

Article

Improving the Processes of Financing Investment Projects through Lending in Banks

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Abstract: Today, the role of commercial banks, which are an integral part of the country's economy, in ensuring economic stability is growing. In particular, the importance of banks financing investment projects is very high, and the government continues to implement reforms to further improve project financing. This article analyzes the current state of investment lending practices in commercial banks, their importance for economic development, and their development trends. Additionally, the types of investment projects, financing methods, the role of banks in financing investment projects, directions for improving lending mechanisms, and the existing problems and opportunities for their resolution based on international experience are examined. This study aims to conduct a scientific analysis of the processes of investment lending practices and project finance to improve the financial efficiency and stability of banking activities as well as the whole economy. The article also allows for a more extensive exploration of the literature, providing a more robust and comprehensive overview of the concepts of project finance. According to the research results, analyses are presented via an ARDL-ECM model of Turonbank JSC indicators affecting the share of bank loans and debt financing in fixed capital investments.

Keywords: Commercial Banks, Investment Projects, Lending, Efficiency, Credit Risk, Financing, Syndicated Loans, Fixed Capital Investments, ARDL-ECM Model, Project's Risk, Assets, Payment

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1. Introduction

The practice of lending for investment projects in commercial banks is important from the point of view of asset diversification. Banks should prioritize the prevention of exposure to high - risk assets and the placement of assets in order to focus on investment activities. It is advisable for banks to appear in the process of investment lending not as an institution lending to the economy but as a financial stakeholder in the business process.

Project finance is the financing of a separate economic unit created by investors, in which creditors assume the majority of the project's risk, and the financing is provided solely for the project [1]. Another source defines this economic term as "a form of financing for large capital-intensive investment projects through a special company, where debt repayment is based on the project's cash flows" [2]. Project financing is also defined as "the process of investing in a legally independent enterprise, funded by one or more sponsoring companies and organizations" [3].

According to the Basel Committee's definition, it is the financing of a project through a special purpose vehicle, where repayment of the loan is primarily dependent on the

project's cash flows [4]. The lender is typically paid only from the cash generated by contracts for the commissioning of the facility. The borrower is not permitted to undertake any task other than the production, ownership, and installation. As a result, repayment is primarily dependent on the project's cash flows and the collateral value of its assets.

Investments and investment problems are extensively covered in the scientific works of Keynes, P. Masse, C. McConnell, S. Brue, E. Dolan, and other scholars. According to P. Mass, "...investment is the process of foregoing the satisfaction of current needs in exchange for expected future benefits" [5].

Literature review

Researchers such as Aizada Seisenbayeva, N. Gumar, M. Imramziyeva, Sanimkul Lapbayeva, and Nurgul Shmanov have focused on the issues of financing investment projects aimed at developing small and medium-sized businesses. The Picture 1. researchers outline the advantages and characteristics of financing small and medium-sized businesses through loans, citing "Igilik," "Sybaga," Analyses are presented on the financing of entrepreneurs' projects in Kazakhstan through investment programs such as "Igilik," "Sybaga," "Kasipker," and "Yrys." [6]

