management of these processes.

The changing world and labor market require aspiring professionals to have skills such as the ability to act without clear instructions and templates, as well as to be independent in decision-making. Such competencies are united under the term “agency” (from the English agency) or “independence” (“pro-activity”, “initiative”, “entrepreneurship”, etc.). Increased attention to this issue is determined by changes in the economy and society, which in sociology it was proposed to call it destructuration. In the labor market, it manifests itself in the fact that in addition to the usual traditional corporate employment associated with sustainable structures, alternative forms are becoming increasingly popular and widespread - platform employment, freelancing, entrepreneurship, etc. In addition, the so-called corporate entrepreneurship is also becoming increasingly popular in organizations. The problem is that scientists and practitioners do not have a common opinion on what a person should be able to do in order to be successful in the new employment conditions, and how to develop these skills, including agency.

Freelancing continues to be one of the most current trends in the labor market. The number of freelancers is constantly growing, which confirms the interest in this form of employment of both specialists and businesses that attract independent performers. With the growing number of freelancers, competition in the market has also increased. Providers began to offer not only more services, but also higher quality in order to stand out from other specialists. The ability to adapt to any changes again proved to be the most important advantage for everyone. The development of artificial intelligence, new technologies, automation - all this is already affecting both the labor market and the freelance market, in particular, so in 2024 there will be those who will be able to use everything new to their advantage.

Thus, with the development of technology, new needs and specializations will arise that freelancers can master. New professions have already appeared in 2023, so in 2024 and the near future we must be prepared for the emergence of new niches, professions and opportunities that will influence the migration processes of freelancing development for self-employed youth.

1. LITERATURE REVIEW

Online freelancing, a type of contingent work performed through digital labor platforms, has received increasing scholarly attention in CSCW and related communities in recent years. However, the research landscape still lacks a comprehensive understanding of this phenomenon (Kim et al., 2023).

Young people around the world continue to move domestically and internationally due to a variety of factors that either push them out of their country/place of origin or pull factors that draw them to their destination region. Some of these factors include employment, education, marriage and escape from poverty, violence, conflict and environmental change (United Nations Department of Economic and Social Affairs (UNDESA, 2016); International Labor Organization (ILO, 2023). Youth are overrepresented in migration for humanitarian reasons, including as refugees, asylum seekers and unaccompanied minors. Finding work continues to be an important driver of youth migration in both developed and developing countries.

Youth make up the bulk of annual movements, and the propensity to migrate is generally highest among this age group. It is estimated that 10% of those migrating are young people. In 2013, young

migrants made up 10.2 percent of migrants in developed countries, 14.9 percent in developing countries, and 20.9 percent of migrants in least developed countries. Although migration is one of the ways to accelerate economic and social development, young people migrate amid high unemployment rates around the world (Africa Center for Strategic Studies, 2021), an estimated 73 million young people worldwide are unemployed. This exposes them to exploitation and they are often scapegoat for the failings of economic and social systems.

In order for young migrants to integrate into society, become active citizens and contribute to the development of the host country, investment in their social, economic and physical well-being is necessary. Migration, if managed well, is a resource for improving the livelihoods of young people, on the other hand, if not managed properly, it can reduce the life chances of these young people. One of the key elements to ensuring the development and integration of young migrants is to involve them in discussions (at global, national and local levels) that affect their own lives. They must play a key role in policy discussions, decision-making processes and activities that affect their well-being. This is due to the goal of the United Nations Youth Strategy, which is to:

- promote greater impact and expansion of activities at global, regional and country levels to meet needs;
- creating an agency and promoting the rights of young people in all their diversity throughout the world;
- to ensure their involvement and participation in implementation;
- Review and follow-up on the implementation of the 2030 Agenda for Sustainable Development and other relevant global agendas and frameworks.

Young people, including migrants, must therefore actively participate in initiatives to improve their health and well-being as part of the Sustainable Development Goals agenda. In addition, increasing the meaningful participation of youth in migration policy debates and programs will be critical for migration management to harness the development potential of youth migration while mitigating the associated risks.

The emergence of digital employment platforms in the late 1990s became a catalyst for the widespread adoption of online freelancing (Berg et al.; Kuhn, 2016). This mode of work is characterized by an emphasis on knowledge-intensive and often complex projects, frequent interaction with clients, medium- and long-term contractual agreements, flexibility in terms of space and time for work (Anwar&Graham, 2020; Margaryan, 2019; Bucher, 2021). These attributes distinguish online freelancing from other forms of work in the platform economy, such as microtask-based crowdworking (e.g. Amazon MTurk) and location-based work (Raluca&Anca, 2022).

Online freelancing is becoming increasingly common and is expected to continue this upward trajectory for the foreseeable future. It is estimated that there are currently about 60 million freelancers in the United States and 163 million worldwide doing this work (Stephany, 2021; Freelance forward, 2022). Projections show that freelance professionals will make up 60% of the global workforce by 2027, and the United States is expected to have nearly 90 million freelancers by 2028. The rise of online freelancing also reflects an ongoing transformation in the world of work, particularly in terms of how work is performed, employment is determined and career paths are chosen. Online freelancing represents a shift away from the traditional work schedule, giving way to alternative arrangements such as remote and hybrid work.

Thus, the rapid growth of self-employment has significantly changed the nature of global employment and redefined the concept of work (Alvarez De La Vega et al, 2021), (Hong and Pavlou, 2017), (Lehdonvirta et al., 2019), (Munoz et al., 2022), (Poon, 2019), (Sutherland et al., 2020). At the same time, online employment platforms (OLPs) have recently experienced an accelerated growth in their activity (Graham et al., 2017), (Kokkodis and Ipeirotis, 2016),(Melián-González and Bulchand- Gidumal, 2018), (Pongratz, 2018), (Wagner et al., 2021), (Zhou et al., 2022). These platforms allow transactions and task execution to be geographically dispersed. They also offer opportunities to enter the labor market, leading to an increase in the number of freelancers (Borchert et al., 2018). OLPs mitigate some of the historical problems of traditional work environments related to location, cost, unavailability of skills, lack of diversity and limited movement of workers. By overcoming some of these challenges, OLPs reduce the asymmetries

created by inequalities and inequalities in the market. The overall effect of OLP growth is positive, with improved economic conditions, reduced poverty and improved quality of life.

One of the distinctive elements of OLP is that task completion is displayed entirely online, which facilitates remote task completion and a wide range of potential employers (clients) and freelancers. The OLP environment is typically characterized by abundant labor and easy-to-perform jobs that do not require advanced or specialized skills. These features make OLPs attractive to self-employed or independent workers, so-called freelancers.

Thus, the author, in the process of analyzing foreign literature, came to the conclusion that migration processes in the freelance labor market of self-employed youth represent the transition of young people from one region or country to another in order to engage in independent activities on a remote basis. These processes can be caused by various factors:

- Labor market potential - young people may migrate to labor markets with higher demand for freelancing services or more favorable conditions for self-employment.
- Technological opportunities - the development of information technology allows young people to work remotely from anywhere in the world, which contributes to the migration of freelancers in search of better opportunities.
- Education and qualifications - young professionals can migrate to places where the best opportunities for professional growth and development are provided.
- Economic factors - instability of national economies and high unemployment may encourage young people to look for work opportunities abroad or in other regions with more stable economies.
- Cultural and social aspects - youth may migrate for cultural or social reasons, such as the desire to explore new cultures or live in places with a better environment for their age.

These migration processes can have an impact both on the countries and regions from which young people leave, and on the places where they come. It is important to study their dynamics and implications for both parties in order to develop policies that promote sustainable development of the labor market and the economy as a whole.

2. ANALYSIS AND METHODOLOGY

Self-employment occurs across all ages, education levels, and incomes, although it tends to skew toward younger workers and people with lower incomes (Figure 1).

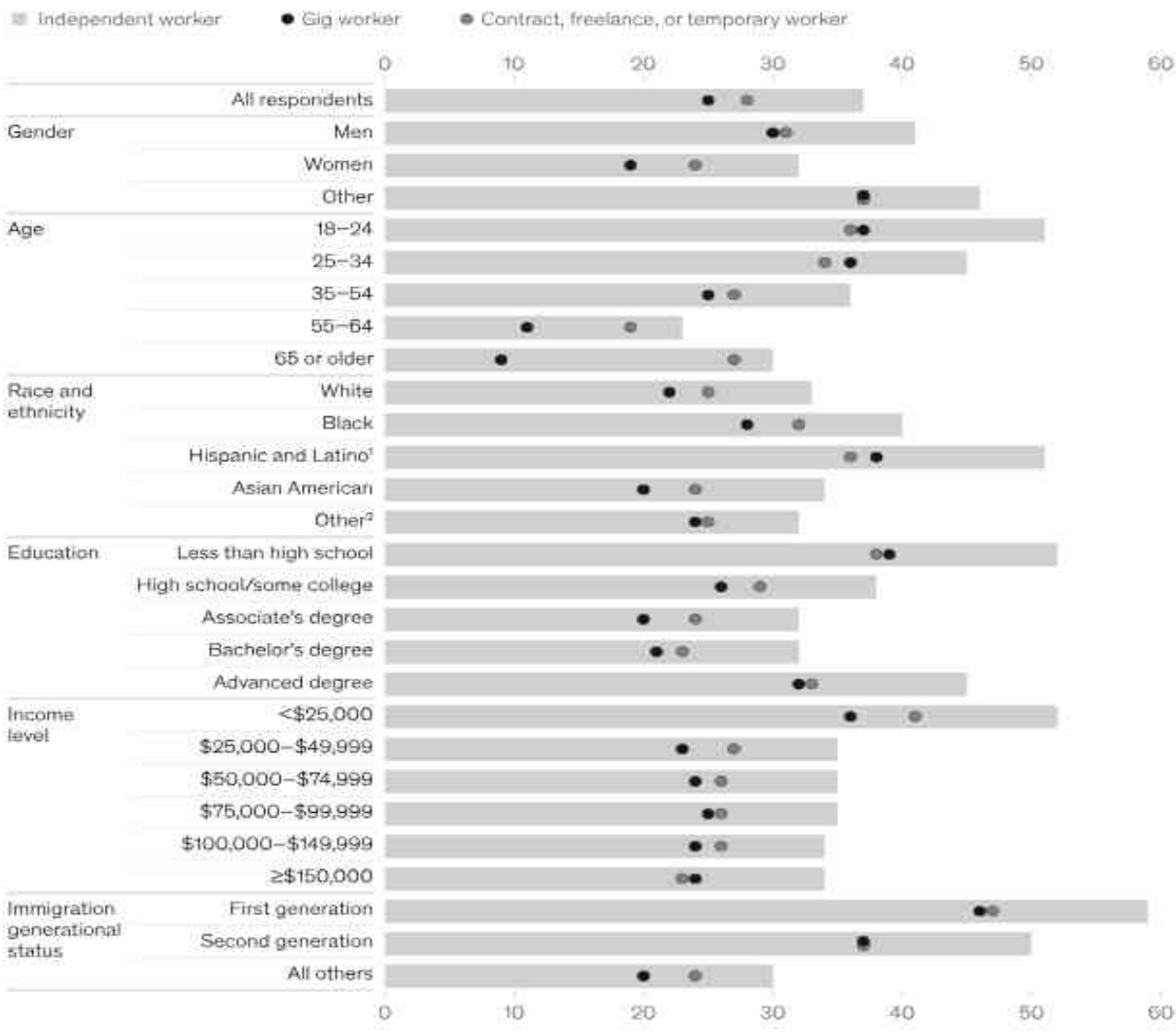

Figure 1. Immigrants, young workers and lower-income workers who engage in freelancing

Source: compiled by authors according to https://www.mckinsey.com/

It's likely for these reasons that twice as many people who freelance, contract, gig and side hustle jobs report using government programs than those who work full-time. Many independent workers must account for unreimbursed expenses that reduce net income, including vehicles, office space and other business expenses. Independent workers must cover both the employer and employee's share of social security contributions, and any time off is paid for out of their own pocket.

Freelancing and contract work, side hustles and part-time jobs are increasingly common features of the modern workforce. According to expert forecasts, the following trends can be identified in the field of freelancing in 2023.

Key trends in freelancing:

– due to the development of technology and increasing opportunities for online communication, more and more people prefer to work remotely;
– an increase in the number of projects related to artificial intelligence and machine learning. Process robotization and task automation are becoming increasingly popular, which opens up new opportunities for freelancers;

– growing demand for cybersecurity services. Due to the increasing number of cyber attacks and network vulnerabilities, more and more companies and organizations require professional services to protect their data;
– an increase in the number of projects related to blockchain technologies, which are already widely used in various fields, and in the coming years this trend will only intensify;
– growing demand for services in the field of marketing and advertising on social networks.

However, it should be noted that the freelancing market is very dynamic, and new trends can appear and change very quickly. Therefore, to remain relevant in this market, it is necessary to constantly monitor news and changes in the industry. For example, due to the COVID-19 pandemic, remote work has become even more relevant, and many companies have switched to this work format. This could lead to new changes in the freelancing market, such as increased demand for software development services for remote work or online training services. Companies and organizations that rely on independent workers should consider the reasons why people are attracted to this type of work and recognize the increasing availability of flexible working as permanent employment. As more employees are able to work from home or on flexible schedules, fewer of them may be drawn to the freelance or contract work that was once the sole provider of such arrangements.

The relationship between permanent migration to individual countries of the Organization for Economic Co-operation and Development (hereinafter referred to as OECD) and freelancing can have several aspects:

1. *Economic aspect*. Migrants arriving in OECD countries face difficulties finding work in the traditional labor market due to language barriers, lack of professional experience or recognition of qualifications. In such cases, they turn to freelancing as a way to earn money. Freelancing allows them to work regardless of where they live, using their skills and knowledge to earn a living.

2. Integration and social adaptation. For many migrants, freelancing is an intermediate step on the path to integration into a new country. This may be particularly useful if they do not yet have sufficient language skills or professional experience to qualify for regular positions. Freelancing also allows migrants to take their first steps in the labor market, explore local market conditions and build their own client base.

3. Economic growth. The development of freelancing can contribute to economic growth both in the receiving country and in the country from which migrants arrive. Freelancers bring new ideas, knowledge and experience to the economy, create jobs and stimulate innovation.

4. Labor market. The rise of freelancing influences labor market dynamics in OECD countries, including changes in the structure of employment, the demand for certain skills and services, and competition among workers. Permanent migration is driving increased demand for freelance services, requiring flexibility and adaptability.

The dynamics of the evolution of permanent migration to OECD countries can be seen in Figure 2.

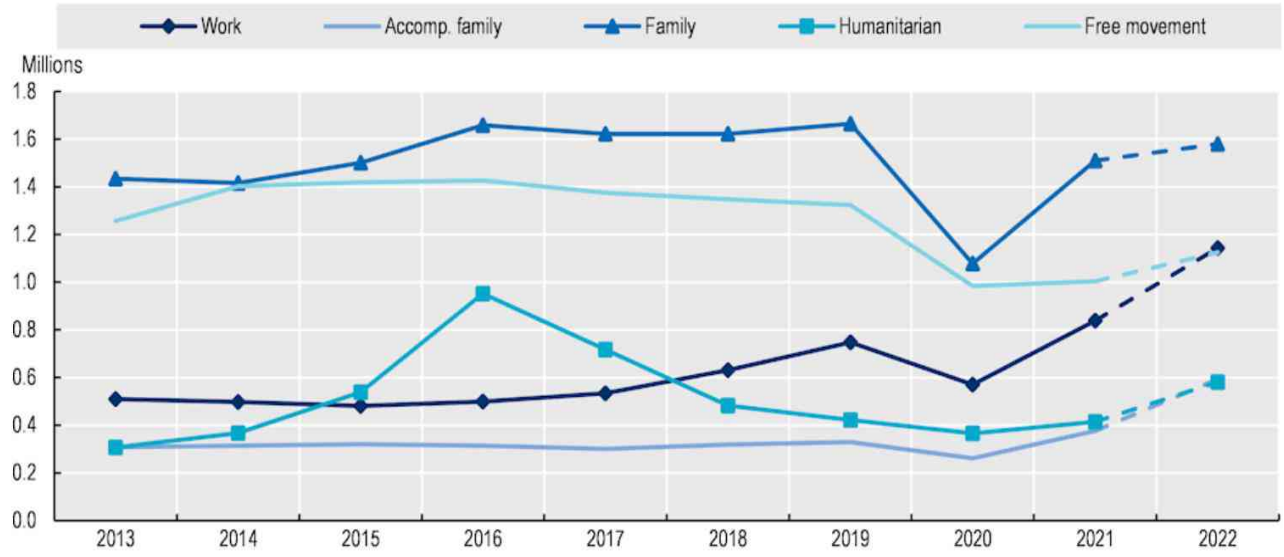

Figure 2. Permanent migration to the OECD region by entry category from 2013 to 2022.

Source: compiled by authors according to https://stat.link/ec3iua https://doi.org/10.1787/data-00342-en.

The category of migrants engaged in freelancing is important both for individuals and for society as a whole, influencing the economic and social aspects of life in new countries of residence (Figure 3).

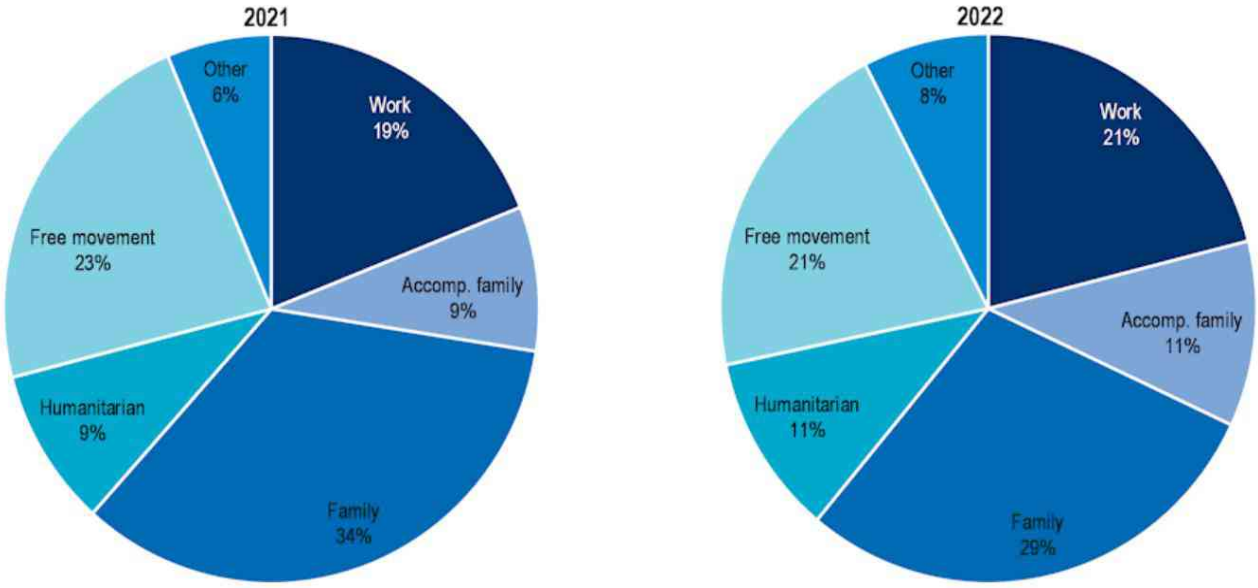

Figure 3. Categories of entry in 2022, in %

Source: compiled by authors according to https://stat.link/ec3iua https://doi.org/10.1787/data-00342-en.

The Upwork Research Institute's 2023 Freelance Forward Survey, a representative study of 3,000 professionals, shows that a staggering 38% of the US workforce, or 64 million Americans, did freelance work in the past year, an increase of four million from the previous year. The study also found that American freelancers contributed approximately $1.27 trillion in annual income to the US economy.

Results were compiled to provide demographic representation according to the U.S. Bureau of Labor Statistics' 2023 labor force statistics based on the Current Population Survey and the American Community Survey. The overall error of the study is ±1.7% at a confidence level of 95%. Freelancers: ±2.8%, Non-Freelancers: ±2.2%. 3,000 working U.S. adults over 18 years of age were surveyed online between October 24, 2023 and November 9, 2023. Of these, 1,142 were freelancers and 1,858 were non-freelancers.

The growing impact of freelancing on the workforce is largely due to professionals seeking alternatives to traditional 9 to 5 models in favor of more flexible arrangements. Data shows that professionals are turning to freelancing for more flexible arrangements, autonomy and control over their careers.

3. APPLICATION FUNCTIONALITY

On average, each year over the past decade in the United States, an additional 1 million people have decided to join the freelance workforce. Also in 2014, freelancers contributed about $715 billion to the economy. This represents an increase of 78% in just ten years (Figure 4).

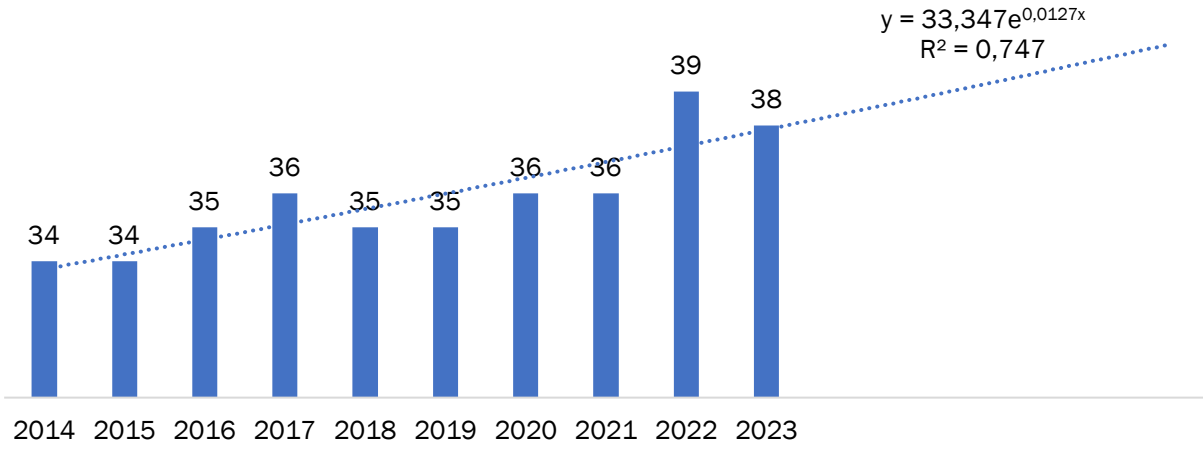

Figure 4. Share of professional freelancers in the USA, in %

Source: compiled by authors according to https://www.upwork.com/

According to Figure 5, we can see that the share of freelance professionals has grown to nearly 64 million Americans, representing 38% of the US workforce (Figure 5).

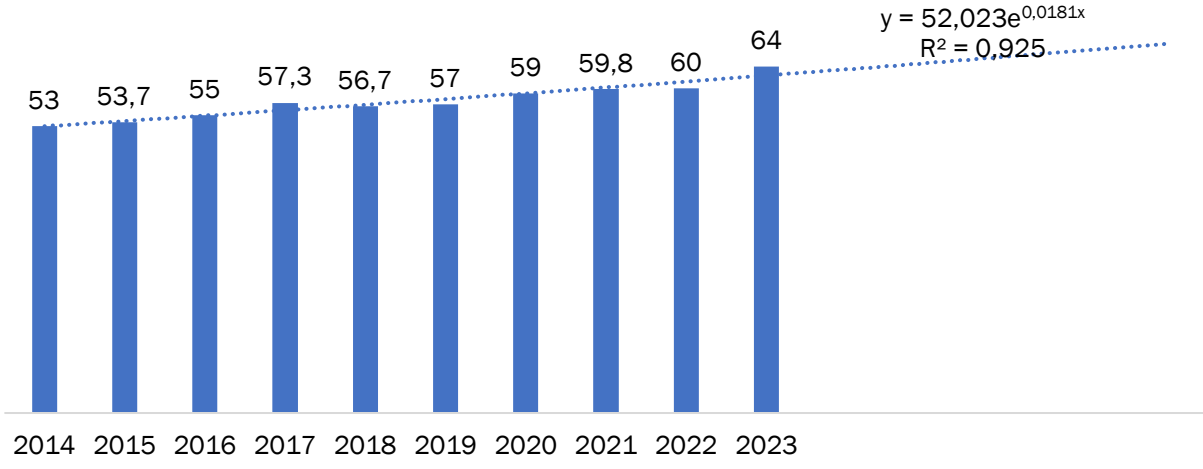

Figure 5. Number of freelancers in the USA from 2014 to 2023, in million

Source: compiled by authors according to https://www.statista.com/

As a result of forecasting the number of freelancers in the United States for 2024-2026, the following trend was noted (Figure 6).

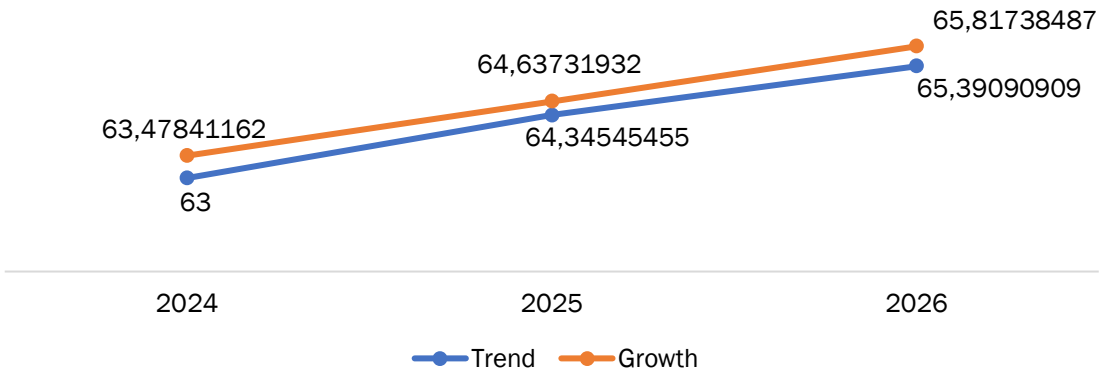

Figure 6. Forecast of payments made by freelancers in the USA for 2024-2026, in million

Source: own

Regression statistics							
Multiple R	0,981155452						
R- square	0,96266602						
Normalized R-square	0,959272022						
Standard error	0,785943804						
Observations	13						
Analysis of variance							
	df	*SS*		*MS*	*F*	*Significance F*	
Regression	1	175,2052		175,2052	283,6378	3,35E-09	
Remainder	11	6,794784		0,617708			
Total	12	182					
	Coeffcients	*Standard error*	*t- statistics*	*P-Value*	*Min 95%*	*Max 95%*	*Min 95,0%*	*Max 95,0%*
Y- intersec-tion	1965,563329	3,239626	606,7254	3,06E-26	1958,433	1972,694	1958,433	1972,694
Variable X 1	0,920810976	0,054675	16,84155	3,35E-09	0,800472	1,04115	0,800472	1,04115

Figure 7. Output of results

Source: compiled by authors

As a result of the study, a growing trend in the number of freelancers in the United States was identified every year. The growing trend in the number of freelancers in the United States every year is due to several factors:

- firstly, the development of information technology and the Internet has created a favorable environment for remote work and provided access to the global labor market. Young people who grew up in the digital age have the skills necessary to work in the online environment, which contributes to their predominant attraction to freelancing;
- secondly, freelancing provides flexible working conditions, which is especially attractive for young people seeking a balance between work and personal life. It allows young professionals to independently manage their work schedule and choose projects that suit their interests and skills;

– thirdly, young people often have innovative and creative ideas, which makes them in demand in the freelance market, where originality and a unique approach to solving problems are often valued. This further stimulates the growth in the number of young people engaging in freelancing.

Thus, coupled with the development of technology and the need for flexibility in work, youth leadership in the freelancing industry is a natural phenomenon, confirmed by the research results.

CONCLUSION

In today's dynamic business landscape, the ability to leverage freelance talent allows organizations to scale efficiently and access specialized expertise when needed. Engaging freelancers is not just a trend, but a strategic imperative for companies looking to thrive in today's economy as freelancers bring flexibility, diverse skills and fresh perspectives to companies, promoting innovation and adaptability.

As a result of the study, the author identified a growing trend in the number of freelancers in the United States every year, the growth of which is due to several factors:

– firstly, the development of information technology and the Internet has created a favorable environment for remote work and access to the global labor market, which helps attract young people to freelancing;
– secondly, the flexible working conditions provided by freelancing are especially attractive to young professionals seeking a balance between work and personal life;
– thirdly, young people often have innovative ideas, which makes them in demand in the freelance market. These factors, combined with the need for flexibility in work, make young people the leaders in the freelancing industry.

In general, the freelance market is promising and dynamic, and its development will continue in the future. However, to work successfully in this field, you need to be prepared for constant changes and follow new trends and technologies. This is the only way to remain in demand and successful in this labor market.

