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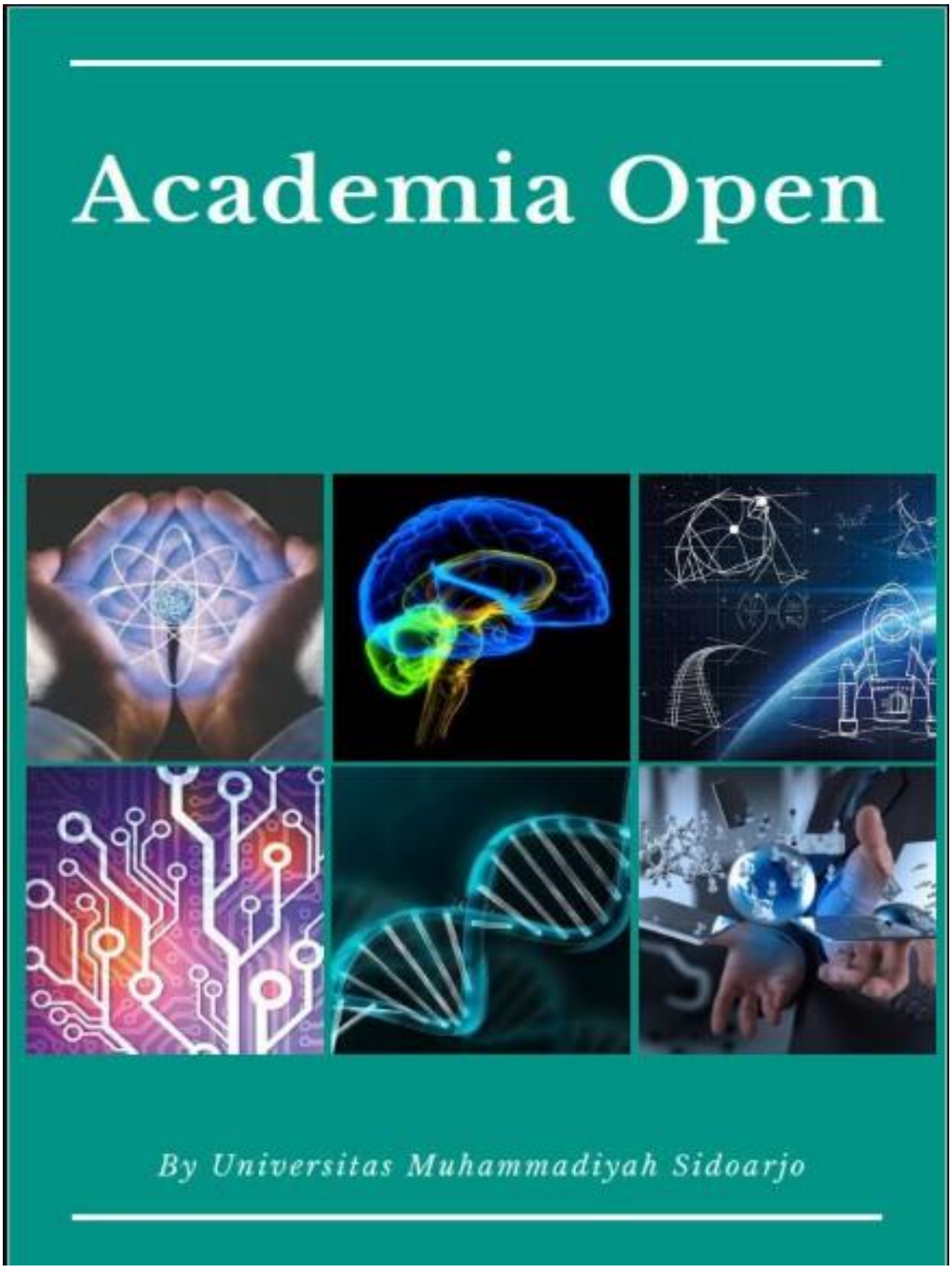

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Inflation and Banking Liquidity Effects on GDP Growth in Russia