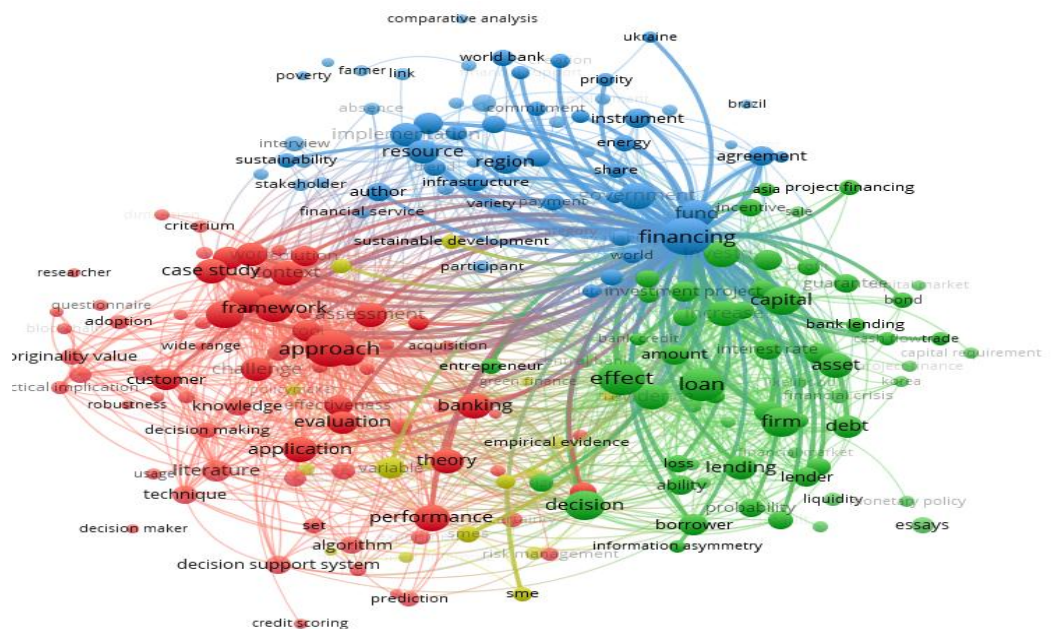


Figure 1. Bibliometric analyses of literature on the research topic (2000-2025 y)

In addition, a bibliometric analysis of the topic was conducted using the VOS viewer software. Based on 854 articles from the Web of Science database, an analysis of keyword co-occurrence was performed. As a result, four main directions were identified:

- Red - formed around the keywords "bank," "approach," "framework," "practical training," "evaluation," and "implementation," These keywords are the largest hubs and primarily encompass research on credit allocation processes and financing approaches and decision-making, credit scoring, and theories related to financing.

- Green - formed around keywords such as "credit," "lending," "assets," "capital," "impact," and "bank lending." This shows the main, most frequently used keywords for this research topic.

- Blue - includes keywords dedicated to the topics of "financing," "fund," "agreement," "resource," "region," "infrastructure," "World Bank," and "energy."

- Yellow - includes key keywords such as "sustainable development," "small business entities," "solution," and "transformative."

Analyses conducted by periods showed that, between 2018 and 2025, the number of studies on the topics of "financing," "credit," "lending," "debt," "resource," "investment project," "fund," and "capital" increased sharply. This indicates that in recent years, research on project financing processes and the security issues related to financing investment projects have become the primary focus of researchers.

Additionally, if we identify the "research gap" on the map, we find that the impact of improving project financing processes in banks, particularly regarding loans, and their effectiveness in enhancing bank efficiency and development directions in developing countries and the Republic of Uzbekistan is very limited in scope. Despite a significant increase in the number of studies on this topic, the issue of successfully applying the financing of investment projects in the context of Uzbekistan's modern digital economy remains insufficiently studied. The relatively limited amount of information on project financing in our country confirms the need to further develop the methodological and theoretical foundations of project financing and to systematize the existing practical experience in this field.

Svitlana Naumenkova and other scholars have analyzed the issues of assessing and mitigating banks' credit risks in the financing processes of investment projects. Their scientific article sheds light on mechanisms for monitoring the borrower's financial stability through financial indicators [7].

In this regard, the scientific research of Howcroft and other scholars has approached project financing from the perspective of financing principles such as "non-recourse" and "off-balance sheet," as well as the sources of financing for industrial investments. In their research, they conducted an empirical survey and explained project financing from the perspective of a risk-return strategy to better characterize it [8].

In his dissertation titled "Project Financing as an Effective Method of Credit for Investment Projects," Y. V. Shenayev a researcher from the Commonwealth of Independent States, defined project financing as a hybrid form of credit and emphasized its fundamental connection with bank lending. The researcher proposed applying new mechanisms to organize the investment interaction between the bank and the enterprise, developed a methodology based on specialized banking technology, and justified the necessity of using syndicated loans to organize the investment process through financing mechanisms. The study analyzes the forms and methods of investment lending, identifying problems in implementing project financing in Russia. The main obstacles in forming sources of financing for investment projects aimed at creating new production capacities are presented, and ways to reduce them using project financing mechanisms are proposed. [9]

According to scholars such as Kleimeier and Versteeg financing projects has a significant positive impact on economic growth in low-income countries. They empirically analyzed panel data from 90 countries over three five-year periods (1991-2005) and concluded that if a low-income country increases the share of project financing from 25 percent to 75 percent, the annual economic growth rate would increase by 0.67 percentage points [10].