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Budgetary Support for the Financial Recovery of Agricultural Entities in Foreign Countries

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ABSTRACT

The study is relevant in the context of the growing need for financial recovery of agricultural enterprises in foreign countries. Periodically occurring economic crises, changes in world trade and climate anomalies can seriously threaten the financial well-being of agricultural entities. Budget support becomes a key tool to ensure the sustainability of their activities. Analyzing the experience of other countries in this area will help identify effective approaches and tools that can be adapted for use in your country. Such research can offer useful recommendations for developing strategies for budgetary support of agricultural formations that contribute to their sustainable development in conditions of instability and changing market conditions. The purpose of the study is to analyze the mechanisms and effectiveness of budget support for the financial recovery of agricultural entities in various foreign countries. Research hypothesis: Budgetary support for the financial recovery of agricultural entities in foreign countries is an effective tool for stimulating the sustainable development of the agricultural sector and increasing its competitiveness. This hypothesis assumes that properly organized and targeted budget support can contribute to the financial recovery of agricultural entities, improving their financial situation and promoting their sustainable development .

INTRODUCTION

Budgetary support plays a key role in stimulating and developing various sectors of the economy, including agriculture and agro-industrial complex. In foreign countries, budget programs are aimed at the financial recovery of agricultural entities in order to improve their competitiveness, sustainability and efficiency. In the context of modern challenges such as climate change, threats to biodiversity, and economic and social changes, fiscal support measures become especially important to ensure sustainable agricultural development.

This study examines the role and significance of budgetary support for the financial recovery of agricultural entities in foreign countries. Various aspects of budget programs, their effectiveness and impact on the development of the agricultural sector are analyzed. In particular, the effectiveness of current budget support mechanisms is examined, key success factors and challenges are identified, and recommendations are made to improve the effectiveness of such programs.

Specific research objectives include:

- Study of existing programs and mechanisms of budgetary support for agricultural enterprises in various countries.
- Assessing the effectiveness and efficiency of the applied methods and tools of budget support.
- Analysis of factors influencing the success or failure of budget support for agricultural formations.
- Identification of best practices and recommendations for optimizing budget support in agriculture.
- Proposing strategies and mechanisms to improve the efficiency and effectiveness of budget support for agricultural enterprises in foreign countries.
- The results of this study will help to better understand the role of budget support in agriculture and develop strategies for its more effective use in the context of modern challenges and requirements.

It is expected that a comprehensive analysis, an adapted approach and taking into account both positive foreign experience and erroneous government decisions will make it possible to develop and create the prerequisites for increasing the efficiency and competitiveness of the agro-industrial complex, which will significantly contribute to strengthening food security.

1. LITERATURE REVIEW

The concepts of effective use of budget funds, sources of their formation, methods and evaluation indicators occupy a special place among the scientific areas of analysis and control. Despite the fact that efficiency refers to the target characteristics of an economic entity and many researchers have been involved in its assessment, complete clarity in the definition of the concept of budget efficiency has not yet been achieved. This situation is explained by the fact that this concept is closely related to politics, ways of running the economy at the macro level and organizational and legal forms of management and types of economic activities at the micro level.

Management effectiveness cannot be measured by any one indicator, but is defined as the result of a complex interaction of various factors: natural, human, socio-economic, environmental, etc., influencing the adoption and implementation of management decisions.

A critical cornerstone of building a modern budget system is the implementation of performance-based budgeting (PB), which is defined as “the systematic use of performance information to inform budget decisions, either as a direct input to budget allocation decisions or as contextual information to inform budgetary decisions.” budget planning, and to ensure greater transparency and accountability throughout the budget process by providing legislators and the public with information on spending objectives as well as results achieved (Schick, 2014), (Gillan et al., 2021).

Countries with a higher proportion of ministries using performance targets in budget discussions tend to have lower public debt and higher GDP growth (Shahvalizadeh, 2020), (Yuhertiana and Fatun, 2020).

For finance ministries, performance budgeting provides new types of information to help them make resource allocation decisions based on evidence of what works, as well as tools to make line ministries more accountable for the efficiency and effectiveness of spending (Blazely, 2018).

Analyzing the essence of efficiency indicators used in budgetary practice, it becomes obvious that the very concept of efficiency in relation to the results of the implementation of programs/subprograms needs clarification and specification. In this regard, it seems necessary to evaluate the effectiveness of the results obtained from the point of view of various aspects of efficiency, among which in the practice of program budgeting the most important traditionally are: impact on society, effectiveness, productivity, quality of service, quality of the organization (Khan and Hildreth, 2002), (Gilmour, 2007), (Miller et al., 2010). Examples of such indicators include: indicators of income growth in a specific industry, regional income growth, completion of the development of a specific technology, the level of competitiveness of the industry in the world market (Peacock, 2008).

In highly developed countries of the world, in order to support the development of the agricultural sector, the state, through authorized bodies, pursues a flexible fiscal policy, organizes preferential lending, participates in agricultural insurance, supports the income of agricultural producers, carries out price and tariff regulation, allocates public investments for the development of production and market infrastructure, and subsidizes exports and uses other measures of government support and regulation. It is thanks to enhanced government support for agriculture that the countries - the largest food exporters - the USA, China, Canada, EU countries, Brazil - were able to achieve an increase in agricultural production parameters and strengthen their food security (Toktomamatov et al., 2017).

In the studies of many authors (Abdiev et al., 2017; Avzalov, 2016; Vartanova, 2019; Vartanova and Drobot, 2018; Vasilchenko and Derunova, 2020; Ovchinnikov, 2018; Prokofiev et al., 2019; Sultanova, 2017; Sushko, 2020; Chernikova et al., 2020) considered various aspects of solving budgetary support for agricultural formations in the practice of foreign countries.

For a more detailed and accurate assessment of the effectiveness of using budget resources, it is extremely important not only to continue, but also to actively develop and improve analysis methods and tools. This will allow for a deeper and more complete assessment of the efficiency of spending funds, identifying potential bottlenecks or opportunities for optimizing budget processes. This approach will allow government agencies and organizations to make more informed and informed decisions aimed at achieving maximum efficiency in the use of budget resources.

2. FOREIGN EXPERIENCE IN THE EFFECTIVE DISTRIBUTION OF FUNDS BETWEEN LEVELS OF MANAGEMENT AND DECENTRALIZATION OF THE BUDGET

Fiscal sustainability is determined by the influence of internal and external factors. At the same time, external factors, as a rule, do not depend on the region, so the authorities cannot influence them and they have to come to terms with them and adapt to the circumstances. Unlike external factors, internal factors depend on the region, so regional authorities can adjust their budgetary stability by influencing these factors.

Interlevel transfers constitute the bulk of local (subnational) income in most countries. They are used to ensure that revenues roughly match the spending needs of local (subnational) governments at different levels. They are also used to achieve government and local goals, such as equality and justice, and to stimulate overall economic growth.

The composition of such transfers provides incentives for higher-level and local governments, affecting financial management, macroeconomic stability, fair and efficient redistribution, and the quality of services. Among non-targeted transfers to subnational budgets, equalizing subsidies for budgetary security and subsidies for maintaining and ensuring the balance of regional budgets are of key importance.

Equalization subsidies are the main tool of the central government to reduce interregional disproportions and differentiation. The non-targeted nature of this form of transfers ensures the flexibility of regional

budget policy, since subnational authorities independently determine the directions for using these funds in accordance with local priorities.

In foreign economies, inter-budgetary regulation is determined depending on the specifics of the budget system of each specific state. International organizations recognize the impossibility of using the same or standard methods and approaches for all countries in financial equalization according to one general model, that is, the impossibility of determining a perfect degree of equalization common to all.

The experience of the world's developed countries demonstrates uniform mechanisms for the distribution of budgetary resources between the budget levels of countries, mainly these are:

- macroeconomic stability;
- equality of regions;
- efficiency;
- coordinated spending of funds.

Similar criteria for inter-budgetary equalization are used, and their selection is significantly influenced, as a rule, by the goals and objectives of the state, and the peculiarities of the territorial and political structure of different countries.

All equalization schemes are the result of both economic and political choices. For example, in many developed countries, when equalizing, such criteria as population size and density, socio-demographic criteria, unemployment rate, general level of financial security are taken into account, income and expenses of territories, the proportion of citizens over the specified age in Switzerland and Australia are certainly taken into account (OECD, 2022).

In many countries, fiscal equalization is based on basic principles common to almost all economic systems in different countries, including the following (Figure 1).

The state forms and adjusts budget relationships, directions and channels of budget flows, thereby influencing the processes of budget relations. It changes the principles, methods, and methods of generating budget revenues and expenses, ensuring regulation of the country's budget system.

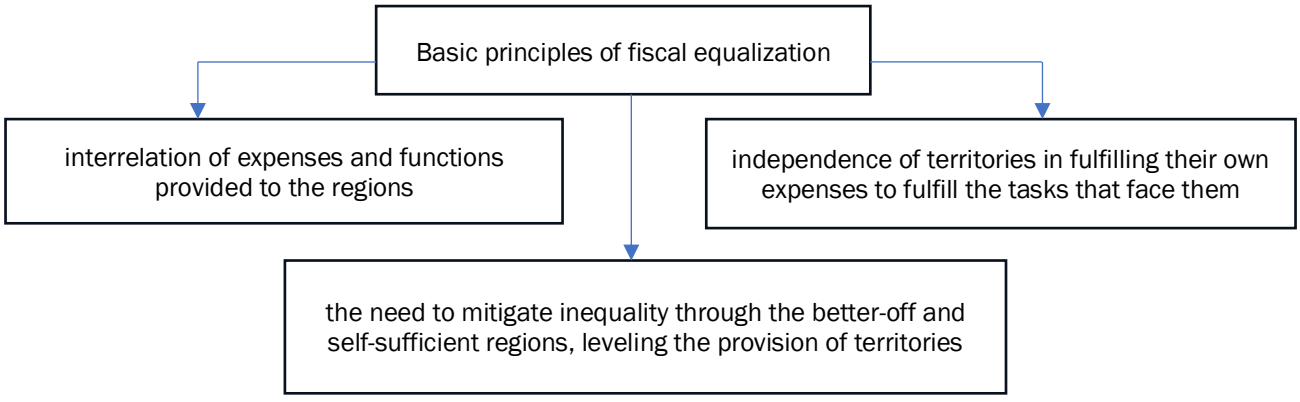

Figure 1. Basic principles of budget equalization

Source: compiled by authors

It is especially important to realize that the basic principles of state budget policy are formed precisely at the republican level. For this purpose, using a set of various financial instruments, the distribution of state revenues is carried out between entities of the same level, and between the center, regions and local authorities. Their use is aimed at equalizing the levels of budgetary security and, accordingly, budgetary sustainability.

Foreign experience in effectively allocating funds between levels of government and decentralizing the budget may include several key methods and strategies.

3. PARAMETERS FOR FINANCING DEVELOPMENT PROGRAMS FOR AGRICULTURAL FORMATIONS IN THE EUROPEAN UNION COUNTRIES

EU programs in the field of rural development are also financed from the European Agricultural Fund for Rural Development (EAFRD). Almost 100 billion euros were allocated, with each EU country receiving financial allocations for 7 years (Figure 2, 3).

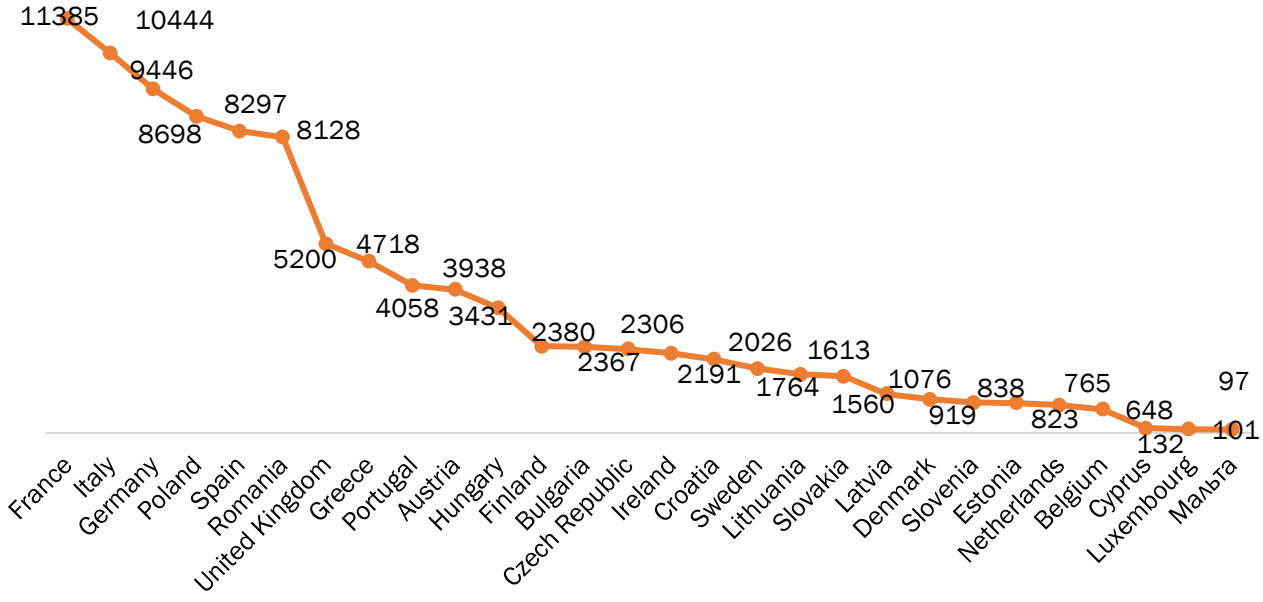

Figure 2. Amount of financing of agricultural formations of development programs of the European Union countries as of 01.01.2021, in million euros

Source: compiled by authors according to https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/rdp-2014-20-list_en.pdf

As of 01.01.2021 in 28 countries of the European Union, 119 special programs for the development of rural regions (Rural Development Programs - RDP) have been developed and continue to be implemented. Of these, 20 programs are unified national programs.

Agriculture receives significant government support in EU countries from the budget at the national level. Unlike the supranational level of the EU, where strict uniform standards for providing financial assistance to farmers are applied, here the directions and parameters of state support are very flexible, which is determined by the financial and budgetary potential and characteristics of the economy of each country. For example, in the Netherlands, Finland, Germany, France, where the agricultural sector occupies a significant place in the national economy, the level and volume of state support for the industry is quite large. Thus, in developed EU countries, in the total volume of government financial support from all levels of budgets, the national level accounts for over 50%. In less developed EU countries (Bulgaria, Romania, Hungary, Slovakia, Poland), on the contrary, the share of the national level of financing is comparatively lower, and in the total volume of budgetary agricultural expenditures of these countries the supranational level accounts for over 80%.

In terms of the number of existing programs in the European Union, the leaders are France (30 programs with a funding share of 11.5%), Italy (23 programs with a funding share of 10.5%), Spain (19 programs with a funding share of 8.4%), Germany (15 programs with a financing share of 9.5%).

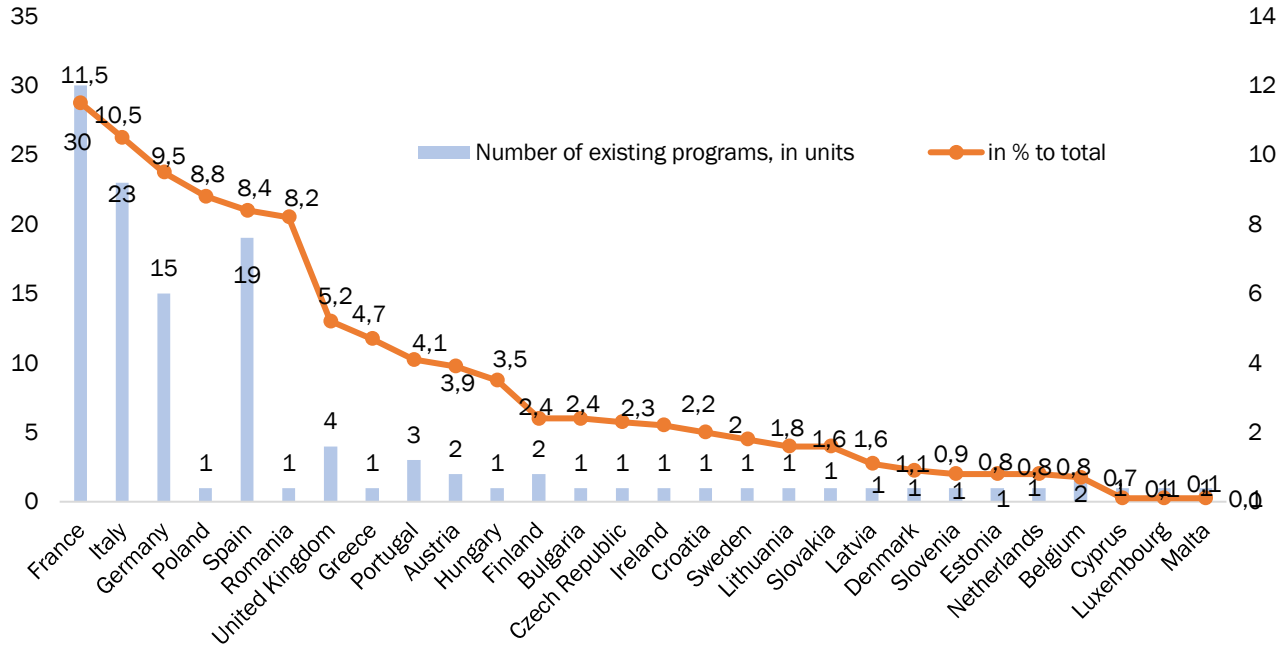

Figure 3. Number of existing programs for financing agricultural formations in the European Union countries as of 01.01.2021, in units

Source: compiled by authors according to https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/rdp-2014-20-list_en.pdf

Comprehensive measures have been developed for agricultural producers and other entrepreneurs in rural areas to create favorable conditions:

- modern infrastructure has been formed,
- special preferential tax regimes have been established;
- optimal mechanisms for subsidizing certain expenses of rural producers, etc. have been developed;
- preferential conditions have been created for the activation of agrotourism as a way of developing rural areas.

The driving force behind setting priorities in favor of the agricultural economy was the fact that in this historical period the degree of mechanization and automation of agriculture, which was the main area of employment for rural residents, increased significantly.

In general, state support for rural producers amounts to about 35.0% of the value of EU agricultural products, and per 1 hectare of agricultural land - more than 800 dollars.

In many EU countries, during the implementation of a common agri-food policy, including in terms of budget financing, many important socio-economic processes gradually began to be restored. The experience of Poland is interesting, whose share in the budget of the Common Agricultural and Food Policy is increasing. Thus, over the previous seven-year period (2007–2013), Poland's share was 28 billion euros (7.5%) with a seven-year CAP budget of 371.3 billion euros. For the current seven-year period (2014–2020), the CAP budget is provided in the amount of 435.0 billion euros.

In 2014, EU countries signed a partnership agreement providing for the coordination of all European Structural and Investment Funds (ESIF) in each country. The European Commission and the authorized bodies of each EU country are working with the European Investment Bank (EIB) to develop and apply appropriate financial instruments within the framework of the European Agricultural Fund for Rural Development (EAFRD). The European Commission analyzes in detail, monitors and evaluates the results of the implementation of agri-food policy, primarily in relation to the development of budget resources provided in the form of financial assistance.

The most important priority of rural development policy in the European Union is the harmonization of ecosystems (44% of all expenditures). The countries of the European Union are alarmed by the destructive influence of anthropogenic factors on the natural environment and the negative consequences of climate change. These consequences are socio-economic, political, cultural and man-made in nature, thereby suggesting some transformation of production relations and certain changes in the parameters of the productive forces of the European community.

Each EU country develops national rural development programs, assessing and analyzing the problems and needs of the territories under its jurisdiction. At the same time, the European Union has established general priorities for agri-food policy that EU countries must comply with (Figure 4).

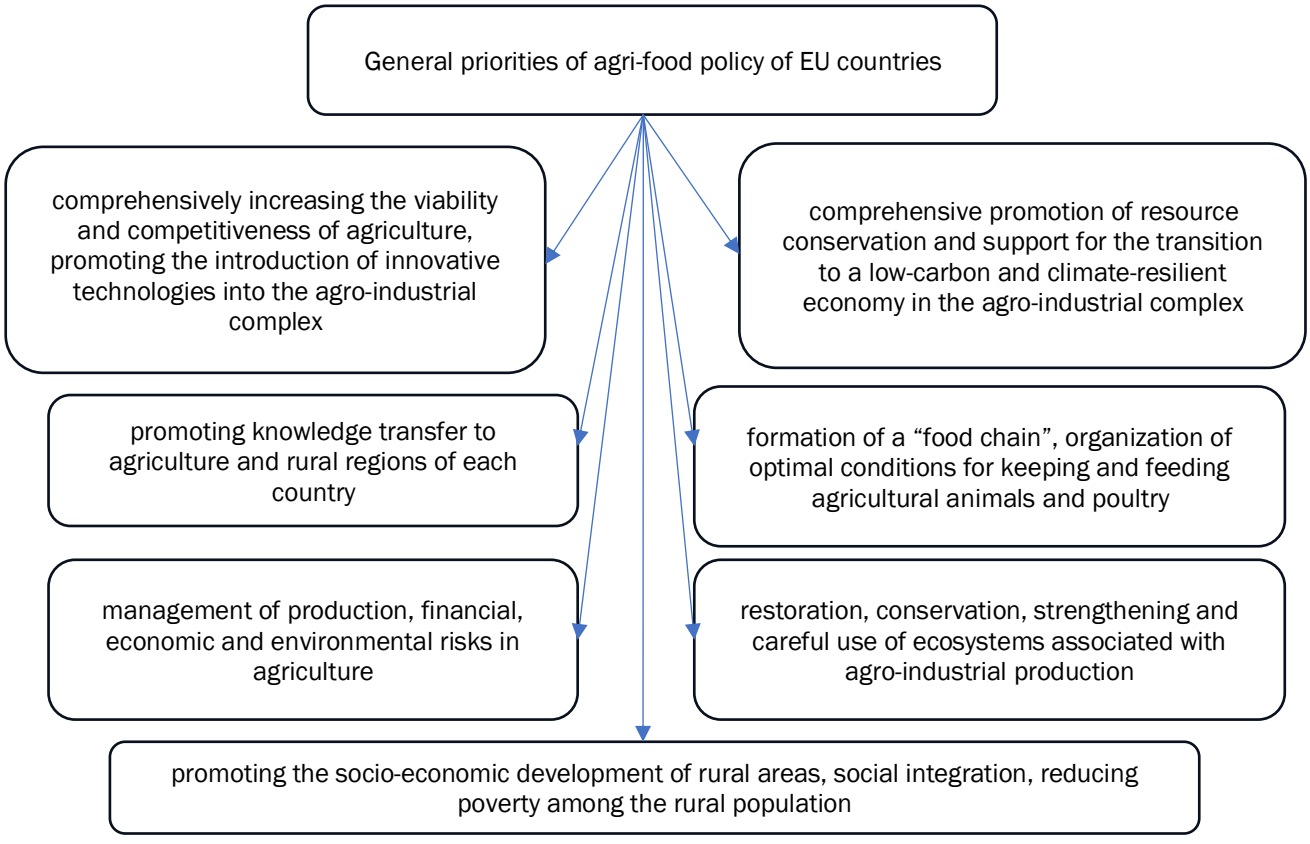

Figure 4. General priorities of agri-food policy of EU countries

Source: Compiled by the authors

4. US GOVERNMENT AGRI-FOOD POLICY MEASURES

In general, effective distribution of funds between levels of government and decentralization of the budget requires a balanced approach that takes into account the specific local needs and management characteristics in each region.

The most important factor in the development of the US agri-food sector is its government regulation and support, which is conventionally divided into three main groups of measures (Figure 5).

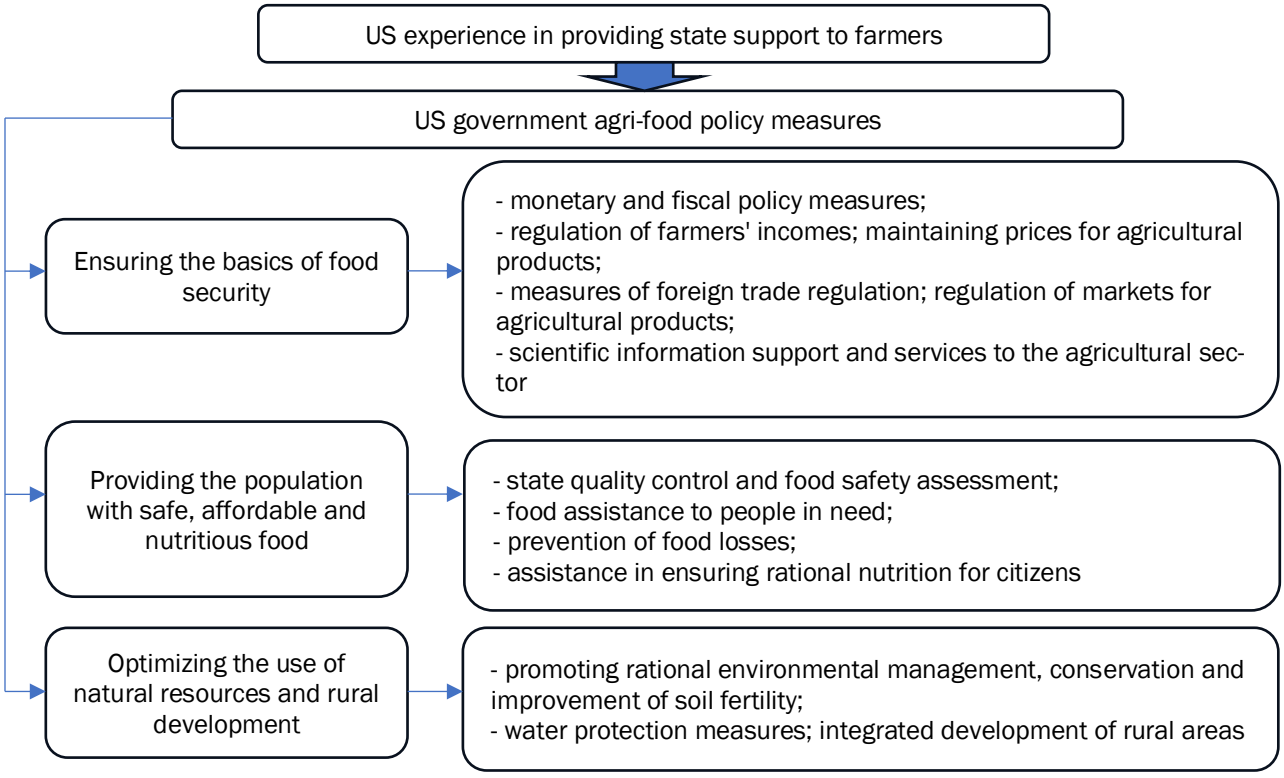

Figure 5. US government agri-food policy measures

Source: compiled by authors according to Ovchinnikov, O.G. (2018), "Evolution of US agricultural policy measures at the beginning of the 21st century". USA and Canada: economics, politics, culture, No. 3, Vol.579, pp.5-20.

In the United States, the government provides direct subsidies to farmers in order to maintain price parity (the relationship between the prices of agricultural products and the resources purchased for their production). The increase in the efficiency of agricultural production and the creation of favorable conditions in the agri-food market contributed to a significant increase in the net income of farmers.

In the US government support system, a large part is subsidies to maintain prices. The price regulation system includes:

– firstly, the establishment of minimum and maximum price limits, as well as a conditional price that the state tries to maintain;
– secondly, government purchases of long-lasting agricultural products for the purpose of commodity intervention and maintaining conditional prices.

To provide information support for the price support policy, the state monitors the dynamics of a number of important indicators:

– costs of production of certain types of products;
– price parity for industrial and agricultural products;
– the level of profitability of farms and industries.

This makes it possible to create an information and statistical database, on the basis of which a policy to support production, income levels, savings, investments of farmers is carried out and regular measures are developed to influence market prices.

Exports of US agricultural and related products at the end of 2023 are estimated at 191 billion dollars, which is 10% lower than the previous year's record figure, Reuters reports.

Exports of bulk agricultural commodities, which include top-grossing commodities such as soybeans, corn, wheat and cotton, were the lowest in 10 years last year, down 17% from 2022, according to the U.S. Bureau of Statistics largest annual decline since 1985.

Last year's U.S. commodity exports were also the lowest in 10 years, driven by high prices and increased supply in competing exporting countries. As specified, the total exports of corn and soybeans from the United States in 2023 amounted to 94 million tons (-18% per year). The largest decline was recorded in December - China was the destination for 38% of US cargo, below the three-year average of 59%. With the exception of the 2018 trade war, this period marked China's lowest share of December U.S. soybean shipments since 2002.