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Abstract

General Background: Economic growth is a central indicator of national performance, with inflation and banking liquidity recognized as key macroeconomic variables shaping monetary conditions and financial intermediation. **Specific Background:** In transition economies such as Russia, fluctuations in inflation and banking sector liquidity have been closely associated with variations in GDP growth over recent decades. **Knowledge Gap:** Prior studies have largely examined inflation and growth separately, whilethe combined relationship between inflation, banking liquidity, and economic growth remains underexplored, particularly in the Russian context. **Aims:** This study aims to empirically examine the relationship between inflation, banking sector liquidity, and GDP growth in Russia using annual data from 2000 to 2024. **Results:** The findings from OLS and robust regression indicate that inflation demonstrates a positive and statistically significant association with GDP growth, while banking liquidity shows a weaker but still statistically relevant relationship. Logarithmic transformations further improve model accuracy and reveal consistent patterns across specifications. **Novelty:** This study considers inflation and banking liquidity jointly as an interactive macroeconomic phenomenon and applies logarithmic transformations to address uncertainty and heteroscedasticity. **Implications:** The results suggest that maintaining controlled inflation is associated with sustained economic growth, while banking liquidity plays a complementary role in supporting financial stability and economic activity within monetary policy frameworks.

Highlights:

- Inflation exhibits a statistically significant positive relationship with GDP expansion
- Banking sector liquidity shows a modest yet meaningful association with growth dynamics
- Logarithmic model specification provides higher explanatory accuracy for macroeconomic relationships

Keywords: Inflation, Banking Liquidity, GDP Growth, Monetary Policy, Transition Economies

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Introduction

Gross domestic product (GDP) is one of the key indicators of economic development and wealth of a country. Two macroeconomic variables which seem to be especially prominent amongst all the macroeconomic variables affecting growth are the inflation rate and the banking system liquidity [1]. As an example, inflation is a pernicious creature and if not contained it has an immediate effect on public purchasing power, investment and consumer confidence. Conversely, liquidity in banking is the liquidity of bank assets held by financial institutions and is the capacity of financial institutions to lend to the economy and support financing for the productive sectors [2]. The analysis of their interdependence and impact on economic growth is vital, particularly for the transitional economies like the Russian Federation, societies which have witnessed dramatic fluctuations of financial stability and growth rates in the last 20 years [3].

Economic theory has never had a settled view on the trade-off between inflation and growth. Supporters of classic and neoclassic approaches consider that inflation destroys the productive efficiency of production and savings, although they also agree that small inflation also has a stimulating effect on investments and consumer spending [4]. Excited inflation is a theory party view rise the greater of inflation at the point where below controlled all okay economic meanwhile the other theory look economic the development of developing country relation with controlled inflation clear in order to Keynesian approach itself. The positive link between banking liquidity and economic growth is conceptually founded on theory of financial intermediation and endogenous growth models, where an efficient allocation of resources by a financial system will lead to the liquidity of markets and promote capital accumulation and economic growth in the long-run [5]. But the empirical evidence is very country-specific, underlining the importance of context-sensitive research that takes into account the structural and institutional features of the economy in question [6].

Empirical Studies Empirical studies to date have yielded mixed results. Fischer and Barro have discovered that deteriorating growth departs by high inflation, whereas output seems enliven by average inflation but inexplicably tend to a goal, ie crecimiento seems and inflation together. The beneficial role of liquid financial systems for the economic development has been documented by Levine and Zervos, rather, excess liquidity in the "wrong hands" can lower the economic efficiency [7]. Therefore, the joint impact of inflation and liquidity of the banking sector still is not fully reflected in literature and view on the topic is narrow, furthermore, this aspect of a transition economy is even more less represented as the current literature on the case of the Russia [8]. This is the gap that this study aiming to fill.

It is a quantitative econometric analysis for the period 2000–2024. Statistical relationships of inflation, banking liquidities and GDP growth were estimated using OLS regression with robust standard errors. In addition, logarithmic transformation was applied to reduce the uncertainty and heteroscedasticity [9]. Using this, it explores the dynamics among the main macroeconomic variables through descriptive and inferential statistics its analysis [10].

In the expected results of study it is postulated that it have positive effect on GDP growth with controlled inflation however high inflation or low accessibility of liquidity buffer that relationship We think that these findings contribute to the ongoing scientific discussion regarding macroeconomic stability, and additionally have direct implications for monetary and financial policy [11]. The paper divides its recommendations to central banks and policymakers between periods of sustainable growth through inflation control and eras of effective management of economic growth through banking liquidities. The integration of theoretical foundations with empirical data not only facilitates the bridging between theory and practice, but also provides a more comprehensive view of the transmission mechanism of the monetary factors affecting economic development [12].