In our view, this suggests that in middle and high-income countries, this effect is not statistically significant, and it can be concluded that its significance also holds at the scale of developing countries. Indeed, transaction costs can be reduced by financing projects. Such costs include those incurred from a lack of sufficient information on investments and capital allocation, from risk management, and from the inability to mobilize funds. Therefore, the impact of project financing can be particularly high in economically unstable countries.

E.V. Rusanovskaya focused her scientific work on the issues of project financing through banks and proposed a methodological approach for assessing project financing risks based on a risk matrix, as well as the tools necessary to conduct such an assessment.

Also, it proposed sub-participation mechanisms, both funded and unfunded, by other participants in the project investment market and a distinction between the general and special principles of bank project financing. (For example: multi-channel and structured financing, prioritizing cash flow over assets, focusing on the final stage of project implementation, and the diversity of bank participation forms in financing), the scientific novelty of the bank's project financing models is described [11].

2. Material and Methods

It can be outlined in this study that we carried out various studies using a systematic literature review method (SLR), bibliometric analysis and a quantitative research method. A review in accordance with universally recognized standards for practitioners and researchers enables the finding, evaluating, and integrating of existing studies. The SLR method is made up of three main phases: planning, execution, and reporting. To resolve these research issues in the current work, we have also used the empirical analysis, which is based on the econometric models.

To carry out the analytical part of our research on lending practices, we conduct econometric analyses for the years 2015-2025, taking into account the process of project finance activity and financial indicators of Turonbank JSC. We will conduct the econometric analyses using the Stata computer software. In analyzing the bank's role in financing investment projects, we perform the Dickey-Fuller test from a model selection perspective. The stationarity of the selected indicators serves as the basis for our decision to choose either the ARDL or another model. As a result, we are able to draw scientific conclusions about the project finance process of the bank's lending operations.

3. Results

As is known, for most investors, choosing from a range of options when financing investment projects, that is, in assessing their investment attractiveness, they rely mainly on two aspects: the risks involved in financing the project and how much profit can be obtained from it over a given period of time. Typically, decisions to finance investment projects are based on the profitability of the investment and the risks involved in its implementation. Therefore, analyzing the likelihood of problematic situations and minimizing these risks plays a major role in almost all investment decision-making [12].

It should be emphasized that one of the primary tasks for commercial banks when financing projects, is to assess project risks. In order to this, it is necessary to develop and implement methodological guidelines for evaluating the project's investment attractiveness. Therefore, to improve the processes of financing investment projects in our country, it is advisable to develop a methodology that is thoroughly and deeply researched in this area.

In this regard, we attempt to analyze the impact of Turonbank JSC's financial indicators for 2015-2025 on investments in fixed capital in the economy. With this, we focus on conducting analyses aimed at identifying and evaluating the bank's role in financing investment projects. We believe this will create the conditions for a broader understanding of banks' role in lending to the economy and for formulating the resulting scientific conclusions [13].

In the data presented in Table 1, we examine the analysis of stationarity test indicators for the factors, including bank indicators and the banks' share in investments in fixed capital in the economy. Using these indicators, we then turn our attention to constructing the ARDL-ECM model. First, we analyze the trends in banking indicators that affect the share of bank loans and debt financing in fixed capital investment.

Table 1. Stationarity Dickey-Fuller Test of Turonbank JSC Indicators for the Period 2015-2025

Indicator	sign	t-stat	P-value	Conclusion
Risk-weighted assets (rwa)	l_rwa	-2.848	0.0518	I(0)*
Highly liquid assets	l_hla	-4.861	0.000	I(0)
Income-generating assets	l_iea	-4.974	0.000	I(0)
Investments	l_inv	0.539	0.986	I(1)
Long-term loans	l_ltc	-6.028	0.000	I(0)
Short-term loans	l_stc	-0.632	0.864	I(1)
Retail loans	l_ret	-1.839	0.361	I(1)
Non-performing loans (NPL)	l_npl	-0.737	0.837	I(1)
Share of bank loans and debt funds in fixed capital investments	l_bank	-0.259	0.931	I(1)
Share of foreign investments and loans in fixed capital investments	l_foreign	-0.583	0.875	I(1)

Table 2 presents the ARDL-ECM model for Turonbank JSC indicators affecting the share of bank loans and debt financing in investment in fixed capital. It shows the following scientific findings. A long-run equilibrium exists between the selected indicators and the dependent variable. Table 2 shows the impact of the composition of bank assets and investments on lending practices for fixed capital [14].