Agriculture and related products accounted for 6.2% of total U.S. exports in 2023, the lowest level in four years, according to official data.

U.S. soybean oil exports fell 76% annually in 2023 as the focus shifts increasingly toward domestic consumption, the lowest on record since 1967. At the same time, soybean meal shipments hit a record 14.1 million tons, which is about 10% higher than the previous maximum set in 2018.

Separately, it noted that by value, Canada, China and Mexico accounted for about half of all U.S. agricultural and related exports in 2023, with Canada slightly ahead of China for the first time in four years. Thus, Canada accounted for 17.3% of the total value of exports from the United States, which is the highest figure since 2006. China's share, in contrast, fell to a four-year low of 16.6% from a record 19.2% in 2022.

5. BUDGETARY SUPPORT AND ASSESSMENT OF SWISS AGRICULTURAL POLICY

Swiss agricultural policy falls under the Agricultural Act (AgricA) of 1998, which sets out the principles and instruments for regulating the sector. AgricA is committed to ensuring that agriculture is sustainable and innovative. The main focus is on the following issues:

- food security of the population;
- conservation of natural resources;
- preservation of the cultivated landscape;
- decentralized occupation of territory;
- improvement of living conditions for animals.

The main elements of AgricA are enshrined in the Swiss Federal Constitution (Article 104). In 2017, following a referendum, a new article on food security was adopted (Article 104a), which emphasizes the need for a guaranteed food supply to the population through:

- protection of the foundations of agricultural production, especially land;
- adaptation of food production to local conditions and efficient use of natural resources;
- ensuring that the agriculture and food industry meets market needs;
- building trade relations that contribute to the sustainable development of agriculture and the food sector;
- use of food in such a way as to preserve natural resources.

Switzerland is a small economy with a high GDP per capita that experienced low and intermittently negative inflation prior to the 2022 global inflation surge and an unemployment rate of less than 5% for the past two decades. Before the COVID-19 pandemic, GDP growth was stable at around 2%, and in 2022 it returned to pre-crisis levels after a recovery period in 2021 (Figure 6).

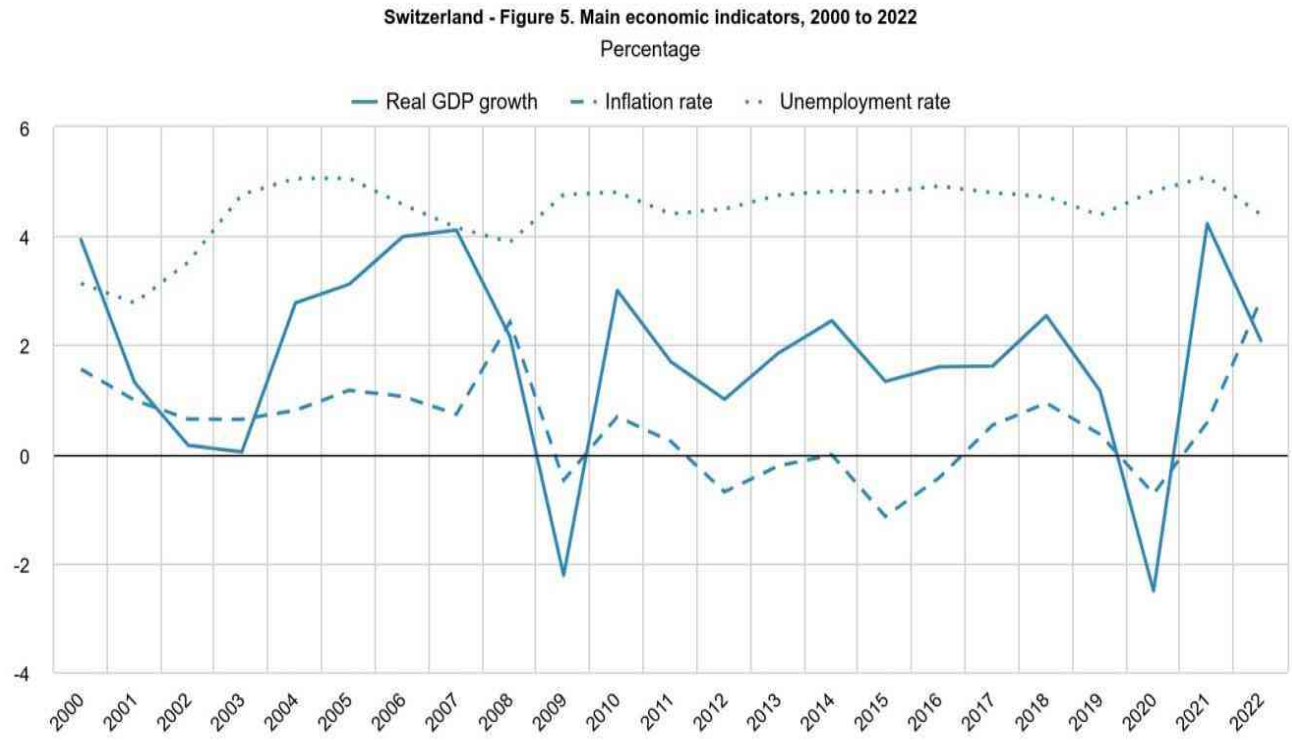

Figure 6. Main economic indicators, from 2000 to 2022

Source: compiled by authors

The relative importance of agriculture in the Swiss economy is small, accounting for only 0.6% of GDP and about 2% of employment. The farm structure is dominated by relatively small family farms. Hilly and mountainous agricultural areas (including alpine summer pastures) are used for extensive milk and meat production, while more concentrated pork and poultry production is located in the valleys.

Agricultural land covers 36% of the country's territory and consists mainly of pastures, with arable land accounting for only 10% of the total area. Crop production has shifted over time from traditional arable crops (cereals, oilseeds) to increased production of fruits and vegetables (Table 1).

Table 1. Indicators characterizing agricultural formations in Switzerland

Indicators	*Switzerland*		*International comparison*	
	2000*	2021*	2000*	2021*
Economic context			Share for all countries	
GDP	264	661	0.7%	0.5%
Population (million people)	7	9	0.2%	0.2%
Land area (thousand km^2)	40	40	0.05%	0.05%
Agricultural area (AA) (thousand ha)	1 566	1 504	0.05%	0.05%
			All countries	
Population density (persons/km^2)	180	218	52	64
GDP per capita	36 350	75 951	9 350	23 401

Trade as % of GDP	29.2	43.2	12.3	15.6
Agriculture in the economy			*All countries*	
Agriculture in GDP (%)	1.1	0.6	2.9	3.9
Agriculture's share of employment (%)	4.8	2.2	-	-
Agri-food exports (% of total exports)	2.7	2.9	6.2	7.9
Agri-food imports (% of total imports)	5.9	4.8	5.5	7.2
Characteristics of the agricultural sector			*All countries*	
Agricultural crops in total agricultural production (%)	50	41	-	-
Share of livestock in total agricultural production (%)	50	59	-	-
Share of arable land in AA (%)	26	27	32	34

Source: own

Current support programs are determined by the new agricultural budget for the period 2022-2025 (AP 2022-25), which follows AP 2018-21, covering the last four years. These plans are a continuation of the policy framework first developed in 2014. The 2018-21 budget allocation was 1.7% lower in nominal terms than 2014-17, while the new 2022-25 budget is 0.6% higher than 2018-21.

Budget support for agriculture consists of three main elements: direct payments, production and marketing expenses, and support for improving the production base.

Direct payments to farmers are aimed at ensuring food security and environmental protection (landscape, biodiversity, sustainable use of resources) and animal welfare. These payments are subject to cross-compliance with environmental requirements, with specific “environmental service requirements”.

Production and marketing expenses mainly support dairy producers through three types of payments:

– for processing milk into cheese;
– for the production of milk without silage feed;
– for the sale of milk and dairy products from the farm (introduced in 2019).

In addition, area payments apply to oilseeds, protein crops, grain crops (introduced in 2019) and sugar beets. Some expenses under this item relate to general sector services, including marketing and promotion.

Policies to improve the productive base include direct support for on-farm investment, as well as general support for infrastructure improvements, social assistance to farmers and extension services. These payments were first initiated under the AP Policy Framework 2014-2017.

Following the abolition of milk quotas in 2009, the intersectoral milk organization l'Interprofession du Lait (IP Lait) introduced standard milk supply contracts for its members. They set different prices and volumes for the supply of milk (contingents A, B and C). In 2013, these contracts became mandatory for all milk producers, including those not included in IP Lait. In essence, the previous production quota system was replaced by another production control mechanism, implemented on a private basis. This scheme was extended in 2021 by the Federal Council (Swiss federal government).

An assessment of agricultural support in Switzerland demonstrates a high level of government attention and support. Here are a few key aspects:

– *Financial support*. The Swiss government allocates significant funds to support agriculture. These funds are used to compensate farmers, subsidize agricultural activities, invest in infrastructure and protect the environment.

– *Development and innovation*. Switzerland invests heavily in agricultural research and development. This includes finding new technologies, resource management methods and developing environmentally sustainable practices.

– *Trade agreements and free trade*. Switzerland strives for balanced trade in agricultural products, both within its domestic market and internationally. This includes participation in trade agreements and initiatives that promote agricultural exports.

– *Environmental protection and sustainable development*. Switzerland pays special attention to environmental protection in agriculture. Government programs are aimed at reducing the negative impact of agriculture on natural resources and biodiversity.

– *Support for small farms*. Overall, support for agriculture in Switzerland reflects the desire for balanced and sustainable development of this key economic sector.

CONCLUSION

Analysis of budgetary support for the financial recovery of agricultural formations in foreign countries allows us to draw a number of important conclusions:

The role of the state., and bilateral partners. These funds can be used to support agricultural projects and infrastructure development.

In general, budgetary support for the financial recovery of agricultural entities in foreign countries plays an important role in the development of agriculture, ensuring food security and sustainable development of rural areas. The desire to improve the efficiency of using budget resources and the development of innovative approaches in this area are key tasks for achieving the goals.

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Social Component of Business Model Competitiveness: Analytical Dimension and Management Approaches

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ABSTRACT

The article studies the role and significance of the social component infortifying competitiveness of the company's business model. The main management technologies used to ensure the development of the social component of a business are outlined. The main purpose of the study is the theoretical and practical substantiation of the impact the social component has on the business model competitiveness and further improvement of management measures for its development. The study areas were focused on: A) analysing the impact the social component has on the business model competitiveness of an enterprise; B) assessing the business model competitiveness for a trading company: C) identifying areas for improving the management of the internal social component in the company. Among other things, the study was basedon the results obtained from a survey of entrepreneurs on the social component of business model competitive-ness. In order to position themselves in the face of intensifying global competition, companies need to link their social component to their operations and business model in such a way that they can operate cost-effectively and competitively. The social component of the competitiveness of a company's business model is presented as a 'soft technology' for gaining competitive advantages. The initial indicators used to test the competitiveness compo-

nents of the business model of a trading company were systematised. A matrix of potential advantages for trading companies that implement social competences in conditions of increased dynamism and uncertainty of the external environment was presented. Practical recommendations for evaluating social investments within the scope of internal audit for management purposes were provided. For this purpose, the document "Assesment of the company's social investments based on qualitative indicators" was developed .

INTRODUCTION

The track of every business is accompanied by competitive confrontation. To win, companies are provided with tools and resources that can become part of the company's corporate identity and one of the ways to stand out from the rest. The European Commission has published twoCommunications on the long-term competitiveness of the EU where trade and open strategic autonomy are among the main policy areas that will contribute to competitiveness in the coming years (https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1668). Trade with the rest of the world as a share of the EU's gross domestic product (GDP) is seen as an indicator of progress. Recent global economic developments show that international trade disputes have significantly changed the business environment of companies, which in turn has affected their internal determinants of development. However, the question arises: 'How do these changes affect the behavioural decisions of companies and will this further affect the competitiveness of their business model?' Given the further expansion of globalisation in the economy and social and labour relations, companies need to coordinate their activities with the social component in order to operate economically efficiently and maintain their competitiveness.

The social component is becoming increa-singly important for maintaining the competitiveness of small and medium-sized businesses and their business models, as evidenced by research and conclusions of the European Commission (https://data. europaeu/doi/10.2826/093808). For example, the portfolio developed by the European Commission contains recommendations on certain aspects of social compliance of business models to ensure competitiveness and sustainable development of EU companies. At the same time, ratings of corporate leadership in terms of transparency and business efficiency are no less relevant and informative. In particular, 3BL annually evaluates the largest public companies in the United States, and in 2023, the palm of supremacy was after Hewlett Packard Enterprise, Accenture, HP Inc., Hasbro and Estee Lauder (https://100best. 3blmedia.com/).

For most companies operating in Ukraine, the social component of business model competitiveness is only at the initial stage of evolution. During the hostilities in Ukraine, the social component is becoming more relevant than ever for research and practical development. With the support of the Kharkiv Regional Fund, the Small Business School was established (time lag: January to March, 2024 - http://surl.li/sullx) to have studied a number of issues regarding the social component of the business model, its implementation in the activities of small and medium-sized businesses, and the benefits of this approach. The results showed low awareness of the goals and results of the social component for the competitiveness of their business since entrepreneurs do not understand the breadth of the challenges their businessis facing. A significant number of business owners are not sufficiently aware of the positive effects the investments produced in the social component (so-called social investments) of their company and business model (Figure 1).

According to the results, business owners feel that the state does not provide sufficient incentives for the social component. Therefore, an excellent step to stimulate the social component of the competitiveness of companies' business models at the regional or national levels would be to improve the conditions for borrowing from socially responsible banks. At the same time, business owners stressed that competition for customers is fierce among the existing companies. And in this harsh competitive environment, customers often face offers and counter-offers from competing businesses. That is why competition among different companies is not only for new customers, but also for the existing ones. The social component of a competitive business model can provide a certain competitiveness for a company through

additional advantages such as credibility, reputation, etc. At the same time, despite a bunch of key advantages of the social component of a competitive business model for their own business, the majority of the surveyed participants noted only reduced labour turnover and increased attractiveness of the company for potential highly qualified employees.

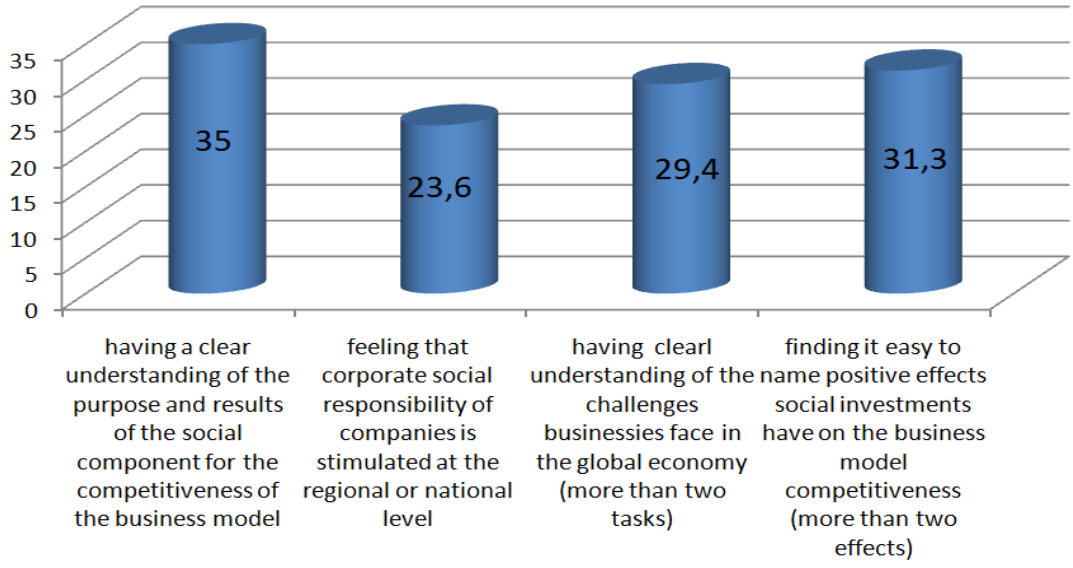

Figure 1. The results of a survey of entrepreneurs on the social component of business model competitiveness, %

Source. Author's

The competitiveness of a company's business model can be expressed as the ability of an economic entity to continuously provide customers (consumers) with goods (services) that are more efficient than those provided by competitors by fully utilising resources to generate nonspeculative profits and ensure further development (Krivokapic, 2023). However, in support of the idea that the social component influences the business competitiveness, it is argued that increasing the company's profit through the motivation of speculation results in a situation with business owners becoming perchant for a higher degree of information symmetry and agency problems, or the top management layer showing a tendency to the psychology of self-interest.

Therefore, we define the social component of the competitiveness of the company's business model as a 'soft technology' for gaining competitive advantages. Given that business competitiveness is influenced by the social component, its management is the basis for changing the level of business competitiveness. However, there is no ideal model of corporate governance of the social component of a business model, which is due to the immanence of the company and its dependence on A) the industry in which it operates, B) the location, and C) the goals of the organisation. In order to position themselves in the face of increasing global competition, companies must link the social component to their operations and business model in such a way that they can operate cost-effectively and competitively.

1. LITERATURE REVIEW

The strong interest of researchers in the field of company competitiveness proves that its important prerequisite is innovation, quality and social component of the business model. With each passing year, issues related to the social component are becoming more and more relevant and urgent when building and developing effective competitive business models of companies and organisations. This tendency is caused by a number of factors. Among the most common, researchers have identified the following. The intellectualisation of labour and the increasing role of human capital lead to an increase in employees'

requirements to the employer-company(Rossouw, 2011). Increased interest of potential investors in information on social responsibility in the context of the company's competitiveness (Mittal et al., 2008). As the principles of openness and transparency of corporate activities spread, the importance of a good image increases, as all information about the company's activities becomes available to employees, consumers and investors. Portna O. et al. (2020b) study the dependence of a company's development on the effectiveness of its partnerships in an unstable market environment. The correlation of strategic economic interests of a company and its business partners allows to make forecasts of business profits, taking into account the type of the latter (internal or external) and the type of strategic interaction (vertical or horizontal) (Portna et al. 2020b). In addition, the spread of the social concept is associated with the problems of maintaining the achieved positions and increased competition in constantly changing economic situations.

Empirical evidence confirms that companies operating on a socially responsible business model have significant competitive advantages through communication activities. These include publishing information on audits, reporting on corporate governance structure, human resources policy, and environmental standards (Corporate social responsibility; Maon et al., 2017; Portna et al., 2020a; Bondar et al., 2021). The ESG Transparency Index showed that in 2020, the share of Ukrainian companies that disclose their CSR goals increased from 23% to 44.4%. At the same time, the number of companies that disclose information on the integration of the Sustainable Development Goals into their CSR strategies has increased significantly from 8% to 17.8%. The number of companies publishing information on human rights issues increased from 27% to 50%. The companies that demonstrated the highest level of information disclosure belong to the sectors of financial services, electricity transmission and supply, pharmaceuticals, and metallurgy(https://csr-ukraine.org/wp-content/uploads/2021/12/Index-2020.pdf)

To ensure the competitiveness of a business model, the social component can be implemented as a set of strategic actions, processes and other programmes integrated into management decisions at all levels (Tian and Wang, 2022). Y. Yuan et al. (2020) investigated how the social component can be effectively incorporated into corporate strategy to ensure the competitiveness of the business model. In this context, researchers focus on analysing the positive impact of CSR on human resources (Kim et el., 2018), risk and reputation management (González-Rodríguez et al., 2021), and innovation (Iershova et al., 2021) for the consistent and effective development of companies in the long term. Gains in innovation, image and reputation, and productivity occur in organisations where CSR attributes are in the spotlight (Javed et al., 2020). Such attributes are defined as: a) safe working conditions and respect for human rights; transparent corporate governance; responsible procurement and supply chain; environmental protection; ethics and compliance; contribution to community development; interaction with stakeholders and partners; and reporting (Sun et al., 2021). However, to ensure the business model competitiveness,the company'ssocial component should have its individual features with respect to the specificbusiness sector (Temerbulatova et al., 2023; Kovács et al., 2023).

Wood et al. (2005) put forward different approaches to measuring the social component of CSR. These approaches are grouped into a) an analysis of social investments; b) an analysis of stakeholders; and c) assessment of social investments through the prism of functional subsystems. Internationally recognised indicators measure one or several aspects of CSR and try to cover and highlight CSR practices but cannot cover all aspects of CSR separately to enhance competitive business models. Researchers also point out a number of shortcomings associated with the limited scope of methods for assessing the social component of an enterprise: the need to take into account a) the sector of the economy (Turker, 2009) and b) the stage of the company's life cycle (Zhao et al., 2012). As a result, the impossibility of precisely defining the social component of a company's business model, as well as the wide range of practices and aspects it covers, make it difficult to record, measure and export related data. These accompanying data relate to social investments, environmental investments, etc. The adopted document 'ISO 26000:2010. Guidelines for Social Responsibility' provides a broad international consensus on the content and boundaries of a company's social responsibility which defines the main areas of activity in this area. It also covers the principles, ideas and goals that the concept of social responsibility encompasses. The results of the corporate social responsibility analysis should be used to identify the strengths and weaknesses of the business, to formulate a strategy that will allow to increase the competitiveness of the business model.

The degree to which sectoral aspects of the concept of social responsibility is developed does not relate to the needs of modern practice of ensuring the business modelscompetitiveness. In particular, the issues of increasing the social responsibility of business entities are fragmentarily studied, which complicates the process of forming an effective corporate governance system, as well as the assessment of the social component for managing the competitiveness of a company's business model.

2. DATA AND METHODOLOGY

During the research process, the authors aimed at assessing the impact of the social component on the competitiveness of the business model and proposing relevant management approaches to its further development. We consider the development of the business social component and its awareness to be an important characteristic of the company's business model in terms of increasing its efficiency with regard to competitors. The hypotheses tested in the course of the study are as follows:

RQ1 The social component is an important internal determinant of the competitiveness of a tobacco company's business model.

RQ2. Trading companies that implement social competences are more successful in conditions of increased dynamism and uncertainty of the external environment.

RQ3. Management of the social component of the company's business model competitiveness is a socially and economically justified necessity that allows achieving effective results in relation to competitors.

Taking into account the purpose of the study, the results for each of the above research questions were carefully analysed. All collected information was arranged into tables so that it could be used at the next stage of the research. The library method was appliedwhen collecting data from theoretical literature and literature reviews, and the field method and questionnaire were used to assess the variables under study. For the purpose of this study, companies operating in the trade sector were selected as an empirical sample and to prove the practical orientation of the present research. According to Forbes, in 2023, the revenues of all the largest retailers in Ukraine declined, and the outsiders include companies in the sectors of mining and metals and the chemical industry. The authors collected detailed financial and non-financial information from the companies' official websites. The sampling period for this study is January to-March 2024 (http://surl.li/sxljv). The data collection strategy included surveys and formal interviews. Expert evaluation methods were also used, namely the ‘commission method’ which allowed gaining greater confidence in the results we obtained. In the process of using it, we relied on the thesis that since the group consists of experts who are well versed in a particular issue, their combined knowledge exceeds the amount of information possessed by any one of the expert group. In other words, a group of experts produces more ‘mental’ energy than a single expert.

The experts involved in this study were selected based on the following criteria: a) existing experience and b) areas of research interest. They were also assessed for their relevance to the task at hand. A total of 10 experts took part in the collective survey. The statistical processing of the collective expert opinion data was carried out according to the following indicators: a) the generalised opinion of the group of experts; b) the degree of coherence of expert opinions; c) the activity of experts; and d) the competence of experts (Tables 1, 2, and 4). The experts gave their assessment of the five components of competitiveness proposed for evaluation. We used calculation methods that allowed assessing the competitiveness of the business model of an enterprise by its individual key aspects such as trade and production, marketing, investment, financial and social aspects (Table 3 and Table 5). The competitiveness of the business model was assessed by the expert method based on a score (Table 6 and Table 7). Based on the integrated method, the study proposes management measures to be implemented by trading companies in order to increase the competitiveness of the business model. The document “Assessment of the company's social investments based on qualitative indicators” was developed for the needs of internal audit and preparation of non-financial and management reporting.

3. RESULTS AND DISCUSSION

3.1 Analytical measurement of the impact the social component has on the competitiveness of the company's business model

The results of analytical studies show that increased international competition and further development of trade are objective facts that all economic agents should take into consideration. Implementing the practice of social responsibility of a trading company means fulfilling a soft power policy to ensure the competitiveness of the business model. This is simultaneously determined by public interests, sustainable development requirements and business ethics. This position is due to the fact that trade is a type of economic activity which has social significance as it is aimed at meeting people's needs and improving the quality of life. As the loyalty of consumers to a trade organisation grows, their willingness and desire to buy goods from a particular seller increases. However, consumers may show opportunistic behaviour towards products and/or merchants whose activities are in conflict with the principles of social responsibility. Therefore, the sellers risk increases significantly if they neglect this fact. As a result, the entrepreneursmay face the following consequences: a) lower sales, b) deterioration of their image, c) increase in the number of complaints from consumers, d) complication of interaction with NGOs and society in general, etc. This will have a direct impact on the competitiveness of the business model. The coefficients of familiarity with the objectives of the study and the reasonableness of the experts' answers are presented on a scale from 0 to 1 (Table 1 - Snedecor & Cochran, 1989).

Table 1. Coefficients to assess the experts' familiarity with the problem and reasonableness of their answer

Focus		*Experts (m_i)*									
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Reasonableness of an answer	F2	0.8	0.9	0.8	0.7	0.9	0.9	0.9	0.6	0.8	0.6
Problem familiarity	F1	0.6	0.8	0.9	0.8	0.8	0.9	0.7	0.8	0.8	0.9

Source. Author's

Further, Table 2 presents the assessment results for each expert's competence using the formula:

$$Ki = \frac{F1 + F2}{2} \qquad (1)$$

Table 2. Competence assessment for each expert, Ki

Competence assessment for each expert, *Ki*									
Km_1	Km_2	Km_3	Km_4	Km_5	Km_6	Km_7	Km_8	Km_9	Km_{10}
0.7	0.85	0.85	0.75	0.85	0.9	0.8	0.7	0.8	0.75

Source. Author's

Summarising the approachesthe scholars used to select assessment parameters in order to analyze the competitiveness of a trade enterprise, it can be concluded that this selection was focused on the main components of the company's activities that affect its competitiveness. To conduct the study, we have selected five components that will determine the competitiveness of the business model of a trade enterprise: trade and production (quality), marketing, investment, financial and socialcomponents. The importance of all thefive components of the business model competitiveness was assessed by experts in points on a scale from 0 to 10. The ranking results with the highest score of 10 arepresented in the descending order. The scores were given by each

expert and later summarized by th authors in Table 2. Based on the experts' data, a matrix was developed (Table 3) where Cij is the score (in points) of the i-th expert for the j-th component of business model competitiveness.

Table 3. Matrix "Assessment of the relative importance of components of business model competitiveness"

Competitiveness component, Aj, j=5	*Experts (m_i, wherem=10), scores (C_{ij}, wherei=1-10)*									
	№1	*№2*	*№3*	*№4*	*№5*	*№6*	*№7*	*№8*	*№9*	*№10*
trade and production, A_1	8	8	9	10	9	10	10	9	8	9
marketing, A_2	7	8	9	9	10	10	8	7	8	8
investment, A_3	6	5	6	5	7	5	6	6	8	7
financial, A_4	7	8	6	8	9	8	8	7	6	6
social, A_5	7	8	8	9	8	8	9	9	7	8

Source. Author's

The scores of the competitiveness components for the business model of a trading enterprise were ranked and the results are now presented in Table 4.

Table 4. Ranks of components for business model competitiveness

Aj, *j*=5	Experts (m_i, *wherem=10*), scores (C_{ij}, *wherei=1-10*)									
	No 1		No2		No3		No4		No5	
	score	rank	score	rank	score	rank	score	rank	score	rank
A_1	8	9	8	9	9	5.5	10	2	9	5.5
A_2	7	9.5	8	6.5	9	3.5	9	3.5	10	1.5
A_3	6	5.5	5	9	6	5.5	5	9	7	2.5
A_4	7	6.5	8	3.5	6	9	8	3.5	9	1
A_5	7	9.5	8	6	8	6	9	2	8	6
Continued										
Aj, *j*=5	No6		No7		No8		No9		No10	
A_1	10	2	10	2	9	5.5	8	9	9	5.5
A_2	10	1.5	8	6.5	7	9.5	8	6.5	8	6.5
A_3	5	9	6	5.5	6	5.5	8	1	7	2.5
A_4	8	3.5	8	3.5	7	6.5	6	9	6	9
A_5	8	6	9	2	9	2	7	9.5	8	6

Source. Author's

To compare the variability of the values measured in the scales, the study used the coefficient of variation (Table 5).