Methodology

The aim of this study is to examine the relation between inflation, banking sector liquidity and GDP growth in the context of the Russian Federation. Using a quantitative approach, the study is based on data spanning the years 2000 to 2024. This includes the massive change in economic conditions in the 1930s that permits full examination of both length and factors underlying economic growth.

This is skip-peat the study uses the empirical research design regiment5 based on the econometric to identify determinant and directionation of relation preced metrics between economic variables used. GDP growth is the dependent variable, and the inflation rate and liquidity are the independent variables in the economy model. Employing an Ordinary Least Squares (OLS) regression framework, the core analysis investigates the underlying relationships and their statistical significance.

Dataset

The dataset relies on information compiled from established sources, predominantly the World Bank and national statistical agencies. Crucially, this paper emphasizes the time-series characteristics of the selected macroeconomic variables. The dataset contains some of the major economic indicators like the inflation rate, the GDP growth along with the liquidity in the banking sector.

Analytical methods

Below are the analytical methods used in the study:

- Perform basic statistics on the variables.

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- The Pearson correlation coefficients detailing the associations between economic growth, inflation, and banking sector liquidity are provided in this table. While these strong correlations indicate significant linkages, an Ordinary Least Squares (OLS) regression framework is employed as the principal analytical method to investigate these dynamics further. The model is formulated as follows:

$$- \ GDP_{growth} = \beta_0 + \beta_1 \cdot Inflation_{rate} + \beta_2 \cdot Bank\_Liquid + \epsilon$$

-

Here the β_1 and β_2 coefficients quantify the strength and orientation of the associations among the variables. To address potential heteroscedasticity and secure the reliability of these estimates, robust standard errors have been incorporated into the model.

The model reliability has been demonstrated with other indicators such as the Breusch-Pagan test for heteroscedasticity detection. Also, Shapiro-Wilk test is performed to evaluate whether the residuals are normally distributed. The results confirmed adherence to normal distribution.

To deal with uncertainty between variables, it applies logarithmic transformations. Logarithmic changes constitute percentage changes and therefore provide a useful means of understanding the relationships here. This approach is a basic instrumental tool to study empirically such effects. These results could be highly relevant for economic policy.

Results and Discussion

Utilizing annual data from the years 2000 to 2024, this empirical study evaluates the influence of banking liquidity and inflation rates on the gross domestic product expansion within the Russian Federation.

Descriptive Statistics

First, let's look at the main statistics of the dataset:

Table 1. Descriptive statistics on economic indicators of the Russian Federation (2000-2024)

Variable	Average	Standard deviation	Minimum	Maximum
GDP growth (%)	3.41	4.02	-7.80	10.00
Inflation (%)	12.62	8.28	0.90	37.70
Bank liquidity	10.61	4.20	5.55	21.32

The Pearson correlation results (Table 2) demonstrate significant relationships among the variables. Specifically, the coefficient between GDP growth and inflation is 0.686 (p = 0.0002), between GDP growth and banking sector liquidity is 0.546 (p = 0.0047), and between inflation and bank liquidity stands at 0.470 (p = 0.0178).

Table 2. Correlation coefficients among GDP growth, inflation, and banking sector liquidity

Variable	GDP growth	Inflation	Bank liquidity
GDP growth	1.0000		
Inflation	0.686*	1.0000	
Bank liquidity	0.546*	0.470*	1.0000

These outcomes demonstrate a moderately positive association between inflation rates and banking sector liquidity, coupled with a statistically significant correlation linking economic expansion to bank liquidity. The results of the OLS model are presented as follows (Table 3)

Table 3. OLS Regression results

Variable	Coefficient	Standard error	t- statistics	p- value
Inflation	0.267	0.080	3.34	0.003
Bank liquidity	0.275	0.158	1.74	0.095
Permanent member	-2.873	1.599	-1.80	0.086

Statistical analysis yielded an R^2 of 0.535, an adjusted R^2 of 0.492, and an RMSE of 2.863. These findings suggest that while inflation exerts a significant positive influence on economic expansion, the corresponding impact of banking sector liquidity remains relatively modest [13].