Table 5. Values of the coefficient of variation

Competitiveness component, A_i, i=5	*Coefficient of variation, CVi*
A_1	0.066667
A_2	0.121905
A_3	0.665246
A_4	0.115205
A_5	0.06037

Source. Author's

The concordance coefficient is equal to:

$$W = \frac{4201.12}{10^2 \times (5^3 - 5) - 10 \times 518} = \frac{4201.12}{6820} = 0.616$$

The concordance coefficientW=0.616, which indicates the agreement between the experts' opinions. The statistical reliability of the degree of agreement between the experts' opinions was checked by the F-distribution for a random variable $W = \frac{1}{2} \ln \frac{(m-1)W}{1-W}$ with the number of degrees of freedomf$_1$=n−1−2lmi f$_2$=(m−1)/f$_1$.According to the results, there is a non-random agreement between the experts' opinions, and thus the final results are credible. The highest degree of consistency of expert opinions was obtained when assessing the importance of the trade and production component (quality of goods) for the enterprise to ensure the business modelcompetitiveness, and the lowest was retrieved when assessing the investment component. Based on the data obtained on the competitive rank of each component in the business model, the experts established weighting coefficients (Table 5).

Table 5. The average statistical value of the scores and the weighting coefficients of each component

Competitiveness component, A_i, i=5		$Aj = \frac{\sum C_{ij}}{m_i}$	*Competitive ranking of components*	*Weighting coefficients*
trade and production	A_1	9	1	0.3
marketing	A_2	8.4	2	0.25
investment	A_3	6.1	5	0.10
financial	A_4	7.3	4	0.15
social	A_5	8.1	3	0.20

Source. Author's

The social component took the third position in terms of its importance, so the research hypothesis RQ1 is confirmed. Thus, based on the results of the expert assessment, the following is a methodological approach to assessing the competitiveness of a trading company's business model.

3.2 Assessing the competitiveness of a business model: a comparative perspective

Assessing the competitiveness of an enterprise is a complex and multifactorial task, which is reduced to interpretating and evaluating a system of indicators that characterize various aspects of the company's activities that form its competitiveness. The biggest problem at the stage of selecting and assessing the indicators of business competitiveness is a significant information limitation associated with the existence of only general statistical data in the public domain and formation of the most important indicators based on the insider information of the organization. Many processes that take place at enterprises remain outside the scope of their statistical assessment to compare performance with similar results of competitors. In Table 6, we have compiled and calculated indicators for the ATB trading company. The results are based on public reporting and information from the website about the Top 15 most profitable retail chains in Ukraine according to Forbes (http://surl.li/sxljv)

Table 6. Output indicators to test the competitiveness components of the business model on the example of the ATB trading company

Competitiveness component of the business model	*Indicator*		*Scale of assessment*		
A_i, i=5	No	Appellation	0	1	2
1. Trade and production	Indicator 1.1	growth rate for stock return		1	
	Indicator 1.2	growth rate for profit per 1 m^2 of retail space			2
	Indicator 1.3	decrease rate for the cost of goods			2
	Indicator 1.4	growth rate for labor productivity			2
	Indicator 1.5	growth rate for profitability of fixed assets			2
		Total score = max 10 points		9	
2. Marketing	Indicator 2.1	growth rate formarket share	0		
	Indicator 2.2	growth rate for commercial profitability			2
	Indicator 2.3	growth rate forsocial orientation of products			2
	Indicator 2.4	ratio of the rate of change in the level of turnover costs to the rate of change in costs turnover		1	2
	Indicator 2.5	growth rate forthe share of environmentally friendly products			2
		Total score = max 10 points		9	
3. Investment	Indicator 3.1	growth rate forexpenses on professional development and retraining of personnel to the volume of expenses on product sales	0		
	Indicator 3.2	growth rate for expenses on professional development and retraining per 1 employee		1	
	Indicator 3.3	growth rate for labor safety expenses			2
	Indicator 3.4	growth rate for social benefits per 1 employee per month			2
	Indicator 3.5	growth rate forexpenses on measures to improve workplaces			2
		Total score = max 10 points		7	
4. Financial	Indicator 4.1	growth rate for the financial independence ratio		1	
	Indicator 4.2	growth rate for the total liquidity ratio		1	
	Indicator 4.3	growth rate for the equity maneuverability ratio		1	
	Indicator 4.4	growth rate for the financial stability ratio			2
	Indicator 4.5	growth rate forreturn on equity			2
		Total score = max 10 points		7	
5. Social	Indicator 5.1	growth rate for the number of employees	0		
	Indicator 5.2	average salary growth rate			2
	Indicator 5.3	decrease rate fornegative staff turnover		1	
	Indicator 5.4	decrease rate forthe ratio of management and key production personnel		1	
	Indicator 5.5	growth rate for the share of managers and specialists who were promoted among those who underwent advanced training and retraining			2
		Total score = max 10 points		6	

Source. Author's

The order of distribution of points among the indicators with differentiation from the lowest to the highest value of each indicator is established by a group of experts (scoring limits [1-2], where 0 —no change rate or negative for the selected indicator; 1 —the change rate for the indicator is insignificant (3-10%), 2 —the growth rate is more than 10%). Considering the proposed system of indicators in subsection 3.1, and using the method of scoring and weighting coefficients (Table 5), we calculated the competitiveness of large trading companies (Table 7).

Table 7. Assessment of the business model competitiveness for trading companies

A_i, i=5	ATB market	Comfy	EVA	Weighting coefficients	ATB market	Comfy	EVA	Benchmark
A_1	9	8	10	0.3	2.7	2.4	3.0	3.0
A_2	9	7	9	0.25	2.25	1.75	2.25	2.5
A_3	7	6	8	0.2	1.4	1.2	1.6	2.0
A_4	7	7	7	0.15	1.05	1.05	1.05	1.5
A_5	6	8	7	0.1	0.6	0.8	0.7	1.0
			Σ	1.0	8.0	7.2	8.6	10.0

Source. Author's

We used a graphical method to illustrate the data obtained during the study (Figure 2).

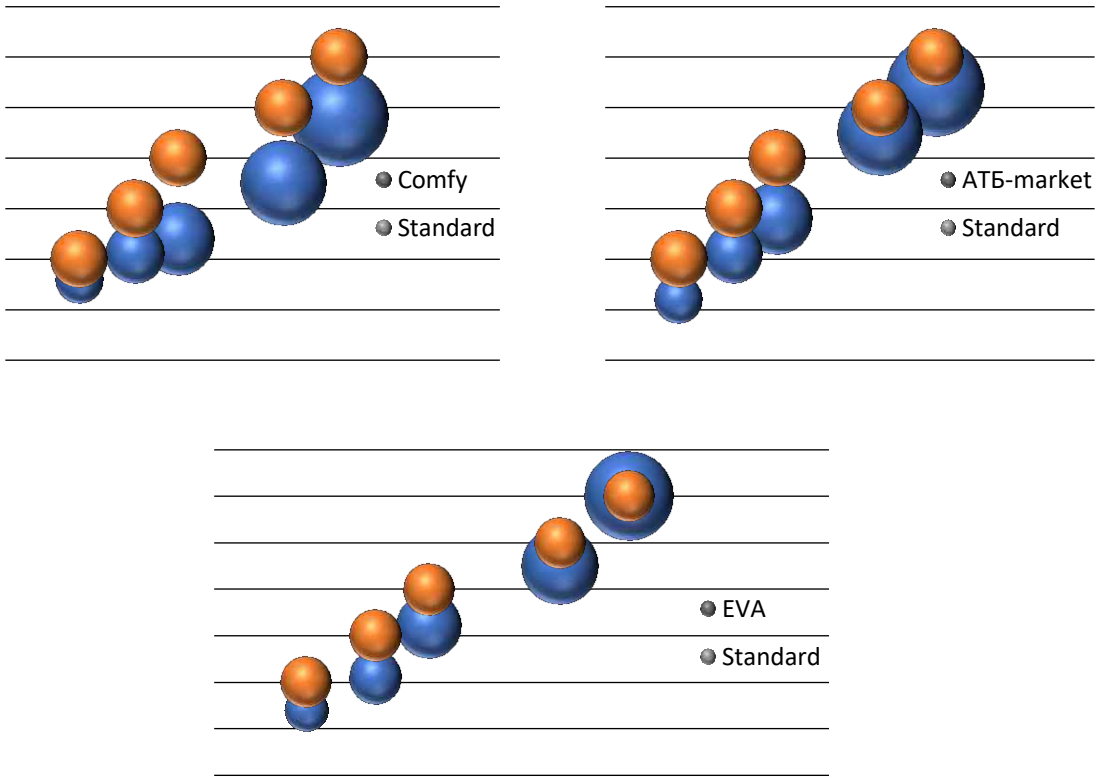

Figure 2. Competitiveness of trading companies compared to each other and to the benchmark

SOURCE: AUTHOR'S

The graphical method made it possible to illustrate the results on the management effi-ciency of trading companies and to compare them with each other and with the benchmark. Thus, Comfy appeared to be the closest to the benchmark. At the same time, the social component of business model competitiveness has the highest score in Comfy. Undoubtedly, the graphical method does not provide for an overall assessment of the level of competitiveness of an enterprise. In the conditions of increased dynamism and uncertainty of the external environment, those trading companies that implement competitive business models with a social component remain successful. Therefore, the research hypothesis RQ2 is confirmed.

3.3 Managing the social component of the company's business model competitiveness

Since the beginning of the 21st century, there has been a kind of "transition" to a strategy of long-term business commitments to social issues and initiatives. Nevertheless, it is a competitive business model that allows building a solid foundation for business restructuring, opening up new development opportunities and ensuring a high level of resilience to the dynamics of the company's external environment. According to the Innovation Map in 2023 (Fig. 3), it is the management of the social component of the competitiveness of the company's business model that is among the top 5.

Figure 3. The innovation map of Top 10 Corporate Social Responsibility Trends in 2023 (http://surl.li/tewgk)

SOURCE: http://surl.li/tewgk

In trade, as in other business sectors, the social component should be the focus of managers' attention when developing a management strategy to ensure the competitiveness of the company's business model. As part of the triad of “social component —business model competitiveness —corporate governance”, successful trading companies make corporate decisions, develop and implement strategic business directions. This is the key to efficient business operations and high performance while ensuring the protection of the rights of owners, investors, employees and other stakeholders. When developing a strategy, one should take into account the position that trading companies implementing social competencies are more successful in conditions of increased dynamism and uncertainty of the external environment (Figure 4).

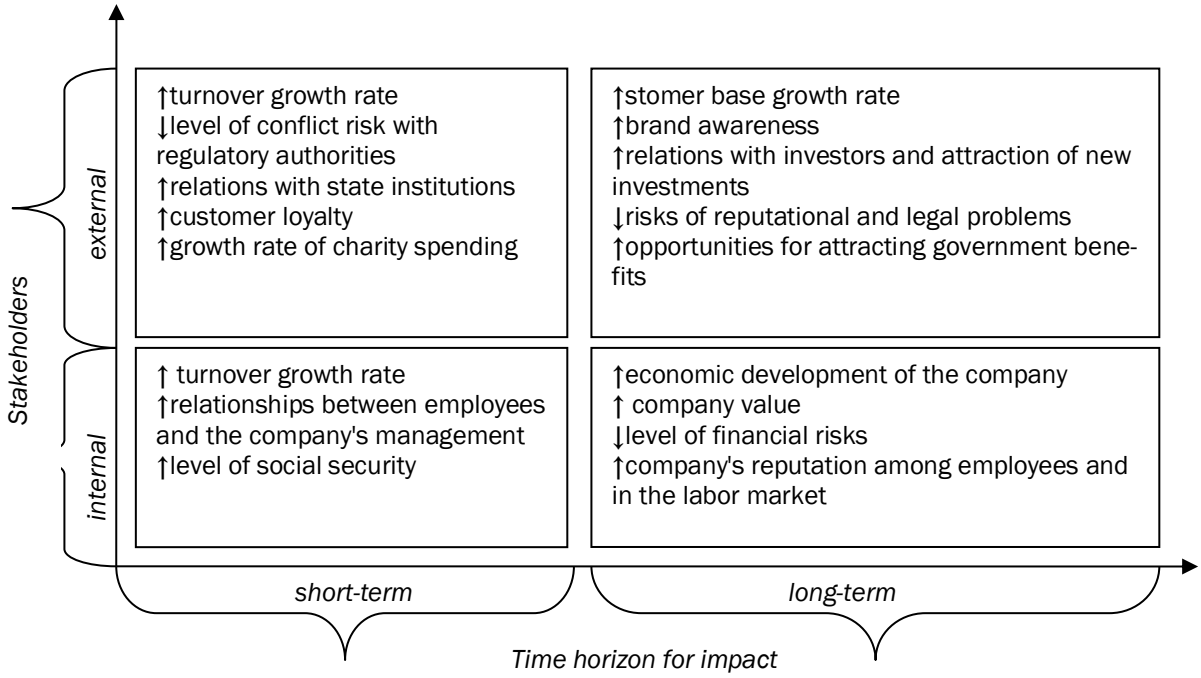

Figure 4. A matrix of potential benefits for trading companies that implement social competencies in the environment of increased dynamism and uncertainty

Source. Author's

The spread of the social concept is associated with the problems of maintaining the achieved positions and increasing competition for companies in constantly changing economic situations. The directions of influence of the social component on the business competitiveness model are shown in Figure 5.

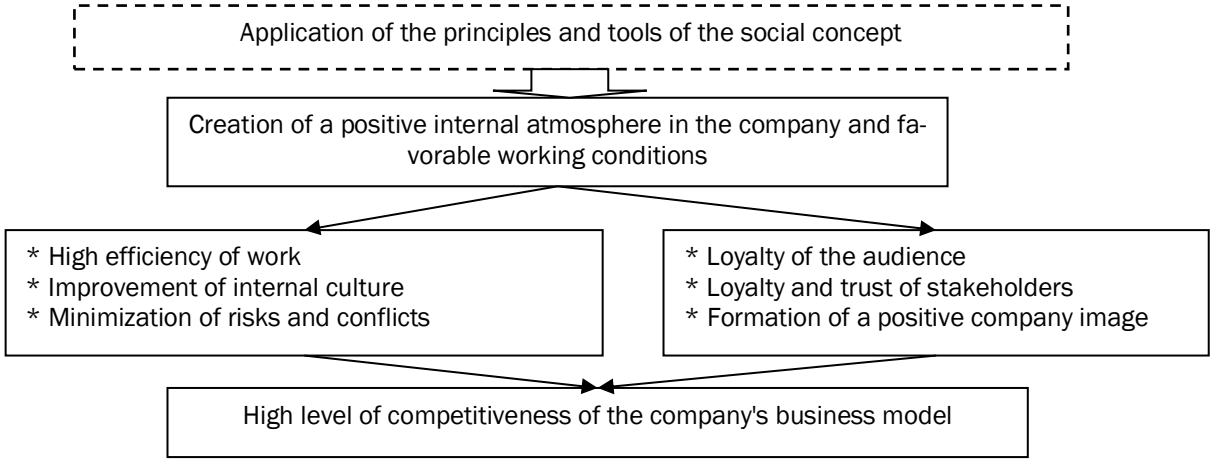

Figure 5. Areas of influence in the social component on the competitiveness of the company's business model

Source. Author's

Based on the proposed scheme, the need to use the principles and tools of the social concept in the activities of trading companies is not only socially but also economically justified today. The corporate

governance system should be decisive in ensuring the investment attractiveness of trading companies, and the social component ensures long-term loyalty on the part of employees and other stakeholders. This ultimately determines the competitiveness of the business model in the market and the achievement of healthy profitability in cooperation with partners.The tools of the social component for trade enterprises are found in the areas of: a) relationships, b) commu-nication, and c) control. For company employees (internal stakeholders), social programs should work effectively in the sector of relationships. In the communication sector, corporate events to shape corporate culture and ethics. In the sector of control, it can be an internal audit. Modern business practices show that investments in social initiatives are a tool to improve the company's financial efficiency and can become a source of competitive advantage. Qualitative assessment of social investments can be the subject of internal audit for management purposes. For this purpose, we propose the document "Assessment of the company's social investments based on qualitative indicators" (Figure 6).

Document title	*Date of internal audit*	*Person responsible for the evaluation*	*Applicationof the document*
"Assessment of the company's social investments based on qualitative indicators"	28/04/2024		Non-financial statements
Company name (department, branch)			

I Main part

Assessment units	Questions for qualitative assessment of social investments	Score: 1 point - yes 0 points - no	Responsible person	Notes
1 Institutionalization of social policy	Is there a special document that defines the compa-ny's social policy?			
	Is there a special department responsible for imple-menting social programs in the company?			
	Are the main provisions of social policy enshrined in the collective agreement?			
2 System of accounting for social programs and measures for their implementation	Are the company's financial statements prepared in accordance with international standards?			
	Are individual components used in accordance with international standards of social responsi-bility?			
	Is there any feedback between investors and the recipient of social investments? (If so, please add the template of such feedback in the com-ments)			
	Are there any social programs currently in place? (add names in the section of Notes)			
3 Comprehensiveness of the social investment process	Does the company develop professionally its staff? (add the information in the section of No-tes)			
	Are there any measures for workplace safety? (add names in the section of Notes)			
	Are there measures in place to protect the health and safety of staff? (add names in the section of Notes)			
	Are resource-saving technologies used? (add names in the section of Notes)			
	Are fair business practices maintained? (add names in the section of Notes)			
Total score				
Conclusions and recommendations				

Figure 6. The template of an internal document on the assessment of the company's social investments for management needs

Source. Author's

This document can be a significant addition to a group of internal documents: Quality Standard, Internal Control Standard or another document. It can also be used in the preparation of non-financial

reporting and internal management reporting in companies. The proposed docu-ment "Assessment of the Company's Social Investments Based on Qualitative Indicators" can be an information component for management. After all, the management of the social component of the competitiveness of a trading company's business model should be based on a strategy. Thanks to the strategy, the goals and objectives for this object will be clearly formulated and communicated. And this strategy will be integrated into the company's operations and core bu-siness. A good orientation here is provided by a management system that provides a fixed struc-ture and guidance. Managing the social component of the competitiveness of the company's business model is a socially and economically justified necessity that allows achieving effective results in relation to competitors, so RQ3 is confirmed.

Unfortunately, the Ukrainian segment does not yet have a systematic and coordinated mana-gement of the social component of the company's business model to ensure its competitiveness. Efforts to ensure quality, meet the social needs of employees, protect labor and the environment, and interact with the local community and government authorities are nether linked to a unified social policy, nor defined by social objectives. They are not implemented on the basis of a coor-dinated investment program.

CONCLUSIONS

The social component of the competitiveness of a company's business model is attracting more and more attention from scholars and practitioners, as it has become increasingly important in the business agenda in recent years. Being an open system, companies operate in an unstable and dynamic external environment in complex networks of interdependence. All companies face competition on a daily basis. In the course of such confrontation, they have to use various tools and resources that are part of the company's corporate style and one of the ways to resist competitors. Despite the importance of social perceptions for business model competitiveness, most previous studies in this area have examined the perspectives of companies and customers, while only a limited number of studies have examined the perceptions of social component competitiveness by employees.

In this study, the competitiveness of a trade organization appears as a complex category that combines and focuses on commercial, social, financial and investment aspects. Therefore, we assessed the competitiveness of trading companies based on the identified competitive elements. This made it possible to conduct a step-by-step study, starting with a comparative assessment of the most important indicators and ending with a generalization of the obtained estimates by integrating individual indicators based on expert opinions.

The study proves that the social component is an important internal determinant of the competitiveness of a retail company's business model. After all, development trends at the global economic level have caused fundamental transformations in doing business and at the same time have put forward a request for the social component in ensuring the competitiveness of companies' business models.

The trading companies that implement social competencies proved to be more successful in conditions of increased dynamism and uncertainty of the external environment. To this end, the study presents a comparative assessment of the competitiveness of the trading companies' business model based on the proposed methodological approach. Given the variability of the industry, the location of companies, we understand the need to differentiate the assessment of the competitiveness of the companies' business model.

The strategy of developing social competencies of trading companies is based on taking into account the needs and expectations of employees in order to increase competitiveness by minimizing conflicts and risks. Taking care of the internal social component on the part of owners and managers is an important factor in motivating employees, attracting highly qualified personnel, and increasing the level of competence and professionalism of the company's employees. Therefore, managing the social component of the competitiveness of the company's business model is a socially and economically justified necessity that allows achieving effective results in relation to competitors.

The results of this study enrich knowledge about the social component of business model competitiveness for managers and business owners.

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The Impact of Electronic Audit Procedures on the Quality of Financial Reports in Jordanian Commercial Banks in Light of Corporate Governance

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ABSTRACT

This research aimed to identify the impact of electronic audit procedures in all their dimensions, which are (planning the audit process, examining and evaluating the internal control system over electronic operation, evidentiary evidence in terms of adequacy and timing of obtaining it, documenting electronic audit procedures, identifying electronic audit samples) on the quality of financial reports in Jordanian commercial banks in light of corporate governance The descriptive analytical approach was followed for the study, and to achieve the primary objective of the study, a questionnaire was developed and distributed to (13) Jordanian commercial banks, and (170) questionnaires were distributed to those working in the field of accounting and auditing. (143) questionnaires were retrieved, with a percentage of (84%) of the fully distributed banks, and (9) questionnaires were excluded due to incomplete filling out (6%). The data was processed using the Statistical Package for the Social Sciences (SPSS) program, such as the Pearson correlation coefficient, Cronbach alpha test, multiple regression test, and hierarchical regression test The research reached several results, most notably: commercial banks interested in electronic auditing procedures, by paying attention to all dimensions of electronic auditing, and the presence of a positive impact of institutional governance on the quality of financial reports in commercial banks. Based on the results, it recommends increasing the interest of Jordanian commercial banks in electronic auditing procedures to increase the quality of its financial reports, and the necessity of using modern technological means and methods and electronic auditing techniques in the audit process.

INTRODUCTION

The increase in cases of fraud and administrations' tampering with financial statements has led to many material losses for users of financial statements the increasing ability of administrations to exploit loopholes in accounting standards applied in various parts of the world and use them to present financial statements in a way that serves their interests has led to changes A radical approach to the auditing profession and its practice (Yusran, 2023). Auditing methods and procedures have been developed to suit the extent of responsibility and complexity by the technological development in the introduction of information technology in all fields until the use of information technology became a competitive advantage for some organizations different from each other). The science of accounting and auditing, as well as other fields, has been affected by technological development, It is worth noting that accounting and auditing do not change the way data is operated and processed, whether manually or electronically In light of the rapid development of the auditing process, there is a need for the auditing process and procedures of commercial banks to be effective, and for auditors in general and internal auditors in particular to possess skills capable of dealing electronically, so that auditors are used with a degree of competence and professional qualifications and have sufficient readiness to develop a strategy for the auditing process Alwan, and Bougatef (2024). internal procedures to ensure continuity, as the audit process has witnessed an increase in technological developments, As a result, what is called computerized systems auditing, computer auditing, or electronic auditing emerged Auditing programs have provided auditors with many techniques and methods that help detect fraud and fraud easily and simply Electronic data auditing is a process based on exploiting modern technology to ensure that financial data have been entered. It also has many advantages, including speed in completing the audit process, increasing confidence among external parties in the fairness of the auditor's report, in addition to saving time and effort for the auditor and the client, and other advantages Sugeng, et al. (2023).

The quality of financial reports is also an important topic at present due to the financial corruption faced by many companies at the local and international levels From this standpoint, and in the presence of internal and external influences, the company's management influences the accounting numbers contained in the financial reports To achieve its purposes, as it misleads accounting information, reduces its quality, and presents a different perspective on the company's true economic and financial reality Sugeng et al. (2023). Hence, the study came to show the impact of electronic auditing procedures on the quality of financial reports in Jordanian commercial banks in light of corporate governance. Auditing in the electronic auditing environment is more realistic in light of the large business volume of Jordanian commercial banks because the business base has expanded significantly in light of governance, which has led to the introduction of more modern technologies associated with processing financial data more accurately and quickly and reducing the work time required to complete the process Auditing Al-Dalaien et al. (2023).

Accordingly, financial reports are considered the outcome of the work of any facility, whether industrial or service. Jordanian commercial banks are interested in issuing financial reports in a clear manner that reflects the real situation of the bank Al Dabbas (2023). To achieve this, bank departments are working to carefully audit their accounts to reflect their true financial situation, relying on modern methods and technology Modern accounting auditing processes are within the standards of transparency and objectivity that represent the quality of their financial reports Hence, the problem of the study lies in knowing the impact of electronic auditing procedures on the quality of financial reports in Jordanian commercial banks under corporate governance. The study seeks to answer the following questions: The first main question: Is there an impact of electronic audit procedures in all its dimensions (planning the audit process, examining and evaluating the internal control system over the electronic operation, evidentiary evidence in terms of adequacy, timing and obtaining it, documenting electronic audit procedures, identifying electronic audit samples) on the quality of financial reports in banks? Jordanian commercial? The following sub-questions emerge from the main question:

A - Is there an impact of planning the audit process on the quality of financial reports in Jordanian commercial banks?

B - Is there an impact of examining and evaluating the internal control system on the quality of financial reports in Jordanian commercial banks?

C - Is there an impact of evidentiary evidence on the quality of financial reports in Jordanian commercial banks?

D - Is there an impact of documenting electronic audit procedures on the quality of financial reports in Jordanian commercial banks?

E - Is there an impact of specifying electronic audit samples on the quality of financial reports in Jordanian commercial banks?

The second main question: Is there an impact of corporate governance on the quality of financial statements in Jordanian commercial banks? The third main question: Is there an impact of electronic audit procedures on the quality of financial reports in Jordanian commercial banks under corporate governance?

Objective study. This study aimed to determine the impact of electronic auditing procedures on the quality of financial reports in Jordanian commercial banks in light of corporate governance. Statement of the impact of electronic audit procedures in their dimensions (planning the audit process, examining and evaluating the internal control system for electronic operation, providing evidence in terms of its adequacy, timing and obtaining it, documenting electronic audit procedures, identifying electronic audit samples) on the quality of financial reports in Jordanian commercial banks, Explaining the impact of corporate governance on the quality of financial statements in Jordanian commercial banks and Explaining the impact of electronic auditing procedures on the quality of financial reports in Jordanian commercial banks in light of corporate governance. In light of the background of the problem, its various aspects, the research questions, and the objectives that the research seeks to achieve, the following hypotheses were formulated:

The first main hypothesis: H01: There is no effect of electronic audit procedures in all its dimensions (planning the audit process, examining and evaluating the internal control system over the electronic operation, obtaining and obtaining evidence in terms of adequacy and timing, documenting electronic audit procedures, identifying electronic audit samples) on the quality of financial reports in Jordanian commercial banks. The second main hypothesis: H02: There is no effect of corporate governance on the quality of financial statements in Jordanian commercial banks. The third main hypothesis, H03: There is no effect of electronic audit procedures on the quality of financial reports in Jordanian commercial banks under corporate governance. Figure 1 shows the study model for the study's variables, dimensions, and hypotheses:

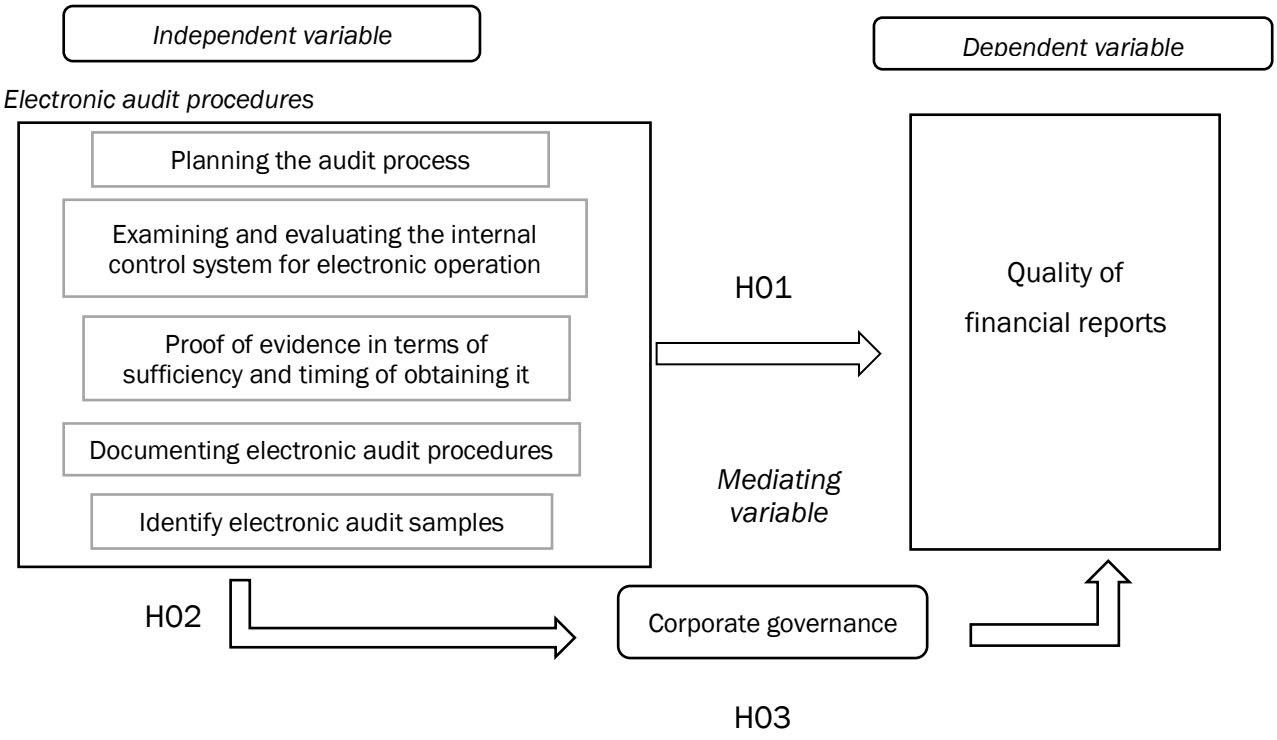

Figure 1. Conceptual framework

Source: own

1. LITERATURE REVIEW

1.1 Electronic auditing

It is known as a detailed review of accounts that enables auditors to be aware of their responsibilities through the possibility of obtaining and retrieving information quickly and simultaneously (Al-Taee et al., 2023) defined electronic auditing as the application of any type of system using information technology to assist the auditor in planning, controlling, and documenting audit work. Electronic auditing is defined as the use of computers and software in the field of auditing to help auditors examine and analyze financial data (Kane et al., 2023).

Electronic auditing has characteristics that distinguish it from manual auditing, such as efficiency and effectiveness: The electronic auditing process provides services to auditors and meets their needs, and this is achieved through the use of electronic auditing programs The efficiency and effectiveness of the auditing process are defined in terms of its ability to achieve goals and carry out its responsibilities with credibility, confidence, accuracy, and in the shortest time The use of information technology improves efficiency, and effectiveness (Ibid.).

1.2 Electronic audit procedures

Planning is considered one of the basic matters in the audit process, and an important requirement based on international auditing standards, which is one of the standards issued by the American Institute of Certified Public Accountants because Planning must be done for the work to be correct and to enable the auditor to exercise reasonable professional care The concept of audit planning according to to have been defined as those requirements that the auditor must take into account to carry out the audit so that the objectives of this process are adequately achieved Planning the audit process is a set of standards and considerations that the auditor must follow to plan the audit process, implement it efficiently and effectively in a way that suits the environment of the client company, and express his technical and neutral opinion in the audit process (Detzen, et al., 2024). The importance of planning in the audit process lies in the reliance of many different parties on the reports issued by the auditors in making their decisions and the auditor provides various services to many categories such as facility management, owners, government agencies, investors, and others (Ibid.). The internal control system refers to a set of procedures that help ensure that the company's internal work is monitored and organized consistently and effectively The internal control system is evaluated by several factors, and these include matters such as the quality of its work and the extent of its reliability, Among these procedures, an auditor who understands the structure of the control system can Internal control can decide which aspects of the system should be relied upon during the audit, and this can help the auditor avoid relying on aspects of the control system that may not be reliable or accurate (Ferreira, 2018).

There are several definitions of the internal control system, and they differ depending on the entity that developed it International Standard No. (315) defines it as the process used by persons responsible for managing individuals to provide reasonable assurance about reliability, and effectiveness, and it has been defined by the American Institute of Certified Public Accountants as the organizational policies and procedures used within the organization to protect its assets and ensure the accuracy and validity of financial and accounting information These policies and procedures help improve the organization's profitability and compliance with management policies (Harasheh & Provasi 2023). International Auditing Standard No. (500) states that evidentiary evidence is the data and information that the auditor obtains, such as examination, inventory, reports, inquiries, and estimates, to reach conclusions on which he bases his professional judgment to determine whether the financial statements under audit give a true and fair picture (IFAS, 2022).

The documentation process, as stated in the International Auditing Standard (230), is the process of creating documents (working papers) that document the audit process in terms of procedures, evidence, and results, whether in the form of stored such as information, films, electronic media, or any other form in which it is kept it the auditor must document any significant evidence and evidence that supports his opinion (Kayikci & Khoshgoftaar,2024).

Tariq et al. (2024). argues that electronic auditing of Jordanian commercial banks is of high importance, and identifying electronic audit samples is considered one of the most important procedures, and then documenting the electronic audit procedures. The next stage, planning the audit process, followed by the adequacy of audit evidence, and finally examining and evaluating the internal control system that determines the capabilities of the banks. A plentiful and electronic auditing application that works to save time and effort and integrate the stages of the auditing process. On the other hand, (Al-Zoubi & Al-Qadi 2016) believe that there is an impact on the electronic auditing system in reducing the burden of the complexity of the electronic environment of the accounting information system on the auditor about the increasing trust factor and dealing with a multiple generation of the electronic accounting information system, and in Follow up on errors and sort them directly.

1.3 Quality of financial reports

The International Accounting Standards Board defined it as the qualitative characteristics of accounting information that include suitability and reliability, which includes the sub-characteristics of verifiability, neutrality, and faithful representation (IASB, 2020). Warnlund & Klein (2020) argued that the quality of financial reports is important because it provides qualitative information that can help in making decisions and Useful qualitative characteristics, such as clarity, accuracy, and timeliness, can make the information more useful in decision-making.

Yusran (2023) argue that the concern for quality in financial reporting comes from the importance of the services provided by financial reporting, and the agreement of all parties and stakeholders about internal and external business organizations this requires an organized administrative effort, allocating resources, providing capabilities, and making a great effort to achieve the set goals and continuity of work while ensuring quality. argues (Bananuka & Nkundabanyanga,2023) that there is a relationship between the effectiveness of audit committees between the internal control system and the quality of financial reports in Jordanian commercial banks, which aims to increase investors' reassurance about the company's financial stability and integrity. (Onuorah & Friday 2016) believe that the quality of financial reports is important in banks because of their quality of financial information, which increases investment opportunities. Accordingly, the main goal of financial reports is to provide appropriate information to decision-makers, and the quality of financial reports is affected by all factors that affect electronic audit procedures, and auxiliary controls are added to them through corporate governance.

1.4 Corporate governance

The Organization for Economic Co-operation and Development (OECD) defined governance as the rules and procedures by which an organization is managed and monitored this includes a company's governance structure, which defines the rules for how rights and responsibilities are distributed among the organization's various employees, such as the board of directors, board members, shareholders, and others (OECD, 2017). The International Federation of Accountants defined corporate governance as a set of relationships, responsibilities, and powers that the Board of Directors must work on, the goal of which is to keep work on the right track and in the right direction, to achieve the main goals of the organization, and that resources, equipment, and property are properly managed (IFAC, 2019).

The importance of commitment to corporate governance lies in the appropriateness of the workflow of work procedures and following the organizational structure of the institution, and this reinforces the principle of separation of duties, which in turn leads to activating the role of effective control that contributes to achieving the organization's goals (Blevins et al., 2022). Applying governance in commercial banks achieves a variety of goals, the most important of which are increased financing opportunities and low investment costs, stabilizing financial markets, and reducing corruption, based on this, the commitment of commercial banks to follow governance standards helps encourage the companies that Borrow from to follow these rules, the most important of which are disclosure, transparency, and good management (Komath et al., 2023). Governance in commercial banks is of a special and different nature due to the difference in the basic activity in this sector from other sectors, as there are elements that are not present in other sectors, such as capital consisting of a small percentage of private funds and a high percentage of deposits that are required to be available when the depositors need it, and the banks' assets are made up

of loans of different duration, including long-term and medium-term (Aslam et al., 2024). the application of governance rules leads to higher operational efficiency and increased profits, and thus the value of the bank increases in the financial markets and increases, Trust leads to attracting investors and increasing deposits, which makes the bank a strong investment value (Athar et al., 2023).

2. METHODOLOGY

This study was applied in Jordanian commercial banks and addressed the importance of applying electronic audit procedures in its dimensions, which are (planning the audit process, examining and evaluating the internal control system for electronic operation, evidentiary evidence in terms of adequacy and timing of obtaining it, documenting electronic audit procedures, identifying electronic audit samples) On the quality of financial reports in Jordanian commercial banks in light of corporate governance. This was a major source of information for research on the impact of electronic auditing procedures on the quality of financial reports in Jordanian banks. Respondents' preferences were matched to data using traditional paper surveys and an online Google survey. Bank employees helped distribute and temporarily store. The appropriate sample size was determined to accurately represent the opinions of respondents. The questionnaire consisted of three sections: the introductory message, demographic questions, and measurement of the independent and dependent variables. On a five-point Likert scale, the following answers were given for each variable: strongly agree (5 points), agree (4 points), neutral (3 points), disagree (2 points), and strongly disagree (1 point). Demographic analysis of the data the questionnaire presents the distribution of participants by gender, age, occupation, and educational level, among others.

The organization then conducts a statistical study of the research topics. By examining the range of factors, we comprehensively assessed the potential for further study. The reliability of the measures selected from the literature was then demonstrated using a reliability coefficient index and a series of questions to assess the quality of financial reporting. the primary objective of our study was to determine the impact of the electronic audit with the five selected dimensions on the quality of financial reports in light of corporate governance, we first studied the correlation between electronic auditing and the quality of reports and then analyzed the internal structure of the five selected measures of the independent variables and corporate governance. Based on the literature analysis, the following operational definition explains the relationship between electronic auditing and financial reporting quality in Jordanian commercial banks. This section explores the research hypotheses and provides a conceptual framework. A descriptive research design was used to summarize the data and describe the characteristics of the variables. The strength of the studied association between variables was evaluated using a correlation model. Secondary sources such as books, annual bank reports, magazines, periodicals, references, and the Internet were used to collect the necessary data.

The study served as a vital source of information to determine the impact of electronic auditing procedures on the quality of financial reports in Jordanian commercial banks. Surveys from Jordanian commercial banks were distributed and collected in 2022. There are thirteen types of commercial banks in Jordan, and 143 responses were accepted for data analysis from Jordanian commercial banks belonging to different regions. An appropriate sample size was chosen to represent the views of the participants to build a quantitative and qualitative research strategy. The developed questionnaire consists of three parts: the first is an introductory letter describing the objectives of the study. In the cover letter, it was emphasized that their comments would be treated with caution. The second part included questions related to demographic data. All data that evaluated the research using the independent and dependent variables are included in the last part. On a five-point scale, strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1 were assigned to the variables. A questionnaire was prepared for commercial banks in Arabic and English and was distributed personally and through Gmail accounts.

All data were analyzed using SPSS. There were two components to examining the data: a) examining demographic data and b) analyzing the data for each research issue and evaluating the study hypothesis. Due to the ease of understanding by interviewees, a five-point Likert scale has historically been used by the majority of studies. In the pilot project, the study sample was then asked to provide their impressions and opinions about the impact of electronic auditing on the quality of financial reports in Jordanian commercial banks in light of corporate governance .The validity and reliability of the questionnaire, a key

research instrument, are crucial for determining the dependability of the research results and conclusions. Thus, it also determines the precision and consistency of the variables' measurements and their selection. Although validity and reliability are closely connected, they represent distinct characteristics of a measuring instrument. In general, a measuring device may be accurate without being valid, but it is also likely to be accurate if it is precise. Nevertheless, dependability alone is insufficient to guarantee legitimacy. Even though attest is trustworthy, it may not correctly represent the intended behavior or quality. Thus, the content validity of a measuring instrument is a validity study that exposes how well each item in the measuring instrument performs its intended function.

A targeted study of the literature, definitions, and ideas was utilized to guarantee the content validity of the questionnaire to increase the quality of the expressions in the measuring instrument and further the research objectives. This section will discuss the reliability and validity of this study. When measuring scales are used in research, the measurement scale's dependability must be established [29]. The word "reliability" refers to the capability of the measuring scale to represent the measured construct consistently. Therefore, a reliable scale should produce consistent results throughout time and geography. A certain level of dependability is necessary for a trustworthy measuring scale. Data analysis uses a measuring scale that is both reliable and accurate. Methods for measuring the dependability of a scale include the test-retest, different forms, and internal consistency techniques. Numerous research strategies have also been used to establish dependability based on internal consistency. Cronbach's Alpha Coefficient is employed in this study since it is the most popular and extensively used approach for measuring internal consistency. Cronbach's alpha assumes values ranging between zero and one (0–1). Higher values suggest more scale dependability and vice versa. Generally, Cronbach's alpha values should be at least 0.70 to ensure dependability. However, even though a value of 0.70 or higher is often desirable, a value of 0.60 will suffice for work utilizing freshly established measures, such as those used in the present research. As demonstrated in Table 1, all alpha values were more than 0.70, indicating the dependability of artificial intelligence applications and service quality.

Table 1. Tests for internal consistency - stability of the study instrument

Domain	*Sub variable*	*Number of paragraphs*	*Cronbach Alpha*
Electronic Audit Procedures	Planning for the audit process	5	0.775
	Examination and evaluation of the internal control system on electronic operation	5	0.823
	Evidence in terms of adequacy, timeliness,and access	5	0.770
	Documentation of electronic audit procedures	5	0.707
	Identification of electronic audit samples	5	0.747
	Electronic Audit Procedures	25	0.837
Quality of financial reporting		8	0.746
Corporate governance		8	0.829
All paragraphs		41	0.915

Source: own

The various elements studied and their dimensions are characterized by stability, as the second layer study was conducted on the same eye and under the same conditions, where the reader's alpha values are considered effective when (Alpha ≥ 0.70), and the Cronbach alpha value of the independent variable items (electronic audit procedures) reached (74.6%). the presence of financial reports (74.6%), corporate governance (82.9.2%), and all tools (91.5%).

3. RESULT AND DISCUSSION

The categories of years of experience were determined based on consultation with the Personnel Department, and we note that the members of the study sample have high experience in the banking field, as the percentage of those whose experience ranges from (10 to less than 15 years) was (34.33%), and

the percentage was (32.84). %) His experience constitutes (15 years or more), and the percentage of experience of the limited study sample from (5 to less than 10 years) was about (23.13%), and the lowest category was the first category (less than 5 years), where their percentage reached (9.7%) This indicates the interest of banks in human resources, especially those with high experience because they have obtained many courses over the years of their service and thus have high efficiency and effectiveness in dealing with banking operations. Those holding a bachelor's degree represent (55.22%) of the sample, and they work well in the auditing and accounting departments. The percentage of the first higher diploma degree is (6.72%) and the doctorate is (8.96%), while the lowest percentage remains (5.97%). This indicates that there are no people who are particularly familiar with the study more than the job title "internal accountant" with a percentage of (45.52%) of the sample members. In the second place, those working in the position of "accountant" remained with a percentage of (35.07%), and a percentage of workers with the job title "president" remained. The department finished the job. "Member of the heads of the audit committees" (9.70%). It is noted that there are senior positions within the study analysis staff, as approximately (13) department heads can answer the questionnaire questions, which increased the stability of the answers of the analytical study and "Member of the Audit Committee" (9.70). %) The certificates contain the results of a professional statistical analysis stating that there is a large number of specific individuals who were tested to state that they do not have professional certificates, and this increases a negative point in the preferred local performance and for the parties concerned with it. Their number was also higher (58.21%) than the members of the study. The actual number that does not have any accredited certificate, is certainly equivalent to the fact that there are (23.13%) of the members have mastered the doctoral certificate (CIA), a certificate whose importance is undoubted. She holds the best professional certificates in the field of internal auditing and was able to achieve an outstanding percentage in the CMA certificate. (11.19%), and the percentage of those holding the JCPA (5.22%), the least and most important of which is the CPA certificate. The percentage of those who mastered this control reached (2.24%). The importance of members obtaining scientific certificates in the creativity of the study is due to the new technical level, which has a very significant impact on the main specialization and the extent of its ability to achieve it. Scientific specialization. View the results now. The largest group of study members (57.46%) whose main scientific specialization is "accounting." It was learned that (4.48%) of the members were allocated to the "Economics" major. The lowest specialty among members was "management" (2.99%).

Table 2. Normal distribution test results

Domain	*Z value*	*Significance level*	*Distribution result*
Electronic Audit Procedures	0.680	0.745	Normal
Quality of financial reporting	1.159	0.136	Normal
Corporate governance	1.512	0.061	Normal
All paragraphs	0.792	0.558	Normal

Source: own

Table 2 describes the data for the study variables achieving a normal distribution, and this confirms that the level of significance of the (Z) value for the variables was greater than (5%), meaning that they are not statistically significant. The statistical significance of the "electronic audit procedures" variable reached (74.5%), and the "quality of financial reports" variable. (13.6%), for the "corporate governance" variable (6.1%), and all items of the tool (55.8%), that is, it is not statistically significant, that is, according to the statistical criterion for judging the result, the data meets the condition of a normal distribution. The second condition is that the axes of the independent variable are free of linear interference, meaning that the independent variables must be independent among themselves because the presence of linear interference between the axes inflates the value of the interpretation factor (R2) and makes it express an unreal value. To ensure the fulfillment of this condition, a test used in many studies, which is the Multicollinearity test, which is based on calculating the variance inflation factor (VIF) and calculating the tolerable variance (Tolerance), the decision rule, meaning that the independent variables are considered free of linear interactions if the value of (VIF) The test value is greater than 10 and the Tolerance value is greater than 5%.

Table 3. Testing that the independent variables are free of linear interactions

Variable	*(VIF)*	*(Tolerance)*
Planning for the audit process	1.578	0.634
Examination and evaluation of the internal control system on electronic operation	2.847	0.351
Evidence in terms of adequacy, timeliness,and access	1.869	0.535
Documentation of electronic audit procedures	2.027	0.493
Identification of electronic audit samples	1.867	0.536

Source: own

Table 3 clarifies the variations of the study I decided to verify that there are no linear interactions, and this confirms that the value of (VIF) for the variables is less than (10), as later the variation of the "Internal System Inspection Examiner on the Electronic Operating System" had values of (2.847), in addition to that the values of (Tolerance) It was greater than (5%), which means it is statistically significant to judge the result that we got rid of collinearity.

Table 4. Multiple regression analysis to track electronic audit procedures and their dimensions on the quality of financial reports

Variable	*Regression coefficient*	*Value (v)*	*Significance level*	*Correlation coefficient*	*Adjusted coefficient of determination*	*Value (P)*	*Significance level*
Planning for the audit process	0.059	0.843	0.401	0.774	0.583	38.149	0.000
Examination and evaluation of the internal control system on electronic operation	0.286	3.025	0.003				
Evidence in terms of adequacy, timeliness, and access	0.257	3.350	0.001				
Documentation of electronic,audit procedures	0.187	2.346	0.021				
Identification of electronic audit samples	0.177	2.319	0.022				

Source: own

Table 4 indicates that there are statistically significant indicators between the electronic audit procedures (independent variable) with its five dimensions combined on the quality of financial reports (dependent variable) in Jordanian banks, certainly as indicated by the (F) test (38.149), which is significant at the significance level (0.05). There is also a comprehensive correlation (0.727) between electronic auditing and the presence of financial statement data, and this confirms the importance of electronic auditing procedures in the presence of a financial survey. In addition, agreement on an interpretation of the complete model (58.3%) indicates that the electronic auditing procedures in all their aspects together can explain the changes that have been developed in the quality of financial reports (58.3%), and it means that the quality of financial reports is based on the truthfulness of their content. The reason behind this is the reliability of its data, and this is supported by the existence of electronic auditing procedures, and it details the contents of the model regarding the variations. Independently, the major experiments affected the quality of financial reports. The focus was "verifying the internal disclosure system on electronic operation," where the percentage of the problem was (28.6%), then the focus was "evidence in terms of accuracy and differences in diagnosis" (25.7%), then the axis of "Documenting electronic audit procedures" (18.7%), and finally came the axis of "Determining the impact of electronic isolation" (17.7%). However, the precise

results of the axis of “Planning the electronic audit process” (5.9%), and this is between... The importance of electronic auditing procedures in Jordanian banks is due to their strong and influential impact on developing the quality of financial performance.

To accept or reject the five sub-hypotheses that branched off from the main hypothesis, we relied on the results of the previous multiple regression analysis, through the statistical significance of the (t) values, and the decision rule is to accept the alternative hypothesis if the (t) value is statistically significant at the level ($\alpha \leq 0.05$) as follows: The first sub-hypothesis: "There is no impact of audit planning on the quality of financial reporting in Jordanian commercial banks". The results of the regression analysis show that there is no statistically significant effect of planning the electronic audit process on the quality of financial reports in Jordanian commercial banks, confirming the significance of the value of (T) for the axis of planning the audit process, which was not statistically significant at the level of ($\alpha \leq 0.05$), and from the above we conclude the acceptance of the hypothesis of the study "There is no statistically significant effect at the level of significance ($\alpha \leq 0.05$) for planning the audit process on the quality of financial reports in commercial banks. Jordanian".

Second sub-hypothesis: "There is no effect of examining and evaluating the internal control system on the quality of financial reporting in Jordanian commercial banks". The results of the regression analysis show that there is an impact of examining and evaluating the internal control system on the quality of financial reports in Jordanian commercial banks, confirming this in terms of the value of (T) for the axis of examining and evaluating the internal control system, which was statistically significant at the level of ($\alpha \leq 0.05$), with a positive impact of (0.286), and this means that the increased interest of banks in examining and evaluating the internal control system by one degree reflects positively on the quality of financial reports by (28.6%).

Third sub-hypothesis: "There is no effect of evidence in terms of adequacy, timeliness, and access to it on the quality of financial reports in Jordanian commercial banks". The results of the regression analysis show that there is an impact of evidence in terms of adequacy, timing, and obtaining it on the quality of financial reports in Jordanian commercial banks, confirming this in terms of the value of (T) for the axis of evidence in terms of adequacy, timing and obtainment, which was statistically significant at the level of ($\alpha \leq 0.05$) and a positive impact of (0.257) and means that increasing interest in evidence in terms of timing and obtaining it to one degree reflects positively on the quality of financial reports by (25.7%).

Fourth sub-hypothesis: "There is no impact of documenting electronic audit procedures on the quality of financial reports in Jordanian commercial banks". It is clear from the results of the regression analysis that there is an impact of documenting electronic audit procedures on the quality of financial reports in Jordanian commercial banks, confirming this in terms of the value of (T) for the axis of documenting electronic audit procedures, which was statistically significant at the level of ($\alpha \leq 0.05$) and a positive impact of (0.187), and this means that the increased interest in documenting electronic audit procedures by one degree reflects positively on the quality of financial reports by (18.7%).

Fifth sub-hypothesis: "There is no effect of determining electronic audit samples on the quality of financial reports in Jordanian commercial banks". It is clear from the results of the regression analysis that there is an effect of determining electronic audit samples on the quality of financial reports in Jordanian commercial banks, confirming this in terms of the value of (T) for the axis of determining electronic audit samples, which was statistically significant at the level of ($\alpha \leq 0.05$) and with a positive impact of (0.177), and this means that the increased interest in determining electronic audit samples by one degree reflects positively on the quality of financial reports by (17.7%). The second key hypothesis: "There is no impact of corporate governance on the quality of financial reporting in Jordanian commercial banks". To reach results from which we can judge the validity of the hypothesis, the data were subjected to a simple regression analysis to know the impact of "corporate governance on the quality of financial reporting in Jordanian commercial banks", the following table summarizes the results.

Table 5 discusses the existence of an impact of corporate governance on the quality of financial reports in Jordanian commercial banks, with the stability of other factors, confirming this in terms of the value of (T) for corporate governance, which was statistically significant at the level of ($\alpha \leq 0.05$) and a positive impact of (0.749) and means that the increased interest in corporate governance to a degree reflects positively on the quality of financial reports by (74.9%)

Table 5. Simple regression analysis of the impact of corporate governance on the quality of financial reporting

Independent variable	*Correlation coefficient*	*Coefficient of determination*	*Value (P)*	*Significance level*	*Regression coefficient*	*Value (v)*	*Significance level*
Corporate governance	0.749	0.558	168.96	0.000	0.749	12.999	0.000

Source: own

This result shows the importance of corporate governance. It was also found through the result of the coefficient of determination that corporate governance can clarify changes in the quality of financial reports by (55.8%) and this is an indicator that improving the quality and reliability of financial reports is supported by corporate governance.

CONCLUSION

Commercial banks are interested in electronic audit procedures, by paying attention to all dimensions of electronic auditing, (planning the audit process, examining and evaluating the internal control system on electronic operation, evidence in terms of adequacy, timing and obtaining, documenting electronic audit procedures, identifying electronic audit samples Financial reports in commercial banks are characterized by high quality in terms of adherence to generally accepted accounting principles, which gives the financial statements accuracy, clarity, transparency, credibility and error-free as well as commitment Commercial banks in corporate governance emanating from the laws, regulations and instructions issued by the Board of Directors and contained in the internal control systems that have a high ability to interpret the changes that occur in the quality of financial reports, which contribute as a positive intermediary factor to improve the impact of electronic audit procedures on the quality of financial reports, and to increase the strength of impact, and improve the amount of electronic audit procedures on interpreting changes in the quality of financial reports. This study recommends Increasing the interest of Jordanian commercial banks in electronic audit procedures, to increase the quality of their financial reports and the need to use modern means and methods of technology and electronic audit techniques in the audit process, which is reflected in increasing the quality of audit procedures, the effectiveness of work and the speed of delivery, and encouraging employees in Jordanian commercial banks to obtain professional certificates such as the Certified Internal Auditor (CIA) and the Certified Management Accountant (CMA). And conducting future studies on this subject and linking it to other fields and different variables, helps to fill the gap in the accounting literature on this subject.

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Conditional Cash Transfers in Kazakhstan: Dynamics and Regional Profiles

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ABSTRACT

The study used economic and statistical methods of analysis (calculation of specific and average values, coefficient of variation, data ranking), cluster analysis based on the k-mean link method. Authors divided the parameters of program participants in the official information base into socio-demographic and organizational and managerial. In the medium term, the program increased its focus on large families with children, the specific indicator of "full-time students" increased, which indicates improved conditions for the formation of human capital of children. There is a vector of movement of regions towards homogeneity in terms of specific socio-demographic indicators per family and an increase in heterogeneity in terms of participation in active employment measures. Using cluster and economic-statistical analysis, three types of regional profiles were identified. The profiles are clearly linked to the economic space and types of demographic behavior. The first type includes the northern and central regions, characterized by low demographic parameters, high unemployment and active participation in employment measures. The second type is represented by large agglomerations of Kazakhstan with average demographic indicators, low unemployment rates and a high number of workers per family. It is advisable to direct active employment measures to improve the skills of workers to increase their wage level. The third type is represented by five regions with high levels of demographic behavior indicators. In this type, there is also the problem of low qualifications of employees with low wages and the problem of unemployment. For the southern regions, it is advisable to stimulate resettlement to the central ones and introduce subsidies for preschool services instead of a cash transfer.

INTRODUCTION

Social protection systems in modern economies are constantly being transformed, but targeted social assistance remains an integral part of it, since inclusive development requires equal starting conditions for all members of society. At the same time, countries' budgetary resources are always limited, which forces government authorities to look for solutions that simultaneously satisfy the principles of maximizing social effect and minimizing budget costs. The mechanism of conditional cash transfers (hereinafter CCT) has the potential to find an equilibrium solution to this management problem. CCTs establish rules for the recipient that are consistent with a given social goal, such as human capital development, while also setting expectations for the recipient's behavior in the form of economic activity. Until recently, countries avoided complex social assistance systems by reducing transaction costs. But digital technologies have simplified many procedures for working with information, and the complexity of the system is no longer a limiting factor for its implementation (Gentilini, 2020).

Among the methods used for targeting social assistance programs, the geographical method is often a priority and either strictly delineates the space for program implementation or determines the normalized load by region based on spatial variations in the need for assistance. In global practice, geographic targeting is used in about a quarter of programs, but is rarely the only method (Grosh et al., 2022).

Considering the regional characteristics of countries with a vast territory, a combination of a geographical method with different conditions for paying cash transfers or transforming them into in-kind forms can be an effective targeting method.

1. LITERATURE REVIEW

Conditional cash transfer programs have a fairly long period of application and a stable positive reputation. Due to their flexibility in targeting specific population groups, they are able to provide a multifactorial system of protection against poverty (Cuesta, 2007). Conditional cash transfers are interpreted by a number of scientists as social innovations, since research results indicate positive changes in the well-being and inclusion of low-income citizens (do Vale, 2021; Béland et al., 2018; Barrientos & Malerba, 2020). The role of such programs as an effective tool for reducing inequality in starting living conditions for children, as they can be based on targeted investments in child health, quality child care, parenting programs and parental employment (Wolf et al., 2017).