Robust Regression:

To account for heteroskedasticity, a robust regression approach was applied. The results indicate that (Table 4):

Table 4. Robust Regressiya Results

Variable	Coefficient	Standard error	t- statistics	p- value
Inflation	0.267	0.098	2.73	0.012

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Bank liquidity	0.275	0.149	1.84	0.079
Permanent member	-2.873	1.258	-2.28	0.032

The findings from the robust regression model indicate a substantial effect of inflation on economic growth, while the role of banking liquidity warrants careful consideration. Furthermore, the Shapiro-Wilk test was employed to evaluate the normal distribution of the residuals, with the outcomes detailed below (Table 5):

Table 5. Shapiro-Wilk Testi (Normal Distribution)

Variable	W-statistics	p-value
yhat	0.92998	0.0868
ehat	0.90822	0.0278

An assessment of the distributions shows that the fitted values yhat approximate normality, whereas the residuals ehat differ slightly from a normal distribution, implying some degree of model uncertainty. However, the Breusch-Pagan test results confirm homoscedasticity (p = 0.1552), ensuring that the variance of the residuals remains constant throughout the model (Table 6).

Table 6. Breusch-Pagan Testi (Heteroscedasticity)

Test statistics	Chi-squared	p- value
Breusch-Pagan Test	2.02	0.1552

Logarithmic transformations were incorporated into the model to mitigate uncertainties and better elucidate the underlying relationships among the variables, structured as follows:

$$ln\ (GDP_{growth}) = \beta_0 + \beta_1 \cdot \ln\ (Inflation_{rate}) + \beta_2 \cdot \ln\ (Bank\ liquidity)$$

Based on this specification, the effect of the inflation rate on economic expansion is positive and highly significant (coefficient = 0.507, p = 0.0001). Furthermore, Table 7 presents a comparative analysis of key statistics across various models, namely OLS, robust regression, log-transformed models, and average marginal effects.

Table 7. Model Comparison

Model	R^2	Edited R^2	RMSE	p- value
OLS	0.535	0.492	2.863	0.0002
Robust OLS	0.535	0.492	2.863	0.0000
Log-Lin-Lin	0.508	0.453	0.678	0.0017
Log-Log-Log	0.650	0.611	0.408	0.0001
Lin-Log-Log	0.459	0.399	6.278	0.0039

OLS model: The results of the OLS regression, show that the models R^2 is 0.535 and the adjusted R^2 is 0.492, which means the model sufficiently explains the main drivers of economic growth. The RMSE (root mean square error) of the model is 2.863 and the small value of this indicator indicates a high quality of the model [14].

Robust OLS: The values of the R^2 and RMSE are almost the same in the robust regression model compared to the OLS model as well. More robust in the sense that it takes heteroskedasticity into account and thus the results would be better. P-values = 0.0000 idealelse p-value = 0.0000

Log-Lin-Lin → model R^2 = 0.508, adj R^2 = 0.453 It has applied a logarithmic transformation to the dependent variable, which is the banking sector liquidity to obtain a better fit between the inflation variables and the functioning of the banking sector. The error reduced by a lot, RMSE is 0.678. These results give more insights into the effect of inflation on GDP growth [15].

Log-Log-Log model: The model uses the log transformation to all variables and gets an R^2 of 0.650, adjusted R^2 of 0.611. It is the most appropriate because it enables analysis of the changes of variables in percentage points. RMSE is 0.408, which means high accuracy. The inflation rate provides a highly statistically significant positive impact on GDP growth (coefficient = 0.507, p = 0.0001)

Lin-Log-Log model: This model does not perform as well, as indicated by the metrics: R^2: 0.459, adjusted R^2: 0.399 and RMSE: 6.278. Banking liquidity effect is weakest (p = 0.388) and the high p-value with a high RMSE indicates to sholud be interpreted cautiously.

Analysis of model comparison:

Top Model: With the highest R^2 (0.650) and adjusted R^2 (0.611), it best explains dynamics of inflation and banking sector liquidity (in percentates) and better captures other economic growth determinants.