Evaluations of the results of the implementation of such programs reveal positive consequences for the human capital of children, in particular: an increase in attendance at educational institutions and the duration of education for children (Meza-Cordero & Gulemetova, 2023), an improvement in the ability of citizens to use microcredit (Habibullah et al., 2023), a reduction in the number of adolescents participating in labor market (Quimbo et al., 2021). At the same time, open sources are actively discussing the comparative analysis of the consequences of using conditional cash transfers (since there are always errors in exclusion from the program) and universal social protection to achieve the Millennium Goals (Scheel et al., 2020;ILO,2017; Saltkjel & Malmberg-Heimonen, 2017) The debate is supported by a number of recent studies that argue that the intended transformational potential of social protection through a conditional cash transfer program may not always be detectable (Ulriksen & Plagerson, 2023). Among the negative consequences of conditional transfer programs are the long stay of participants in the program, their commitment to paternalism and stigmatization in society (Borzutzky, 2012; Seekings et al., 2023). At the same time, researchers emphasize the dependence of the results on the content of the program itself and on the quality of its management (De Venanzi, 2022; Boko et al., 2023).

Conditional cash assistance, like many social programs, has a geographical projection, since the economic and socio-demographic parameters of countries with a large territory most often demonstrate pronounced heterogeneity. The regions of residence of program participants can determine their perception of the fairness of the program, its transformative role, and, consequently, their assessment of the government’s performance, as has been found in a number of studies (Huang & Gao, 2018., Béland et al., 2017).

Hulme et al. (2014) summarize the results of medium-term cash transfer programs for the poor and, in particular, emphasize the decentralization of cash transfer programs to the municipal level in China and

Brazil as a way to increase social impact. Nasri K. (2022), argues that targeting effectiveness varies from one region to another. Attention is drawn to the fact that regional characteristics of residence can have a significant impact on the components by which the state of poverty is measured (food and nutrition structure, quality of housing and costs of its maintenance - Gibson, 2016). Jindra and Vaz (2019), based on 71 countries, argue that program management reduces the risk of poverty only if it takes into account regional characteristics of residence and is specifically linked to certain household characteristics.

In a number of cases, it is noted that programs that are geographically linked are being implemented, including for reasons of accessibility of social services (schools, medical and special social centers, etc.). Sometimes households are initially selected for a program based on geography (Kosec & Mo, 2017; World Bank, 2020; Arruda et al., 2021; World Bank, 2021). To speed up the response to the process of reducing family resources and entering the social group of the poor, early warning systems include, among others, geographical triggers (WorldBank, 2020; UNICEF, 2019; WorldBank, 2020; Gentilini et al., 2020; Boko et al., 2020) .

It is widely accepted that geographic information can help diagnose a program access problem that is generating exclusion errors (WorldBank, 2020). Geographic targeting opened a new stage for its method, which was made possible by processing complex sets of information and drawing up maps of poverty (Skoufias et al., 2017; Ohlenburg, 2020). At the same time, many studies note that the geographical method alone is not enough; it is used in parallel with the proxy method and monetary measures (World Bank, 2021). In our study, we use a geographical method to compile a typology of Kazakhstan's regions in the conditional cash transfer program and develop recommendations for program management for individual types.

2. METHODOLOGY

We adhere to the World Bank methodology (Grosh et al., 2022), which uses a broad interpretation of the term “program” and considers a program a system of interventions to achieve policy goals, even if a specific legal act does not use the term “program”. The goal in this case is to support the population in a situation of under consumption, risks of declining well-being and falling into chronic poverty. The study used economic and statistical methods of analysis (calculation of specific and average values, coefficient of variation, data ranking), cluster analysis based on the k-mean link method. We have grouped the parameters of program participants in the official information database as follows:

- Socio-demographic, designed for 1 family;
- Organizational and managerial, defined by us for 1 family and 1 able-bodied person.

Socio-demographic indicators are presented as follows: number of family members; amount of children; number of pensioners; number of disabled people; number of able-bodied people; number of unemployed; number of people employed at the time of application; the number of people caring for children, the disabled, and the elderly. Organizational and managerial factors are associated with active employment measures:

- Active measures in the field of employment, per family and per able-bodied person;
- Persons employed in permanent jobs, per one able-bodied person;
- Persons employed in public works/social jobs/professional retraining, per one able-bodied person.

The study compared the parameters of social groups for 2018, 2022 and 2023, because over a longer period, data are not comparable due to changes in monitoring and evaluation indicators. For comparability of results from year to year, data are presented for the regional structure of Kazakhstan, which was in force until 2022 inclusive. Since new regions were identified by dividing the territory of three regions into two parts, the data for parts of each of the three divided regions are summarized.

3. RESEARCH RESULTS

3.1 Characteristics of the average family of a Kazakh CCT recipient for 2023

The average family consists of 5.6 people, the composition is determined as follows:

- 3.6 children under 18 years of age,
- 0.02 disabled people of all groups,
- 0.01 pensioners,
- 0.19 full-time students (except for doctoral studies),
- 1.73 able-bodied citizens
- 0.03 others.

Translating the data into another measurement format, we can say that the probability of the presence of children in the family is 65%; full-time students (students, cadets, undergraduates) 3.5%; able-bodied persons 31%; disabled people and pensioners 0.3% and 0.2%, respectively; other categories 0.5%. By status in the labor market, out of 1.73 able-bodied citizens in the family:

- 0.12 unemployed;
- 1.01 has a job at the time of application;
- 0.6 are caring for other family members at home;
- 0.01 self-employed.

In other words, the probability of the presence of an unemployed family among able-bodied persons is 7%; having a job at the time of application - 58%; care workers -35%; self-employed - 1%. 14% of able-bodied persons or one able-bodied person out of 4 families are involved in active employment measures.

When calculating participation rates in active employment measures per able-bodied person, the following is revealed:

- one person out of seven is involved in active employment measures;
- one in 10 gets a permanent job
- one in 1000 undergoes professional training/advanced training courses;
- one in 14 ends up in a social workplace;
- one in 33 participates in community service.

3.2 Dynamics of average indicators for the period from 2018 to 2023

The dynamics of the average demographic indicators of the program allows us to conclude that there are positive changes and a concentration of efforts on helping large families and children, including older children in full-time education. Indicators of the number of family members, children under 18 years of age, and full-time students have a positive sign of absolute changes. (Table 1) The last fact may indicate an improvement in the conditions for the formation of children's human capital, since the probability of the presence of full-time students in the family increased by 1.5%. The growth of universal social benefits for the disabled and pensions has reduced participation in the program for these categories.

At the same time, the dynamics of the social and labor characteristics of program participants is contradictory. As demographic shifts continue, working-age people and carers are becoming less likely to participate in the program. The likelihood of unemployed people being in the program increased slightly. The most controversial from the point of view of assessing the results of the program is the significant increase in the probability of the presence in the family of people who are employed at the time of application from 32% to 58%. Since such persons are entitled to receive assistance, it is obvious that the level of their wages does not allow the family to go beyond the poverty line. That is, the problem is both the low qualifications and wages of such participants, and the insufficient level of benefits for children and caregivers, since they are the dominant groups. A negative phenomenon can be considered a decrease in the intensity of active measures to promote employment: in 2018, a person from every third family was involved, and

in 2023 only from every fourth. The organizational and managerial indicators of the associated employment program, designed for one able-bodied family member, have negative dynamics. This applies to all indicators, except for the specific indicator of persons sent to social jobs, which has the least significance among the proposed measures. The specific indicator of able-bodied persons sent for vocational training and advanced training, which, given the current picture, should be the leading measures, decreased by twenty times compared to 2018.

3.3 Dynamics of the regional profile of conditional cash transfers

To assess regional differences, we selected a statistical coefficient of variation, according to which in 2023 in the regions, according to specific indicators per family: a) Insignificant degree of dispersion of regions by the number of family members, by the number of children in the family, by the number of able-bodied persons in the family, and b) Average degree of dispersion among full-time students; persons who have a job at the time of application; persons caring for other family members.

Based on these indicators, regions can be read as homogeneous aggregates. Regions are heterogeneous in terms of the number of disabled people per family; pensioners; unemployed; number of persons involved in active employment measures. It is interesting that over the period there is a decrease in the coefficient of variation, i.e. a vector of increasing homogeneity or decreasing heterogeneity appears for all specific indicators per family, except for persons involved in active employment measures. This is evidenced by the negative sign of absolute changes in the coefficient of variation in 2023 compared to 2018.

As for the specific indicators per able-bodied person, all employment projects across regions show pronounced heterogeneity, which increased in 2023 compared to 2018. The increase in heterogeneity reflects both the different economic development of the regions and the different effect of organizational and managerial efforts in the employment program.

3.4 Types of regional profiles

A comparative analysis of the results of regional profiles for the period from 2018 to 2023 allows us to conclude that over the past two years the geographical grouping of regions has been consolidated and agglomeration specifics are visible. In 2018-2019, we observed a mixed composition of clusters in terms of the geographical location of the regions. For example, the southern Zhambyl region was part of the northern cluster. The regions of Central and Western Kazakhstan were connected with it in one subcluster (Figure 1)

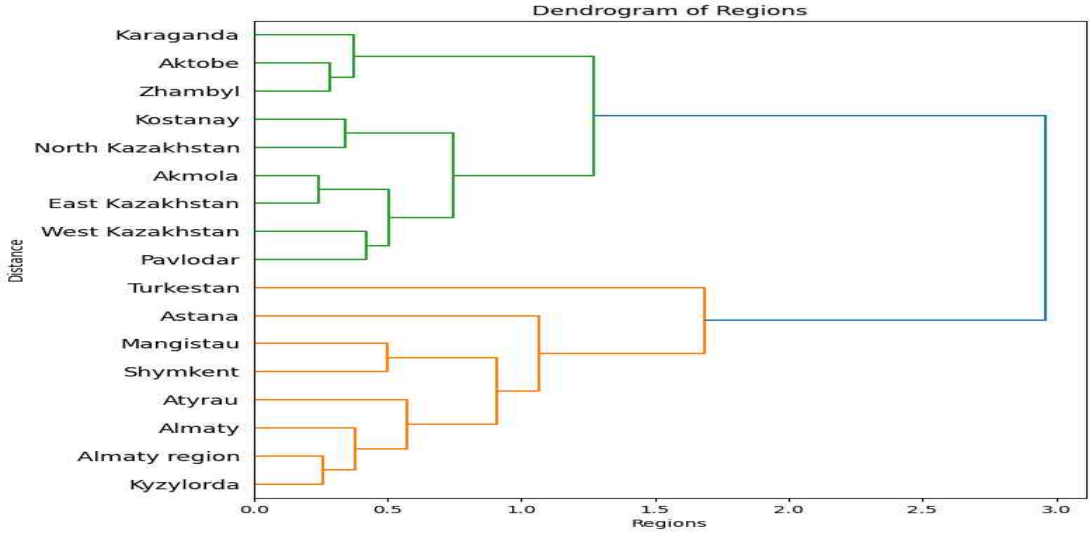

Figure 1. Dendrogram of the regions of Kazakhstan based on the characteristics of the social group of CCT recipients, 2018

Source: compiled by the authors

In 2022-2023, there is a clear geographical grouping with the identification of a type that has a clear agglomeration link (Figure 2).

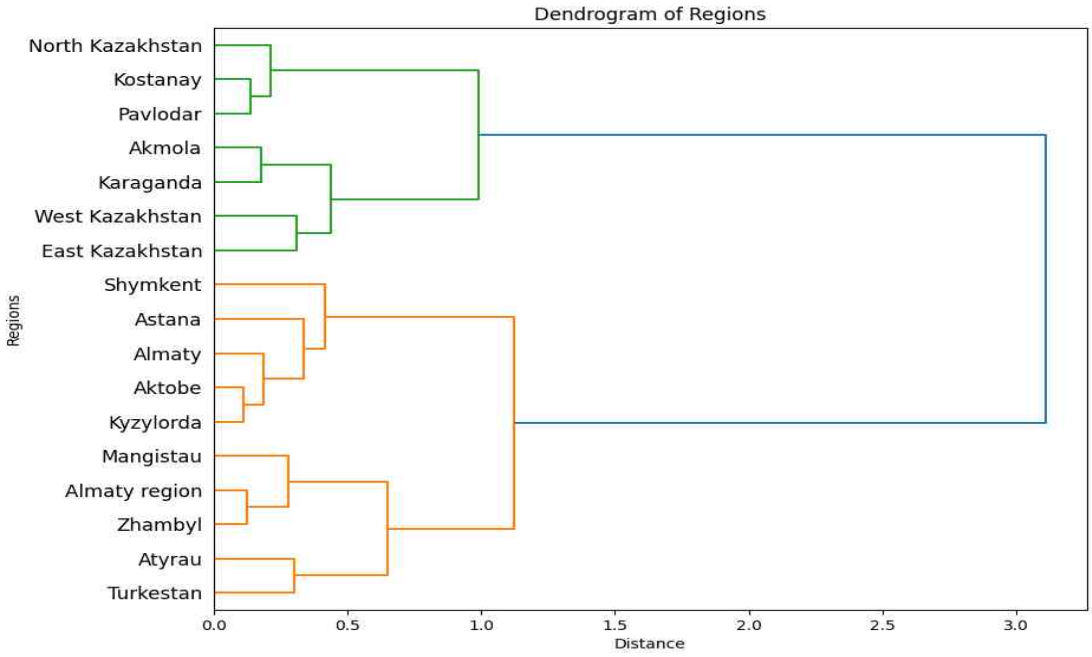

Figure 2. Dendrogram of the regions of Kazakhstan based on the characteristics of the social group of CCT recipients, 2023

Source: compiled by the authors

Two clusters have formed, within each of them there are two subclusters. Cluster No. 1 includes 64% of the territory of Kazakhstan and 18% of CCT recipients. Subcluster 1.1 includes three regions that can be considered the northern arc: Kostanay, Pavlodar and North Kazakhstan regions. Subcluster 1.2 included the eastern, one western and two central regions of Kazakhstan. Cluster No. 2 includes 36% of the territory and 82% of CCT recipients. Subcluster 2.1 was made up of the agglomerations of the cities of Astana, Almaty, Shymkent, Aktobe and Kzyl-Orda regions. Subcluster 2.2 consisted of three southern and two western regions, which concentrate 54.2% of all recipients in Kazakhstan.

To clarify the characteristics of the resulting cluster distribution, we undertook a comparative analysis of the arithmetic mean value of the program indicators for the cluster with the average value of a specific indicator for the country. When analyzing specific demographic characteristics of a family, cardinal differences between clusters are revealed:

- In the first cluster, all demographic characteristics are below the national average. (Table 1)
- In the second cluster they are either close to the national average (subcluster 2.1, columns 4-8), or above the average (subcluster 2.2, columns 4.5).

The cluster distribution was determined by the demographic parameters of the population of recipients in the regions. Subcluster 1.1 differs from subcluster 1.2 in lower values of a number of indicators of the demographic block. This applies to family size; number of children in the family; number of caregivers; number of able-bodied family members; the number of people employed at the time of applying for help. In terms of the number of full-time students at the post-secondary level and the number of unemployed, the subclusters coincide. Subcluster 1.1 is the most problematic in terms of employment, as its "number of unemployed" and "those with a job at the time of application" indicators are worse than the national average. At the same time, it is characterized by high activity of measures to promote employment (per family), above the national average indicators of active measures of employment and placement of

persons in permanent jobs (per 1 able-bodied person). As well as the country's highest rate of professional training and advanced training per 1 able-bodied person.

In subcluster 1.2, some employment indicators are slightly worse. This applies to the indicator "the number of persons involved in active employment measures" and "the employment of persons in a permanent workplace". In general, for cluster 1, it can be said that a lower level of demographic burden on the family is combined with the highest number of students in the country continuing their education after school, which emphasizes the focus of support measures on children's human capital. The higher unemployment rate in these regions compared to the national average is combined with more intensive measures to promote employment.

Subcluster 2.1 has a number of demographic indicators at the national average (family size; number of children; number of people with jobs), but for all other indicators it is characterized by a level below average. The number of unemployed per family is two times lower than the national average, and the number of people with jobs in this cluster is higher than in other subclusters and the national regional average. This confirms the hypothesis of a low level of wages with high employment and an average demographic load, in which working family members cannot provide an average per capita income at the poverty line. The reasons for this may be both the low qualifications of workers, which does not allow them to increase their wages, and the high cost of living characteristic of large cities and agglomerations. This subcluster contains all the growing agglomerations of Kazakhstan and the Kzylorda region with its oil producing companies. In the same subcluster, there is a deviation of the indicators of active employment measures by more than two times from the national average. Another unfavorable deviation is the lower activity of recipients in the field of post-school education, apparently associated with an early job search.

Subcluster 2.2 is the undisputed leader in terms of average family size, the number of children in the family, the number of able-bodied people and carers. In terms of the number of unemployed; number of people with jobs; and also in terms of employment promotion indicators, the cluster is slightly above or equal to the average. The exception is the indicator of professional training per able-bodied family member, which is almost two times less than the national average. It is obvious that the focus on large families, large families and a high dependent burden on the family are not combined with high economic activity of the population, which is to a certain extent related to the economic environment. In the western regions (Atyrau and Mangistrau regions) this is specialization in oil production and the predominance of large corporations with little development of other types of activities. And in the southern regions (Almaty and Zhambyl regions, Turkestan) agricultural orientation dominates, a focus on self-employment with unstable and insufficient income. The southern regions are characterized by a surplus labor market with a chronic excess of labor supply over demand.

4. DISCUSSION

We agree with the opinion of do Vale (2021) and Cuesta (2007), who substantiated in their works the ability of the instrument of conditional cash transfers to ensure the targeting of social protection to target groups of the population. Evaluating the results of the program over time confirms the positive impact on children's human capital, because the probability of having full-time students in the family increased by 1.5% in the medium term. Similar results were shown in studies by Meza-Cordero & Gulemetova (2023).

At the same time, we believe that there is a need to strengthen the transformative role of the program in terms of developing the human capital of children and parents, using the experience discussed in the study by Meza-Cordero and Gulemetova (2023).

We are close to the view that the results of a program certainly depend on the quality of its management (De Venanzi, 2022; Boko et al., 2023). We are alarmed by the trends identified in the agglomerations of Kazakhstan, which can be diagnosed by the proxy indicator "continuation of education after school." In agglomerations, the proportion of children in a family continuing education is lower than the national average. Combined with the fact that working parents cannot provide an average per capita income above the poverty line, this is caused by economic reasons, but cannot be justified in the long term.

We are confident that the regional characteristics of the program are of fundamental importance, as reflected in the works of Huang X., Gao Q. (2017) and Béland D. et al. (2017).Targeting effectiveness clearly varies from one region to another, as stated by Nasri K. (2022). This may be indicated by indicators of chronic poverty or staying in the program for more than 3 years. Unfortunately, in Kazakhstan such data is not provided in open sources of information and, apparently, the problem requires a separate study. Although there are no technical barriers to such research, digital databases of beneficiaries are becoming uniform across years.

Table 1. Correlation of average values of specific indicators (per family/one able-bodied person) by subcluster with the national average, 2023

Clusters	Subclusters	Territorial units	Average family size *	Amount of children	Number of full-time students (after school)	Number of able-bodied people	Persons caring for children, disabled people, the elderly	Number of unemployed	Number of people employed per family	Persons involved in active forms of employment	Active employment measures	Employment of persons in permanent jobs	Professional training
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1 Cluster	Subcluster 1.1	Kostanay, Pavlodar, North Kazakhstan	4,7	2,8	0,24	1,53	0,45	0,16	0,92	0,25	0,16	0,11	2,9
	Subcluster 1.2	Akmola, East Kazakhstan, Karaganda, West Kazakhstan	5,1	3,7	0,24	1,61	0,5	0,16	0,94	0,22	0,14	0,07	2,3
2 Cluster	Subcluster 2.1	Almaty city, Astana city, Shymkent city, Kyzylorda, Aktuibinsk	5,5	3,6	0,18	1,7	0,58	0,06	1,07	0,1	0,06	0,03	0,9
	Subcluster 2.2	Almaty, Atyrau, Mangistau, Turkestan, Zhambyl	5,9	3,8	0,22	1,74	0,63	0,15	0,98	0,28	0,16	0,1	0,6
National average			5,4	3,6	0,19	1,73	0,6	0,12	1,01	0,24	0,14	0,1	1,0

* Indicators in columns 4-11 are calculated per family, in columns 12.13 per able-bodied person, column 14 per 1000 able-bodied people

**White color of the cell – the average value of the indicator for the subcluster is below the national average, dark color of the cell – above the national average

CONCLUSION

Over the reviewed period from 2018 to 2023, the program increased its focus on large families with children, including an increase in the specific indicator of "full-time students after school education," which indicates improved conditions for the formation of children's human capital. If in 2018, per 100 families, 12 children continued their education after school, then in 2023, 19 children. One of the significant consequences was the exclusion of persons with disabilities and pensioners from the program brackets with a parallel increase in categorical basic transfers for them. Of these categories, only members of large families, in which the average per capita income does not reach the poverty line, remained in the program, but the size of these groups is statistically insignificant.

The most controversial from the point of view of assessing the results of the program is the significant increase in the probability of the presence in the family of people who are employed at the time of application from 32% to 58%. Since such persons are entitled to receive assistance, it is obvious that the level of their wages does not allow the family to go beyond the poverty line. That is, the problem is both the low qualifications and wages of such participants, and the insufficient level of benefits for children and caregivers, since they are the dominant groups. A negative phenomenon can be considered a decrease in the intensity of active measures to promote employment: in 2018, a person from every third family was involved, and in 2023 only from every fourth.

The organizational and managerial indicators of the associated employment program, designed for one able-bodied family member, have negative dynamics. The specific indicator of able-bodied persons sent for vocational training and advanced training, which, given the current picture, should be the leading measures, decreased by twenty times compared to 2018.

Over the period, there has been a decrease in the coefficient of variation between regions according to the socio-demographic parameters of recipients, i.e. a vector of increasing homogeneity or decreasing heterogeneity appears for all specific indicators per family, except for persons involved in active employment measures.

As for the specific indicators per able-bodied person, all employment projects across regions show pronounced heterogeneity, which increased in 2023 compared to 2018. The increase in heterogeneity reflects both different rates of economic development of regions and different effects of organizational and managerial efforts in the employment program.

Using cluster and economic-statistical analysis, three types of regional profiles of Kazakhstani recipients have been identified, which have become established in 2022-2023. The profiles are clearly linked to the economic space and types of demographic behavior.

The first type (cluster No. 1) includes all regions of the northern border (except for the Aktobe region), central and eastern regions, which constitutes approximately 20% of the target group. The social subgroup is characterized by low or low demographic parameters relative to the national average, calculated per family. This type is characterized by specific unemployment per family above average, but high participation in employment measures, including vocational training. Since a number of industrial enterprises are planned to be localized in these regions in the near future, the number of this subgroup will most likely decline. The subgroup is characterized by the highest number of full-time students, which is certainly a positive phenomenon.

The second type (cluster No. 2, subcluster 2.1) is represented by large and developing agglomerations of Kazakhstan, which are characterized by demographic behavior corresponding to the average for the entire group of recipients in Kazakhstan. The group includes about 30% of conditional cash transfer recipients. A pronounced feature of the subgroup is the extremely low rate of unemployed and the high number of persons with wages per family. This, in our opinion, indicates the low qualifications of working people, whose wages cannot provide an average per capita income at the level of the poverty line for a family. Since prices in large agglomerations are usually higher than in other regions, it is more difficult to ensure a living wage. Active employment measures in this subgroup are calculated in scanty values, because formally able-bodied persons work. We believe that it would be advisable to offer vocational training and advanced training for people in this group to move to another job and increase their wages. The lower

proportion of full-time students than in other subgroups is of concern, which may be due to early job searches by young people.

The third type (cluster No. 2, subcluster 2.2) is represented by five regions with a high level of demographic behavior indicators, which together make up about 50% of recipients and this group tends to increase its share in the program. The subgroup is characterized by an above-average level of specific unemployment and a slightly below-average rate of people with jobs. In this type, there is also the problem of low qualifications of employees with low wages and the problem of unemployment. In terms of employment promotion indicators, the cluster is slightly higher than or equal to the average, but the indicator of professional training per able-bodied person is the lowest, which characterizes the economic environment as a whole. Large corporations in Kazakhstan's oil-bearing regions in the west of the country set high prices for consumer goods in the region, but other activities are not actively developing. Perhaps a solution could be the development of cross-sector partnerships between local governments, corporations and the non-profit sector in order to enhance social entrepreneurship and corporate volunteering. The southern regions are traditionally labor-abundant and it is necessary to more strongly encourage the relocation of those wishing to the central and northern regions. For these regions, it is advisable to give local governments the right in some cases to replace cash transfers with services. Replacing a cash transfer with subsidizing the services of a preschool institution is better aimed at building the child's human capital.

Further research will be devoted to clarifying the results based on sociological surveys of recipients, program operators, and experts.

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Analysis of the Investment Potential of the Stock Market and its Impact on the Banking System

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ABSTRACT

Studying the investment potential of the stock market and its impact on the banking system allows us to identify important trends and risks, promotes more informed decision-making and increases the stability of financial systems. In a rapidly changing global landscape, such research is essential to ensure stable and prosperous economies. The purpose of the study is a comprehensive analysis of the investment potential of the stock market and its impact on the banking system in order to develop recommendations for optimizing investment strategies and strengthening financial stability. The stock market has significant investment potential, which has a positive impact on the banking system, improving its liquidity, creditworthiness and stability, subject to favorable macroeconomic conditions and a stable political and regulatory environment. However, sharp fluctuations in the stock market can lead to an increase in risks and negatively affect the banking system. Testing the hypothesis will allow us to identify key factors influencing the investment potential of the stock market and its interaction with the banking system, contributing to the development of an effective risk management strategy and improving financial stability. The study confirmed the hypothesis about the significant impact of the investment potential of the stock market on the banking system. During periods of economic growth and a stable political and regulatory environment, stock market growth helps improve the financial condition of banks, increasing their liquidity and creditworthiness. However, high volatility and sharp fluctuations in the stock market increase risks for banks, negatively affecting their stability.

INTRODUCTION

The Kazakhstan stock market plays an important role in the country's economy, providing financing for enterprises and stimulating investment activity. Optimizing this market is key to ensuring its efficiency, sustainability and attractiveness to both local and foreign investors. In the context of a rapidly changing global economic environment and competition for attracting capital, strategies to increase investment attractiveness are becoming a necessity, which is especially important for Kazakhstan, which is striving to modernize and develop its economy.

The study of the investment potential of the stock market and its impact on the banking system is of particular relevance in the modern economy. The stock market is an essential element of the financial system, playing a key role in the process of attracting capital, allocating resources and assessing the value of companies. The interaction between the stock market and the banking system is multifaceted and mutually beneficial, having a significant impact on the stability and development of the economy as a whole. In recent decades, the world has faced a number of serious economic shocks, including the global financial crisis of 2008 and the COVID-19 pandemic, which have exposed the vulnerabilities of financial systems and emphasized the need for in-depth analysis of the relationships between different sectors of the economy. Understanding how the stock market affects the banking system helps identify key risks and opportunities, which is especially important for ensuring financial stability and sustainable economic growth.

The modern economy is characterized by a high degree of globalization and integration of financial markets. Investors are increasingly considering international opportunities to diversify their portfolios, increasing the importance of examining macroeconomic factors and the political and regulatory environment. Technological innovations, such as the development of financial technology (FinTech), cryptocurrencies and blockchain, are also bringing significant changes to the structure and functioning of stock markets and the banking system. The study of the investment potential of the stock market and its impact on the banking system is highly relevant for several reasons:

A. Economic instability and global changes. The global economy is experiencing periods of instability caused by various factors, such as:

- COVID-19 pandemic - major changes in economic activity, disruption of supply chains, changes in consumer habits;
- geopolitical conflicts - sanctions, trade wars and political instability that affect stock markets and banking systems;
- climate change - impact on the economy and markets through natural disasters and the transition to sustainable development.

B. Technological innovation. Technological changes and innovations in the financial sector (FinTech) have a significant impact on investment potential and the banking system:

- development of digital platforms - increasing the number of private investors thanks to access to online platforms and applications;
- blockchain and cryptocurrencies - impact on traditional financial markets and banking systems;
- Big Data and artificial intelligence - improving analytical capabilities for assessing investment potential.

C. Changes in the regulatory environment. Regulatory changes at the national and international levels continue to affect the stock market and banking system:

- tightening capital requirements for banks - after the 2008 crisis, many countries introduced more stringent regulatory standards;
- central bank policies - monetary policy, including interest rates and quantitative easing programs, significantly influences the investment climate.

D. Impact on private and institutional investors. Understanding the investment potential of the stock market is important for both private and institutional investors:

- private investors - increasing financial literacy and increasing the number of market participants;
- institutional investors - pension funds, insurance companies and other large players need reliable analytical data for asset management.

E. The relationship between financial markets and the real sector. Stock markets and the banking system are closely related to the real sector of the economy:

- business financing - a successful stock market contributes to the availability of capital for companies, stimulating economic growth;
- risks for the economy - a fall in the stock market can lead to a decrease in the creditworthiness of companies and an increase in the number of bankruptcies, which negatively affects the banking system and the economy as a whole.

F. Globalization of financial markets. Increasing globalization leads to increased interconnections between different financial markets and banking systems:

- capital flow - investors actively move capital between countries in search of the best return;
- financial integration - an increase in the number of cross-border transactions and interactions between financial institutions of different countries.

Analysis of the investment potential of the stock market and its impact on the banking system allows us to identify important trends and risks, promotes more informed decision-making and increases the stability of financial systems. In a rapidly changing global landscape, such research is essential to ensure stable and prosperous economies. The study represents an important step towards understanding the complex relationship between the stock market and the banking system. Its results will help develop more effective investment strategies and risk management measures, contributing to strengthening financial stability and sustainable economic development.

The study of the investment potential of the stock market and its impact on the banking system opens up wide opportunities for practical application and further scientific analysis. The findings can serve as a basis for developing more effective investment strategies, improving bank risk management and supporting regulatory policies.

Prospects for further research include expanding time horizons, in-depth analysis of individual factors, international comparative studies, the use of new analytical methods and the development of an interdisciplinary approach. These opportunities will help deepen understanding of the relationships between the stock market and the banking system, contributing to strengthening financial stability and sustainable economic growth.

1. METHODS

To achieve the goal and test the hypothesis, various research methods were used, which provided an integrated approach to the analysis of the investment potential of the stock market and its impact on the banking system:

A. Econometric analysis:

- regression analysis was used to identify the relationship between macroeconomic indicators (GDP, inflation, interest rates) and stock market indicators (capitalization, volatility). Regression models helped determine the degree of influence of each factor on the stock market and its connection with the banking system.
- correlation analysis was used to assess the degree of relationship between various economic and financial indicators, making it possible to determine the main trends and dependencies.

B. Time series analysis:

- trend analysis was used to identify long-term trends in the dynamics of the stock market and its impact on the banking system, including data analysis, helping to identify stable patterns.

C. Qualitative analysis:

- content analysis - Analysis of legislative changes, political events and regulatory acts made it possible to assess their impact on the investment climate and financial stability.

D. Analysis of financial market data:

- analysis of liquidity and capitalization was carried out to assess the current state of the stock market, including analysis of trading volume, capitalization of the market and its segments;
- volatility analysis was used to assess the level of market risks.

E. Forecasting methods:

- forecasting models were used to develop forecasts for the development of the stock market and its impact on the banking system. Various forecasting models were used, including econometric and statistical methods.

The use of an integrated approach, including quantitative and qualitative methods of analysis, made it possible to obtain a comprehensive picture of the investment potential of the stock market and its impact on the banking system. The use of these methods ensured the reliability and validity of the research results, which made it possible to develop sound recommendations for investors, banks and regulators.

2. RESEARCH DESIGN

The research design represents a detailed plan and structure on the basis of which the analysis of the investment potential of the stock market and its impact on the banking system was carried out. It includes the definition of goals and objectives, the choice of research methods, the collection and analysis of data, as well as the interpretation of the results, which made it possible to comprehensively assess the investment potential of the stock market and its impact on the banking system. An integrated approach ensured the reliability and validity of the results obtained, which made it possible to develop sound recommendations to improve financial stability and sustainable economic growth.

3. LITERATURE REVIEW

The stock market, as a segment of the financial market, is becoming increasingly relevant and important as a mechanism for the free but regulated flow of capital into the most efficient sectors of the economy. The stock market is the epitome of a capitalist economy, as stock exchanges arise where there are well-developed market relations and flourish when there is a natural influx of large amounts of capital. In a sense, the stock market is the pinnacle of the complex structure that is the securities market.

The history of the emergence, formation and development of the stock market spans centuries, showing that the stock market plays an ever-growing and constantly renewed role in the national and global economic activity of society. The stock exchange has come a long way in its history, experiencing periods of prosperity and relative obscurity while serving as a market economy. At the same time, in each of the countries where exchanges were created, new elements and rules for the operation of exchanges were introduced. There are quite a few opinions about what a stock exchange is. According to foreign researchers, the stock exchange is a necessary part of a market economy, and the securities market is an important component of a market economy (Mexmonov, 2020).

Over the past few years, research linking stock market movements to investor attention and sentiment has become quite extensive. This confirmation is the works of foreign scientists such as F. Audrino, F. Sigrist, D. Ballinari (2020), A. Hamid, M. Heiden (2015), N. Kim, K. Lučivjanská, P. Molnár, R. Villa (2019). Understanding the importance of the stock exchange can be interpreted as follows:

- organized market for the sale of financial instruments;
- financial intermediary with regulated operating hours; purchase and sale transactions between sellers and buyers of securities are carried out with the participation of stock exchange intermediaries according to officially established rules.

– an area in which financial sources of economic growth are concentrated and distributed among areas of development with the active use of market principles.

In practice, there is a wide variety of organizational and legal forms of exchange throughout the world. They range from semi-private institutions to partnerships, corporations and non-profit organizations. For example, as shown in Figure 1, Western European stock exchanges lag behind their American and Japanese counterparts in terms of trading volume and market capitalization. According to Kazakhstani legislation, stock exchanges must be organized in the form of a joint stock company. State regulation of the economy affects the mobilization of money capital and affects the functioning of the stock market.

Thus, at the stage of development of modern economic relations, it is obvious that stock exchanges and exchange trading mechanisms are firmly established as a necessary mechanism for conducting commercial transactions in financial markets. The stock market offers the largest number of financial instruments, including those that allow you to trade without selling or buying a physical product. There are a fairly large number of financial instruments that allow financial transactions and influence macroeconomic indicators (Olokoyo et al., 2020). In the modern global economy, investment is the basis of economic growth (Rehman et al., 2023).

The investment strategy depends on the investor's goals, risk tolerance and investment horizon. For example, in the short term, investors may prefer impulsive strategies because they allow them to react quickly to market opportunities and make quick profits. On the other hand, in the long term, investors more often choose strategies aimed at long-term holding of assets (Abukari and Otchere, 2020; Day et al. 2022; Blajer-Gołębiewska, 2024; Mohapatra and Misra, 2020). Most of the world's stock markets are currently characterized by speculative and blind behavior, which threatens the stability of the market and interferes with the main function of the stock market, namely the correct allocation of capital. As a result, a useful quantitative stock selection methodology should be able to accurately measure enterprise value (Li et al., 2023) and rank stocks using a scoring methodology (Gounder et al., 2017; Sia et al., 2023). A study on optimizing the Kazakhstan stock market using an investment attractiveness strategy highlights the importance of effectively managing investment resources to stimulate economic growth and development (Peprah et al., 2019).

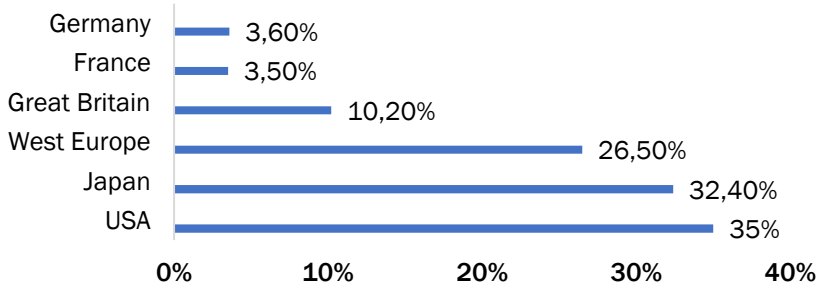

Figure 1. Analysis of the distribution of transaction volumes and stock market capitalization among foreign countries

Source: Mexmonov, 2020.

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Bongini et al. (2017) explain that countries with well-functioning financial markets grow faster and ease financial constraints that affect the expansion of firms and industries important to economic growth. These findings are similar to those and they are evident in the mission of the ZSE, which prioritizes capital and risk management. Bhowmik, Roni, and Shouyang Wang (2020) concluded that the stock market is the fundamental insulin in economic activity in the modern world. It is a measuring instrument used to test the health of an economy in the face of a given disaster because it is the first market that sends a signal of growth or a cycle of business trends to policymakers. Thus, the volatility of stock index returns is an important variable for measuring adverse factors in the economy.

Chaudhary et al. (2020) strengthened the assertion that uncertainty in markets is the perception of stock market volatility that has the greatest impact on investment analysis and portfolio management. Volatility indicates economic instability.

Analysis of factors influencing the development of the stock market is important for understanding the dynamics and prospects of this segment of financial markets, among which the following can be highlighted (Figure 2).

It is necessary to understand that in order to create a favorable investment environment and stimulate the development of the stock market, it is necessary to improve regulation and improve the investment climate.

As a result, stock markets mitigate this burden by providing investors with an asset that they can sell quickly and inexpensively (Şendeniz-Yüncüetal, 2018). This analysis adds empirical information about the stock market and GDP growth.

By attracting international investors, stock markets promote transparency and strengthen rules in emerging economies. This is because maintaining investments will require adequate trading ethics, accountability and clear shareholder rights (Bernal-Ponce et al., 2020; Roshchyk et al., 2022).

The stock market's influence on the business community is critical to managers who closely monitor stock market trends and movements to identify potential risks and opportunities because the stock market reacts to information in the market in which they operate. In order for firms to withstand market shocks, management must ensure adequate financial resources by encouraging savings, diversifying through liquid assets, and providing access to emergency financing to support operations in the face of irregular cash flows. Topcu, Mert, and Omer Serkan Gulal. (2020) stated that extensive policy measures are critical to rejuvenate stock markets.

The literature review conducted shows that there is a significant amount of research devoted to various aspects of the interaction between the stock market and the banking system. Macroeconomic factors, corporate performance, political and regulatory environment, and new technologies play a key role in determining the investment potential of the stock market and its impact on the banking system. The results of these studies confirm the hypothesis of a significant impact of the stock market on the banking system and provide a basis for further analysis and development of recommendations.

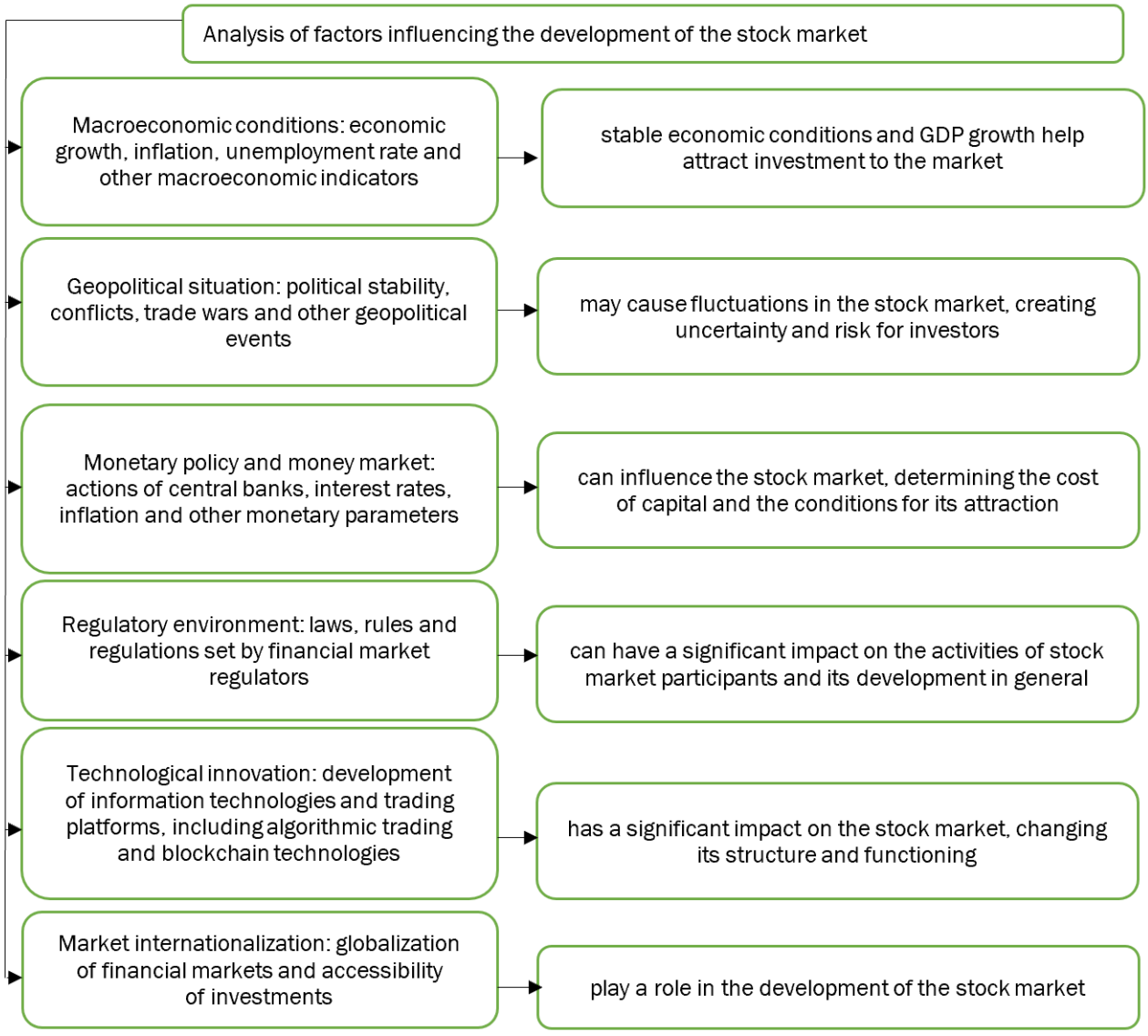

Figure 2. Analysis of factors influencing the development of the stock market

Source: Compiled by the authors

4. ANALYSIS AND DISCUSSION

Optimization of the stock market in Kazakhstan is achieved through a number of measures aimed at increasing its investment attractiveness. The need for strategies used to optimize the stock market is to ensure efficient functioning, stability and sustainability that:

- help attract investors;
- ensure market liquidity;
- reduce risks for market participants;
- create favorable conditions for investment;
- contribute to increasing market transparency;
- improving the quality of regulation and control over the activities of market participants.

Ultimately, stock market optimization strategies contribute to its development and contribute to the economic growth of the country. These strategies are implemented both independently and in combination with each other in order to optimize the stock market of Kazakhstan and increase its attractiveness for

investors. The country's stock market is reaching a qualitatively new level in its development, increasingly responding to the needs of some economic entities to attract capital, and others to place it on favorable terms.

In accordance with the Law of the Republic of Kazakhstan "On the Securities Market", the bond market in 2022 saw a record number of concluded transactions - 18,481, with a continuing downward trend in the average volume of one transaction. The average daily trading volume amounted to 10.2 billion tenge (on the secondary market - 4.1 billion tenge), the average daily number of transactions - 75 (on the secondary market - 67), the average volume of one transaction - 134.7 million tenge (on the secondary market - 60.4 million tenge) (Table 1).

Table 1. Main trading indicators on the bond market

Indicator	*01.2019*	*01.2020*	*01.2021*	*01.2022*	*01.2023*
Trading volume, billion tenge, incl.	2309,4	2715,6	2691,2	1980,8	2488,8
– primary market	1858,2	1953,7	2239,4	1143,7	1492,2
– secondary market	451,2	761,9	451,8	837,0	996,7
Number of transactions, pcs.	2203	2704	3203	8839	18481
– primary market	137	363	1033	980	1978
– secondary market	2066	2341	2170	7859	16503
Average number of transactions per day, pcs.	9	11	13	36	75
Average volume of one transaction, million tenge	1048,3	1004,3	840,2	224,1	134,7

Source: compiled by authors according to https://kase.kz/

In terms of the main categories of investors in the primary corporate bond market, the share of banks was 27.0%, broker-dealer organizations - 2.9%, other institutional investors - 11.1%, other legal entities - 58.1%, individuals - 0 ,8 %. The share of participation of non-residents was 3.5%. Note that in 2023, local investors could have a double-digit return on their investments on the country's stock market, as well as, indeed, on most foreign exchanges. In these conditions, it is important to ensure the speedy implementation of fair taxation (the tax base is all profitable and unprofitable transactions), which will motivate citizens of the country to declare their income, open accounts in their own tax jurisdiction and stimulate receiving passive income.

Successful analysis and decision-making require continuous monitoring and adaptation to changing conditions. The introduction of digital financial instruments and blockchain technology in the securities market can increase the transparency of the stock market and reduce risk for its participants. The main task in 2021 is to expand channels for financing the economy through stock market instruments, while in 2020 the stock market of Kazakhstan developed by attracting new investors, which were the regulator's priority.The stock market in the economy ensures the redistribution of capital from investors to issuers operating in various sectors of the economy. To enhance its role, the regulator has carried out comprehensive work in recent years aimed at liberalizing the regulation of professional stock market participants, creating a safe environment for investment and increasing the inclusiveness of brokerage services. Measures have been taken to stimulate the implementation of new technological solutions in the securities market, which today is a key driver for the development of the stock market, improving the quality and availability of brokerage services.

To attract foreign investment, work is being done to promote the Kazakh stock market in international capital markets. In 2020, the agency worked to increase the accessibility of exchange infrastructure for market participants, strengthen the potential of strategic investors and involve the population in work on the stock market. Among the main measures include initiatives to increase the availability of investment fund securities for the population, transfer of part of the pension assets from the Unified Pension Pension Fund to the management of private companies, and create conditions for the introduction of new types of

investment instruments. Retail investors were able to open a brokerage account remotely via SMS code and invest online without physically visiting a broker. Thus, in 2020, the agency's efforts were focused on attracting new investors to the stock market. As a result, 15 thousand accounts were opened in 2020, and the total number of unique investor accounts in the market exceeded 137 thousand. In 2021, the agency's main priority will be expanding channels for financing the economy through stock market instruments. The experience of countries with a sufficiently developed capital market shows that the key policy in the development of the securities market is measures for tax incentives for companies issuing securities, as well as government support measures through the provision of subsidized interest rates or guarantees on securities. With regard to the digitalization of the stock market, it can be noted that in August 2020, the Concept for the development of financial technologies and innovations for 2020-2025 was approved. Over the course of five years, the National Bank and the ARRDF will implement measures to create a favorable environment for fintech areas. Regarding the regulation and development of the insurance market and the securities market, it is possible to transfer all brokerage services to electronic format, including:

– the ability to open a personal account,
– register non-standard transactions with securities and other financial instruments in the system,
– provide a complete list of information operations.

In addition, as part of the roadmap for implementing the concept by the second quarter of 2023, measures are envisaged to study the feasibility and approaches to creating a securities marketplace with stock market participants. A comprehensive assessment of the feasibility and approaches to creating centralized securities services, developing concepts, requirements and architectural solutions will be carried out. If a financial marketplace for securities is created, this will reduce the overall costs of issuers and investors due to centralized infrastructure and standardized services, and will also improve the efficiency of online sales of financial products on the securities market and their accessibility among the population.

In order to consider the prospects for the development of digitalization of services of the stock market of Kazakhstan, the profitability indicators of the Stock Exchange were analyzed in accordance with the data in Figure 3.

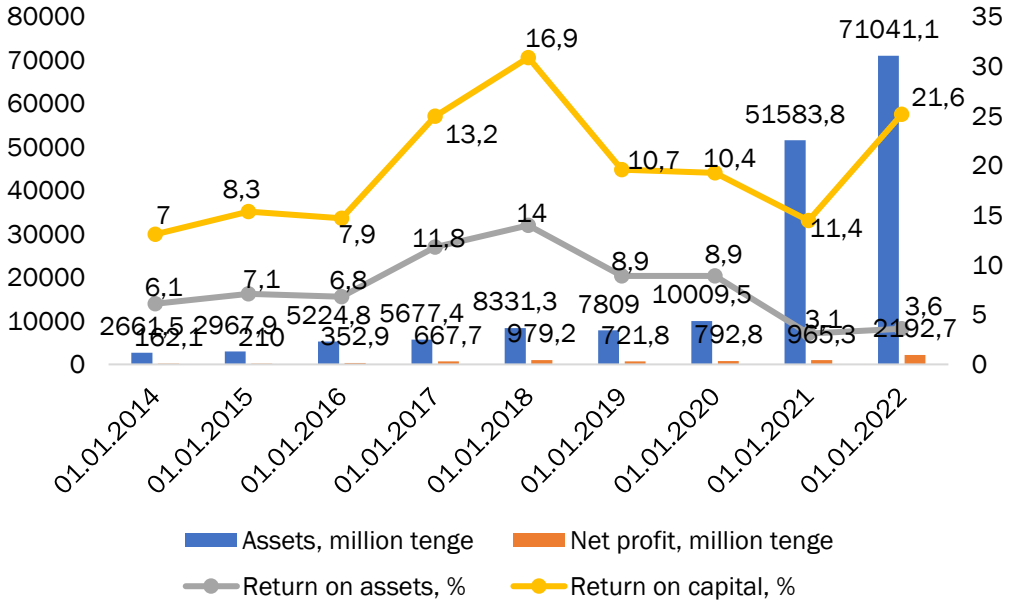

Figure 3. Stock Exchange profitability indicators

Source: compiled by authors according to https://www.kase.kz/

In this study, extrapolation forecasting was carried out, based on the stock exchange return indicator "Net Profit" in order to identify forecast values for 2023-2025. Using the criterion of "ascending" and

"descending" series, it was found that the series contains a trend component. To approximate the initial data, a polynomial of the second degree was chosen as the growth curve:

$$\tilde{y}_t = a_0 + a_1 t + a_2 t^2,$$

The parameters of the selected curve were estimated using a modeling and forecasting method that ensures the minimum distance of the function graph from the original data points in accordance with the data in Table 2.

Table 2. Checking for a trend

General view of the criterion for "ascending" and "descending" series (it is enough to violate at least one inequality)	With the possibility of error $0{,}05 < \alpha < 0{,}0975$
$\nu(n) > \left[\frac{2n-1}{3} - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$	3< 4
$K_{\max} < [K_0(n)]$	4< 5

Source: compiled by authors

As a result of data approximation, the following trend model was obtained:

$$\tilde{y}_t = 271{,}555 - 47{,}124t + 23{,}583t^2$$

To check the adequacy of the model, a number of residuals were examined, i.e. discrepancy between levels calculated from the model and actual observations. The results of the analysis of a number of residuals in order to test the model for adequacy are shown in Table 3.

Table 3. Checking the adequacy of the model

Property being checked	*Statistics used*		*Border*	*Conclusion*
	Name, calculation formula	*Received value*		
Accident	Peak criterion (turning points) $p > \left[\frac{2}{3}(n-2) - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$	3 >2	2	Adequate
Normality	RS- criterion $RS = \frac{e_{\max} - e_{\min}}{S}$	3,03	2,67-3,69	Adequate
Equality of the mathematical expectation of the levels of a series of residues to zero	*t*- Student's t-statistic $t_{\cdot} = \frac{\left\lvert \bar{e} \right\rvert}{S}\sqrt{n}$	0	2,26	Adequate

Source: compiled by authors

The most important properties of the residual component are: the equality of the mathematical expectation to zero, the randomness of the residuals and their compliance with the normal distribution law. To

calculate the point forecast, the corresponding values of the time factor were substituted into the constructed model. Results of forecasting for 2023-2025. are presented in Table 4.

Table 4. Forecast of the "Net profit" indicator for 2023-2025

Year	$n+k$	*Point forecast, million tenge*
2023	12	2606,701
2024	13	3101,979
2025	14	3644,423

Source: compiled by authors

Thus, at the stage of development of modern economic relations, it is obvious that the stock exchange and the exchange trading mechanism have firmly established themselves as one of the most important mechanisms for conducting commercial transactions in the financial market. As a result of the analysis, it was revealed that the stock exchange will receive a net profit in the coming years; accordingly, the assets of the exchange will increase their turnover for further functioning, using digital technologies in the financial sector of the economy. To substantiate this conclusion, it is necessary to consider several key factors that support this statement.

A. Economic growth and macroeconomic stability. GDP growth and macroeconomic stability create favorable conditions for the development of the stock market. Economic growth helps to increase corporate profits, which in turn attracts investors and increases turnover on the stock exchange.

B. Corporate profits and dividend policy. Growing corporate profits and stable dividend policies of companies stimulate investor interest in the stock market. Companies that demonstrate stable financial performance attract more investments, which increases liquidity and turnover on the stock exchange.

C. Innovation and digital technologies. The introduction of digital technologies such as blockchain, automated trading platforms and financial technology (FinTech) significantly improves the efficiency of stock exchange operations. These technologies reduce transaction costs, improve access to markets, and increase the speed and security of transactions.

D. Regulatory reforms and support. Transparent and fair regulations contribute to increased confidence in the stock exchange. Proper regulation ensures investor protection and market stability, which attracts more participants and increases turnover.

All of these factors - economic growth, corporate profits, innovation and digital technologies, regulatory reforms and political stability - create conditions for the stock exchange to generate net profits in the coming years. These factors also contribute to an increase in the turnover of the exchange's assets, which will ensure its further successful functioning. The introduction of digital technologies in the financial sector will further increase the efficiency and attractiveness of the stock market, which confirms the validity of what has been done.

CONCLUSION

The growth and stability of the stock market has a positive effect on the banking system, improving the liquidity and capitalization of banks. In turn, a stable and efficient banking system supports the development of the stock market by providing the necessary infrastructure and financial resources.

The pace of globalization and environmental changes are changing the way in which surplus funds are raised and allocated. If we consider financial instruments as a type of financial liability, we can talk about the use of financial instruments as a basis for monitoring and evaluating the activities of companies.

For further development of the stock market of Kazakhstan, it is recommended:

- deepen the analysis of factors influencing investment activity;
- develop more effective risk management strategies;
- continue to work to ensure the stability of the financial system and create a favorable investment environment to attract both local and foreign investors.

The study demonstrates the importance of an integrated approach to analyzing the relationship between the stock market and the banking system. Taking into account macroeconomic, corporate, political and technological factors allows us to more deeply understand the dynamics and interaction of these financial market segments. The results obtained and recommendations developed can be useful for investors, banks and regulators, helping to improve the investment climate, financial stability and sustainable economic growth. Recommendations for stakeholders:

- it is recommended for investors to diversify portfolios and take into account macroeconomic and market risks when making investment decisions;
- Banks need to strengthen risk management and maintain liquidity, especially in conditions of stock market volatility;
- regulators should create a transparent and stable regulatory environment that helps attract investment and maintain financial stability.

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Development of a Concept for Managing National Resources in Accordance with Sustainable Development Goals in A Low-Carbon Economy

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ABSTRACT

Relevance of the study. In the modern conditions of public activity, characterized by constant changes in the economic environment, digitalization of processes and the need to ensure sustainable development, the role of effecttive management of public resources is increasing. At the same time, public audit is the most important mechanism of control, transparency and accountability in the management of public finances. The study is aimed at developing a new paradigm of public audit and recommendations for improving the system of assessing the management of public resources, contributing to the improvement of the efficiency of public administration and the sustainability of economic development. The purpose of the study is to develop a new paradigm and concept for the development of public audit aimed at increasing the efficiency of using public resources, improving the transparency and accountability of government agencies, and minimizing corruption risks. Research hypothesis. The introduction of a new paradigm of public audit based on international standards, modern technologies and best foreign practices will significantly increase the efficiency of public resource management, improve the transparency and accountability of government agencies, and reduce the level of corruption. The use of a risk-oriented approach, big data analytics and digitalization of audit processes in the national system of state audit will contribute to a more rational and targeted use of budget funds, which will have a positive impact on the eco-

nomic development of the country. Research results. As a result of the study, conclusions were obtained that confirm the hypothesis that the introduction of a new paradigm of state audit and the use of modern technologies can significantly improve the efficiency of public resource management and improve the quality of control.

INTRODUCTION

Public audit plays a key role in ensuring effective and transparent management of public resources, as well as maintaining public trust in public institutions. In the context of globalization and growing economic challenges associated with digitalization, sustainable development and economic crises, public audit systems require constant updating and adaptation to new realities. The development of technologies, including artificial intelligence and big data analysis, opens up new opportunities to improve the efficiency of audit processes and improve control over the use of budget funds. Many countries successfully implement innovative methods of audit and management of national resources, focusing on international standards and best practices. However, national audit systems often face unique challenges, such as lack of transparency, limited resources or political dependence of audit bodies. This makes it necessary to develop a new paradigm of public audit that will not only take into account global trends, but also effectively adapt to the specific conditions of a particular country. The purpose of this study is to develop a new concept of public audit and make recommendations for improving the system for assessing the quality of management and the effective use of national resources, based on international experience. The study aims to identify best foreign practices and integrate them into the national system of public audit in order to improve the transparency, efficiency and effectiveness of public funds management.