Heteroskedasticity and robust model: The Robust OLS model when adjusting for heteroskedasticity gives more statistically reliable results thereby confirming the model significance and the robustness of the results.

Log transformations: The Log-Lin-Lin and Log-Log-Log models demonstrate that log transformations yield better models for expressing relations between variables; for example: inflation and GDP growth.

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This paper deals only with the inflation and banking sector liquidity affecting the GDP growth. Future research design may extend the modeled variables to also include political instability, external economic shocks, and other relevant macroeconomic variables. Additional generalizability to the findings could be derived from comparative analyses cross-nationally. Also, support an extended model containing political and external economic factors, and a more detailed analysis on logarithmic transformations.

Conclusion

In short, drawing on data from the Russian Federation into the period 2000–2024, we found that the inflation rate has positive and statistically significant impact on GDP growth, while the influence of banking sector liquidity is relatively weaker and should be treated with caution. These results have considerable implications for economic policy keeping a lid on inflation may increase economic activity and thus sustain growth. Liquidity may, however, have a supportive and secondary role in encouraging economic growth in the banking system. These results are, theoretically, consistent with growth models where a monetary policy aligned with growth incentives is expected. Future research should improve the model by including further variables like external economic perturbations, political factors, capital flows, and banking reforms, and by performing cross-country studies.

References

1. S. Fischer, "The role of macroeconomic factors in growth," Journal of Monetary Economics, vol. 32, no. 3, pp. 485–512, 1993.
2. R. G. Rajan and L. Zingales, "Financial dependence and growth," American Economic Review, vol. 88, no. 3, pp. 559–586, 1998.
3. T. Beck, A. Demirgüç-Kunt, and R. Levine, "Finance, inequality and the poor," Journal of Economic Growth, vol. 12, no. 1, pp. 27–49, 2007.
4. A. Demirgüç-Kunt and V. Maksimovic, "Law, finance, and firm growth," Journal of Finance, vol. 53, no. 6, pp. 2107–2137, 1998.
5. R. J. Barro, "Inflation and economic growth," Annals of Economics and Finance, vol. 14, no. 1, pp. 121–144, 2013.
6. A. N. Berger and C. H. S. Bouwman, "Bank liquidity creation," Review of Financial Studies, vol. 22, no. 9, pp. 3779–3837, 2009.
7. P. Romer, "Endogenous technological change," Journal of Political Economy, vol. 98, no. 5, pp. S71–S102, 1990.
8. J. Fidrmuc, M. Fungáčová, and L. Weill, "Does bank liquidity creation contribute to economic growth? Evidence from Russia," Open Economies Review, vol. 26, no. 3, pp. 479–496, 2015.
9. H. López-Villavicencio and V. Mignon, "On the impact of inflation on output growth: Does the level of inflation matter?," Journal of Macroeconomics, vol. 33, no. 3, pp. 455–464, 2011.
10. A. A. Shirov and A. A. Yantovsky, "Development of the Russian economy in the medium term: Risks and opportunities," Studies on Russian Economic Development, vol. 34, no. 2, pp. 153–167, 2023.
11. O. Tayirov, I. V. Karimov, A. Toshmamatov, and S. Shomirzayev, "Rational Use of Water Resources in Agriculture (In the Case of Uzbekistan)," International Journal of Business Diplomacy and Economy, vol. 3, no. 5, pp. 142–146, 2024.
12. X. Diyorbek, K. Ibrohimbek, and T. Ozodbek, "Cryptocurrency adoption and its role in reshaping international financial systems," Journal of International Accounting and Financial Management, vol. 1, no. 1, pp. 28–33, 2024.
13. O. Tayirov, "Comparative Analysis of Global Tax Regulations and Corporate Financial Reporting Practices," International Journal of Business Diplomacy and Economy, vol. 3, no. 5, pp. 192–197, 2024.
14. I. V. Karimov, "Effective utilization of investments in agriculture: A case study of Uzbekistan," Journal of Fintech, Business, and Development, vol. 1, no. 1, pp. 17–21, 2024.
15. K. Ibrohimbek, M. Jurabek, O. Umidxon, and T. Ozodbek, "Innovative funding strategies to surmount financial obstacles for early-stage entrepreneurs," Journal of Fintech, Business, and Development, vol. 1, no. 2, pp. 43–48, 2024.

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