The study will include an analysis of existing approaches to public audit in countries with a developed financial control system, such as the United States, Germany, South Korea and Singapore. The experience of introducing modern technologies into the audit process, such as the use of big data analytics and a risk-oriented approach, will be studied, and the results of audit reforms aimed at increasing accountability and minimizing corruption will be assessed.Thus, the relevance of this study is due to the need to improve the efficiency of public administration in the context of modern challenges and opportunities. The development of a new paradigm of public audit will contribute to a more rational and transparent use of national resources, having a positive impact on economic development and strengthening citizens' trust in government institutions.

1. LITERATURE REVIEW

The effectiveness of public administration, including economic, is considered as the implementation of management, during which the set goals are achieved (solving a certain socially significant problem, satisfying the interests of the population, maintaining the digital competitiveness of the region and the country) while minimizing costs and complying with modern standards of digital maturity (Ortina et al., 2023; Bilan et al., 2023). Public sector auditing is associated with various institutional logics associated with three public sector paradigms: Public Administration (PA), NPM and NPG. In addition, the evolution of ECA audit methodology and standards has contributed to the overall improvement of the audit process over time (Talbot et al., 2023).

Public institutions will manage public finances in accordance with the principles of efficiency, effectiveness and economy (3E), and their activities are mainly scrutinized through performance auditing (Cordery&Hay, 2019). The debate on the emergence of performance audit and non-financial audit in the public sector has a certain gap in the literature on supranational audit institutions, which are discussed by authors such as (Bonollo, 2019; Mattei et al., 2021; Nerantzidis et al., 2022). In any organization, audit plays a key role in identifying whether there have been abuses in the decision-making process and resource allocation (Grossi et al., 2023; Moolkham, 2025). In a democratic system, there are checks and balances that ensure accountability for the decisions made by agents - those who hold public office (Cordery et al., 2022). Thus, the decision-making process and the allocation of public funds and other resources by

cabinet ministers and administrators should be audited (Hay and Cordery, 2021; Salienė et al., 2024), since their decisions and the way they use public funds and resources certainly affect not only the well-being of the current generation but also the well-being of future generations. The UN emphasizes the importance of sustainable production and consumption to ensure the conservation of renewable and non-renewable natural resources. In this regard, reports call on organizations to be accountable for intergenerational equity, which is related to poverty reduction through the equitable distribution of natural resources and anthropogenic wealth among individuals, while ensuring environmental sustainability (Kozubikova et al., 2024; Dvorsky et al., 2024). As a result, the debate has focused on sustainability mainstreaming (Bebbington and Unerman, 2018) and sustainability auditing (Celone et al., 2022).

Public sector organizations are increasingly adopting innovative principles and implementing digital governance strategies to improve service delivery (Grossi and Argento, 2022). Increased transparency, improved efficiency, and improved communication and engagement with users are among the key benefits of implementing smart services (Argento et al., 2020),(Spicer et al., 2021). Around 80 countries claim to conduct some form of performance auditing, and there should be scope to explore this function in countries, which differs significantly from previous studies in the UK, Europe, Australia and New Zealand. Country experiences show that successful implementation of e-government models promotes good governance and is an important factor in creating effective, distinct and inclusive institutions at all levels of government (Dreshpak, 2022). With the development of digital technologies and innovative public services, it becomes important for governments to use them strategically to improve the quality of services provided and ensure sustainable development. This can be a key factor in improving the efficiency and openness of government agencies (Eom and Lee, 2022). Researchers Ramsetty & Adams (2020) examine these issues in detail and are likely to provide analysis and examples demonstrating how open data and innovative technologies can be used to achieve e-participation and public engagement.

2. RESEARCH DESIGN

The research design provides a comprehensive approach to studying the current state of public audit and assessing the management of national resources. The use of both quantitative and qualitative methods will provide a deeper understanding of existing problems and develop recommendations for their solution based on international standards and practices. *Research limitations*: a) difficulties in gaining access to full data from government reports and statistics; b) limited number of experts willing to participate in interviews and share inside information; and c) limited applicability of international standards and practices in the national context due to the specifics of legal and economic systems.

Expected results: a) Development of a new paradigm of public audit, including elements of a risk-oriented approach, sustainable development audit and the use of modern technologies (e.g. big data); b) Development of recommendations for the implementation of a system for assessing the quality of management and the effective use of national resources, based on international standards and successful examples; and c) Increasing transparency and accountability in the management of public resources through improving audit processes and using international best practices.

3. FOREIGN EXPERIENCE IN CONDUCTING STATE AUDIT

State audit is an independent inspection and assessment of the activities of state bodies, budgetary institutions and organizations, carried out in order to ensure the legal, effective, efficient and targeted use of state funds and property. The main objective of state audit is to guarantee transparency and accountability in the management of public resources, as well as to ensure proper control over the implementation of state programs and projects. Foreign experience in conducting state audit includes various approaches, methodologies and practices that are used in different countries (Figure 1).

This experience can serve as a basis for improving the government audit system in other countries, including the introduction of best practices and innovative approaches. Government auditing in the United States is carried out through various government and independent audit bodies, the most famous of which

is the U.S. Office of the Auditor General (GAO). Here are the main aspects of government auditing in the United States:

A. Structure and Independence. GAO is an independent agency reporting to Congress, ensuring its independence from the executive branch and allowing GAO to conduct objective and impartial audits.

B. Types of Audits:

- Financial Audit - examining the financial statements of federal agencies for compliance with standards and rules;
- Compliance Audit - assessing how agencies comply with laws, rules, and regulations.

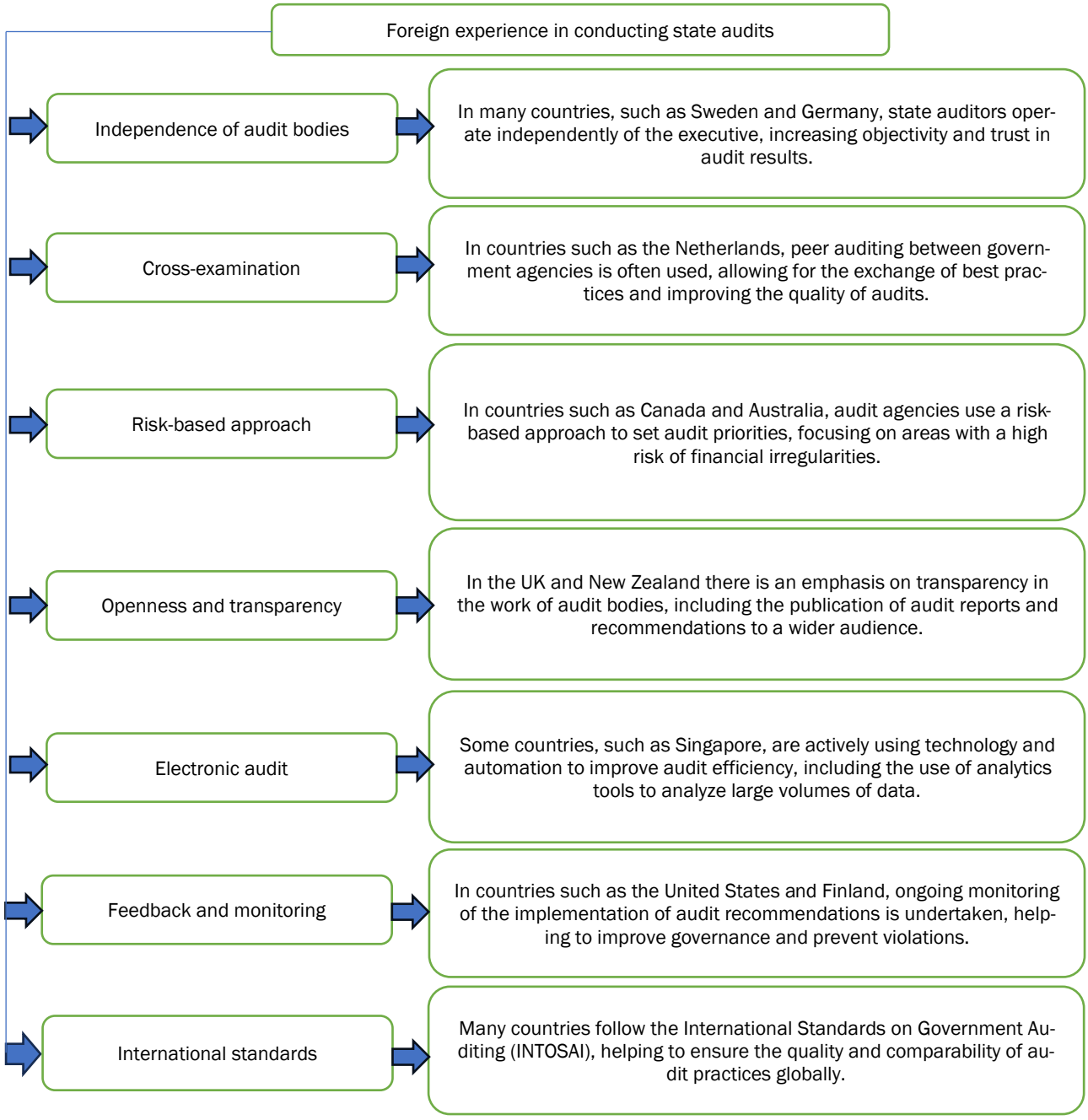

Figure 1. Foreign experience in conducting state audit

Source: Compiled by the authors

C. Performance Evaluation. Analyzing the effectiveness of programs and operations to determine whether goals are being achieved.

D. Risk-Based Approach. GAO uses a risk-based approach to focus on areas where financial irregularities or poor performance are most likely.

E. Publication of Reports. GAO regularly publishes audit reports that are available to the public and used by Congress to make funding and legislative decisions.

F. Monitoring Implementation of Recommendations. GAO monitors how federal agencies are implementing its recommendations and includes this information in its subsequent reports.

G. Collaborating with Other Agencies. GAO actively collaborates with other state and local audit agencies, as well as with international organizations, to share best practices.

H. Technology Approach. GAO implements new technologies and analytical tools to improve the efficiency of its audits and data analysis.

I. Program Audits. GAO audits a variety of federal programs to evaluate their effectiveness and appropriateness and to identify areas for improvement.

J. Training and Professional Development. GAO also invests in the training and development of its staff to maintain a high level of professionalism and audit knowledge.

Government auditing in the United States plays a key role in ensuring accountability and transparency in the use of federal funds, which contributes to more efficient management and improved government services. The assessment of the efficiency of budget use can vary significantly across countries depending on the methodology and indicators used for the analysis. In the context of studies by the Organisation for Economic Co-operation and Development (OECD), efficiency assessment is often carried out using methods such as frontier efficiency analysis (DEA). This approach allows identifying potential for efficiency improvements, for example in health and education (Table 1).

Table 1. Examples of assessing the effectiveness of using budget funds

№	*Country*	*Usage*	*Opportunity*
1	United Kingdom	Performance-Based Budgeting (PBB)	the approach aims to improve efficiency through rigorous monitoring and evaluation of programs with the goal of achieving better results at the same or lower cost
2	France	The performance audit conducted by the Accounts Chamber is widely used	allows identifying areas where public spending can be optimized and offers specific recommendations for improvement
3	South Korea	A system for assessing the effectiveness of budget expenditures has been introduced, including regular reviews of programs and projects to ensure their cost-effectiveness and efficiency	helps to reduce unnecessary expenses and direct funds to more productive areas
4	Germany	Strict audit and control mechanisms are applied to assess the effectiveness of the use of public funds	includes both internal and external audits, as well as the use of a system of indicators for monitoring and evaluating the implementation of budget programs

Source: compiled by the authors

Evaluation of the effectiveness of budget funds abroad involves the use of various metrics and indicators. Here are some examples from other countries:

A. Return on investment (ROI) in healthcare.

In the UK, £100 million was invested in a cardiovascular disease prevention program, which reduced hospitalizations by 20%. If the average cost of hospitalization is £5,000 and the number of hospitalizations prevented was 10,000, then:

ROI = (10,000 x 5,000) - 100,000,000 / 100,000,000 x 100% = -50%

This shows that, despite the high social effect, the short-term financial results were negative.

B. Effectiveness of educational programs.

In the USA, a teacher training program cost $20 million and covered 10,000 teachers. As a result, the level of student achievement increased by 15%. If the economic benefit of improving academic performance was $50 per student and the number of students was 200,000:

Savings = 200,000 x 50 = $10,000,000

So the net savings were:

Net savings = 10,000,000 – 20,000,000 = -$10,000,000

This highlights the need for long-term analysis of the effects of such programs.

C. Comparison of infrastructure costs.

In Australia, a bridge cost AUD 200 million, reducing travel time by 30 minutes for 10,000 users per day. If the average cost per hour of time is AUD$25:

Annual savings = 10,000 x 30 min x 25/60 x 365 = AUD$1,562,500

Payback period estimate:

Payback period = 200,000,000 / 1,562,500 ≈ 128 years

This demonstrates a long payback period that may not justify the investment.

D. Efficiency of social assistance programs.

In Canada, 50 million Canadian dollars were spent on a program to support the unemployed, allowing 5,000 people to find jobs. If the average salary is 40,000 Canadian dollars per year, then:

Tax savings = 5,000 × 40,000 × 0.2 = 40,000,000 Canadian dollars

Thus, the efficiency of the program can be estimated as:

Net savings = 40,000,000 – 50,000,000 = - 10,000,000 Canadian dollars

E. Environmental performance indicators.

In Norway, a water purification program costing 30 million Norwegian kroner was implemented, which reduced pollution by 40%. If the economic benefit from improving the ecosystem is estimated at 50 million crowns:

Net benefit = 50,000,000 – 30,000,000 = 20,000,000 crowns

This demonstrates the positive result and effectiveness of the program.

These examples show how different countries evaluate the effectiveness of the use of budget funds in different areas, which allows us to analyze whether the goals are being achieved and how appropriate the use of resources was.

4. ANALYSIS AND RESULTS

Let us consider the activities of state audit in the Republic of Kazakhstan, where the main performance indicators are presented by the Supreme Audit Chamber (Table 2).

Table 2. Key performance indicators of the Supreme Audit Chamber for the period 2015-2022, mil. tenge

Year	*Number of audit events*	*Number of objects*	*Volume of funds*	*Total established violations*	*Amount of established financial violations*	*Volume of funds subject to recovery*	*Recovered and reimbursed funds*
2016	11	116	2635305	562662	4 850,5	512	65062,5
2017	7	56	1297792,4	612549,9	10 946,5	1 121,1	62 783,1
2018	23	179	5195,8	429,2	771,0	138,1	130,1

2019	20	207	34177,5	1203,8	173,0	35,7	21,5
2020	18	117	47278781,2	1852710,3	689,3	80 648,9	15723
2021	21	155	32363548,8	1723035,6	11 116	397 166,6	390155
2022	20	124	4958499	271100,9	2186,3	34 188,1	16905,1

Source: compiled by the authors according to https://www.gov.kz/memleket/entities/esep?lang=ru.

Based on the presented data on the activities of the Supreme Audit Chamber, we can conclude that the coverage of budget funds by audit activities has expanded. To assess the effectiveness of audit activities and identify the main trends for the period 2016–2022, we will conduct the following calculations and analysis:

A. Funds recovery rate

The recovery rate shows how effectively the identified financial violations are returned to the budget. We will calculate it for each year as the ratio of recovered funds to the amount of funds subject to recovery (Table 3, Figure 2).

Recovery Ratio = Recovered Funds / Amount of Funds to be Recovered x 100

Table 3. Calculation of the recovery coefficient

Year	*Recovered funds (million tenge)*	*Amount of funds to be recovered (million tenge)*	*Recovery rate (%)*
2016	65062,5	512,0	12,71
2017	62783,1	1121,1	5,60
2018	130,1	138,1	94,20
2019	21,5	35,7	60,22
2020	15723,0	80648,9	19,49
2021	390155,0	397166,6	98,24
2022	16905,1	34188,1	49,44

Source: compiled and calculated by the authors

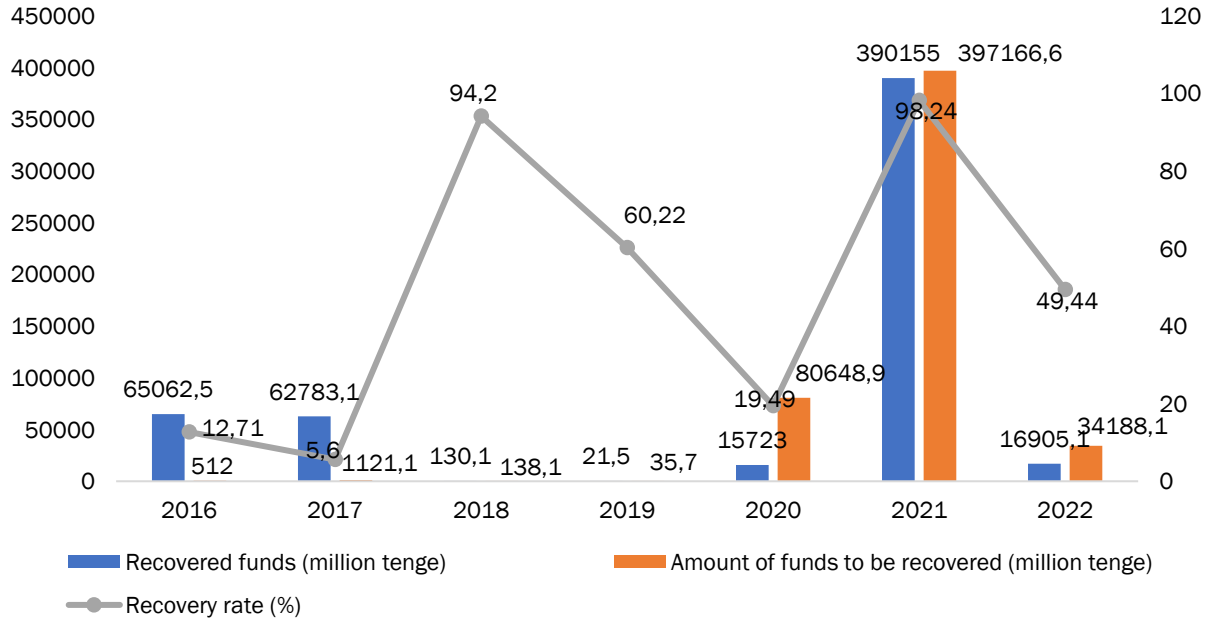

Figure 2. Indicators characterizing the recovery coefficient

Source: Compiled and calculated by the authors

B. Growth rate of the volume of verified funds

The growth rate shows how the volume of verified funds has changed. We will calculate it as a percentage change compared to the previous year (Table 4).

Growth rate = Current year's verified funds volume - Last year's verified funds volume / Last year's verified funds volume x 100

Table 4. Calculation of the growth rate of the volume of verified funds

Year	*Volume of verified funds (million tenge)*	*Growth rate (%)*
2016	2,635305	-
2017	1297792,4	-50,75
2018	5195,8	-99,60
2019	34177,5	+557,70
2020	47278781,2	+137271,83
2021	3236358,8	-31,56
2022	4958499	-84,68

Source: compiled by the authors

C. Share of financial violations from the volume of funds checked

Shows what part of the checked funds was subject to violations. We will calculate it as a percentage of the amount of financial violations to the volume of funds checked (Table 5).

Share of violations = Amount of financial violations / Volume of funds checked × 100

Table 5. Calculation of the share of financial violations

Year	*Volume of verified funds (million tenge)*	*Amount of financial violations (million tenge)*	*Percentage of violations (%)*
2016	2635305	4 850,5	0,18
2017	1297792,4	10 946,5	0,84
2018	5,195.8	771,0	14,84
2019	34177,5	173,0	0,51
2020	47278781,2	689,3	0,0015
2021	3236358,8	11 116	0,034
2022	4958499	2186,3	0,044

Source: compiled by the authors

D. Trends and Findings

The recovery rate varied, with the highest in 2021 (98.24%) and the lowest in 2017 (5.60%). This may indicate an increase in the efficiency of recovery since 2018, despite a decline in 2020.

The volume of funds inspected increased significantly in 2020 (by 137,271.83%), which may be due to increased government oversight in the context of the pandemic and economic crisis. However, there has been a sharp decline in the volume of funds inspected in 2021 and 2022.

The share of financial violations is generally small (less than 1% for most years), but there was a sharp jump to 14.84% in 2018. This may indicate significant problems this year or increased scrutiny. 5. Effectiveness of measures

The effectiveness of audit measures can be assessed by calculating the ratio between the number of objects and the violations identified, as well as the amount of funds recovered (Figure 3).

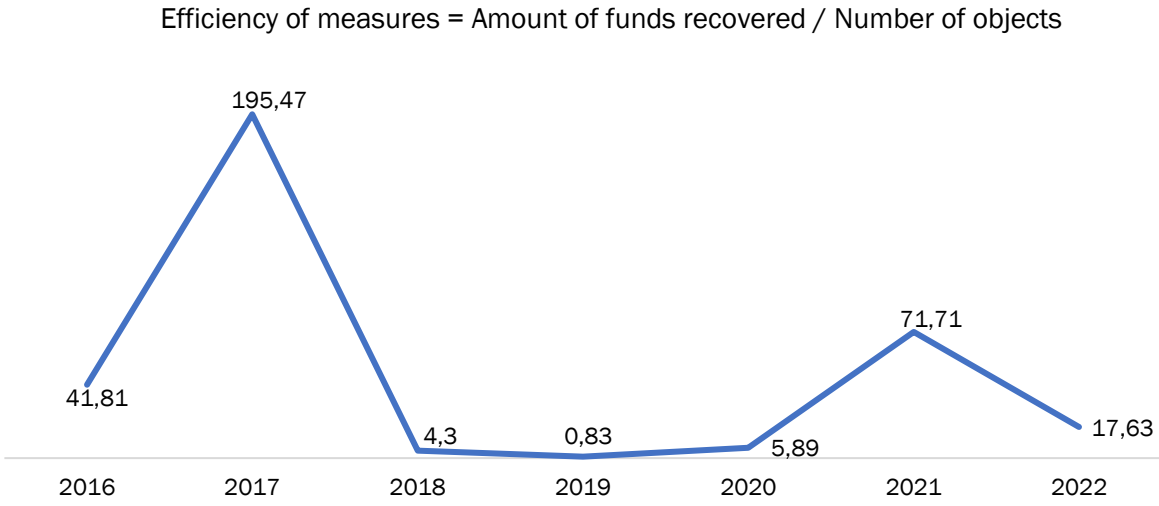

Figure 3. Assessment of the effectiveness of audit activities, million tenge

Source: Compiled on the basis of calculations made

For example, the Supreme Audit Chamber summed up the results of 20 audit activities conducted at 124 facilities in 2022. The volume of funds covered by the audit amounted to 4,958.5 billion tenge. During the audits, 271.1 billion tenge of violations were identified, including 34.2 billion tenge of financial violations, 236.9 billion tenge of ineffective planning and use of budget funds and state assets.

E. Calculate the average values for the budget deficit and debt to GDP using the formula:

Average value = ∑ Indicator values / Number of years

Data:

- budget deficit: [−4.1,−2.8,−2.4,−3.1,−3.4,−3.8,−4.7,−15.0,−12.4,−5.8]
- government debt to GDP:
[100.3,102.4,100.2,105.4,105.0,105.8,107.2,128.4,127.0,129.5]
Calculations:

A. Average budget deficit:

- sum of values:
[−4.1, −2.8, −2.4, −3.1, −3.4, −3.8, −4.7, −15.0, −12.4, −5.8]
Number of years: 10

B. Average value of public debt:

- sum of values: [100.3+102.4+100.2+105.4+105.0+105.8+107.2+128.4+127.0+129.5]
Number of years: 10

Next, we will carry out calculations:

A. Average value of budget deficit

Σ =−4.1−2.8−2.4−3.1−3.4−3.8−4.7−15.0−12.4−5.8=−58.7
Average=−58.7 / 10=−5.87%

B. Average public debt to GDP

Σ=100.3+102.4+100.2+105.4+105.0+105.8+107.2+128.4+127.0+129.5=1,189.2
Average=1,189.2 / 10=118.92%

Thus, the main trends are the growth of the efficiency of recovery of funds and a significant increase in the volume of inspections in certain periods:

- recovery of funds has become much more efficient by 2021 year, which may indicate an improvement in the quality of audit activities;

- 2020 stands out for its sharp increase in the volume of audited funds, which may be due to special circumstances (e.g., combating the consequences of the pandemic);

- the share of financial violations remains relatively low, which may indicate a high level of compliance with financial discipline or effective management in most cases.

The development of a new paradigm and concept of public audit, based on foreign experience, involves a more integrated, transparent and effective approach that takes into account both modern challenges and the needs of society. Implementation of these recommendations will help create a more effective public audit system that will contribute to better management of national resources and increase trust in government institutions. Development of a new paradigm and concept for the development of public audit requires taking into account modern challenges, such as transparency, accountability, use of technology and the need for sustainable development. Here are some key recommendations for improving the system for assessing the quality of management and effective use of national resources in the Republic of Kazakhstan:

A. New paradigm of public audit:

a) Integration with risk management:

- introduce a risk-oriented approach to auditing, focused on assessing the risks associated with financial and operational processes, helping to more effectively direct resources to audit checks.

b) Focus on results:

- change the emphasis from compliance with formal procedures to assessing the results and impact of programs. Audits should evaluate how effectively funds are used to achieve goals and results that benefit society.

c) Use of modern technologies:

- implement automation of audit processes, big data analysis and the use of analytical tools to increase the efficiency of audits and improve the quality of reporting.

B. The concept of developing public audit:

a) Increasing transparency:

- develop and implement openness standards in auditing activities, including the publication of reports available to a wide audience and the use of interactive platforms to inform citizens about audit results.

b) Feedback and engagement:

- create mechanisms for feedback from citizens and stakeholders to take their opinions into account when conducting audits and improving the management system.

c) Partnership with other organizations:

- establish partnerships with non-governmental organizations, academic institutions and international organizations to share experiences and best practices.

C. Recommendations for improving the management quality assessment system:

a) Development of key performance indicators (KPIs):

- define KPIs for assessing the results of state programs and initiatives, taking into account both quantitative and qualitative parameters.

b) Periodic review and updating of standards:

- regularly review and update audit standards and methodologies to ensure that they comply with modern requirements and international practices.

c) Personnel training and development:

- invest in training and advanced training of audit staff so that they can effectively use new technologies and methodologies.

D. Efficient use of national resources:

a) Sustainable development:

- include sustainable development principles in the assessment of the efficiency of resource use, paying attention to ecology, social responsibility and economic feasibility.

b) Optimization of budget processes:

- implement systems for monitoring and analyzing budget expenditure in real time to quickly respond to possible deviations and violations.

c) Evaluation of programs and projects:

- conduct comprehensive assessments of existing programs and projects for their effectiveness, identify successful practices and opportunities for improvement.

This new paradigm and concept for the development of public audit implies a more dynamic, flexible and results-oriented approach that allows for increasing public confidence in government institutions and ensuring more efficient use of national resources. The implementation of these recommendations will help create a sustainable management system that promotes social and economic development.

CONCLUSION

Public audit helps improve the quality of public resource management, identify weaknesses in the public control system, and increase public confidence in public institutions.

The relevance of improving public audit systems is especially obvious in conditions where countries face problems of corruption, misuse of budget funds and low efficiency of government programs.

In recent years, the introduction of new technologies, such as artificial intelligence, big data analytics and digitalization of audit processes, can significantly improve the quality and speed of audits, as well as reduce the cost of their implementation. However, the use of these technologies requires a significant revision and update of the concept of public audit, which should be adapted to current challenges and opportunities. The relevance of the study is also associated with the need to adapt international standards and best practices in the field of audit for their effective application in various national conditions. In addition, in the context of growing international competition and the increasing role of global economic factors, each country seeks to improve the efficiency of its resources. Public audit plays a key role in ensuring the rational use of public funds, reducing corruption and increasing citizens' trust in government institutions. Updating the methodology and concept of state audit will lead to:

- Increasing the efficiency of using state resources through more accurate detection of violations and misuse of funds.
- Reducing corruption risks through the introduction of transparent and automated audit processes.
- Increasing the accountability of government agencies through the introduction of international standards and stricter control over the implementation of state programs.
- Optimizing audit costs through the introduction of digital tools and data analytics.

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