Table 2. ARDL-ECM Model of the Factors Affecting the Share of Bank Loans and Borrowed Funds in Investment in Fixed Assets of Turonbank JSC

ARDL(1,1,0,1) regression		Sample: 2016-2025		Number of obs		10
				R-squared		0.9460
				Adj R-squared		0.8381
Log likelihood		11.774162		Root MSE		0.1361

D.l_bank	Coefficient	Std. err.	t	P>t	[95% conf. interval]	
ADJ						
l_bank						
L1.	-.106319	.045393	-2.34	0.022	-.1969238	-.0157143
Long term						
l_rwa	-.0278173	.1934655	-0.14	0.895	-.6435109	.5878763
l_hla	.3370907	.3097429	1.09	0.356	-.6486494	1.322831
l_inv	-.5895142	.0549132	-10.74	0.002	-.7642726	-.4147558
Short term						
l_rwa						
D1.	1.081932	.2997817	3.61	0.037	.1278929	2.035971
l_inv						
D1.	.3841703	.1382813	2.78	0.069	-.0559025	.8242431
cons	2.904271	1.103835	2.63	0.078	-.6086262	6.417168

In the long run, the impact of banking indicators on investment in fixed capital reflects their interdependence from an investment activity perspective. It should be noted that the bank's assets do not have a statistically significant impact. It can be observed that the volume of the bank's investments develops in inverse proportion to the investments in fixed capital in the national economy. This reflects the need for the bank to be active in financing the priority sectors of the economy.

In the short term, the increase in liquid assets serves to increase the volume of investment in fixed capital. This reflects the bank's high risk appetite when extending credit to the national economy. It should also be outlined that the bank's investments are also having a positive impact on investments in fixed assets.

In our opinion, it is creating the Table 3. conditions for increasing the volume of investments in fixed capital by the bank in the short term. At the same time, it should be noted that its long-term impact is diminishing. From this perspective, the short-term impact of banks [15].

Table 3. ARDL-ECM Model of the Factors Affecting the Share of Bank Loans and Borrowed Funds in Investment in Fixed Assets of Turonbank JSC

ARDL(1,0,1,0) regression		Sample: 2016-2025		Number of obs		10
				R-squared		0.7140
				Adj R-squared		0.3565
Log likelihood		3.434938		Root MSE		0.2714
D.l_bank	Coefficient	Std. err.	t	P>t	[95% conf. interval]	
ADJ						
l_bank						
L1.	-.3947445	.2607903	-1.51	0.205	-1.118814	.3293254
Long term						
l_ltc	.3543008	.6754721	0.52	0.628	-1.52111	2.229712
l_stc	-1.142124	.6984484	-1.64	0.177	-3.081328	.7970794
l_npl	-.0321288	.4293027	-0.07	0.944	-1.224064	1.159807
Short term						
l_stc						
D1.	.3692688	.1868707	1.98	0.119	-.1495674	.8881051
_cons	1.95957	1.225128	1.60	0.185	-1.441929	5.361069

The Table 4. bank's investments in core capital have an impact in the short term. During this period, banks demonstrate a risk appetite in deploying risky assets and financing investments. It should also be noted that the bank's role in ensuring liquidity by financing enterprises' working capital has grown. This indicates that banks will further develop their investment activities over the long term.

Table 4. ARDL Model of the Effect of Bank Assets on Bank Investments

ARDL(1,1,1,1) regression		Sample: 2016-2025		Number of obs		10
				R-squared		0.9699

Log likelihood		3.434938		Adj R-squared		0.8644
				Root MSE		0.2973
D.l_inv	Coefficient	Std. err.	t	P>t	[95% conf. interval]	
ADJ						
l_inv						
L1.	-.3947445	.2607903	-1.51	0.205	-1.118814	.3293254
Long term						
l_rwa	32.45004	41.65282	0.78	0.517	-146.7676	211.6677
l_hla	-16.69384	31.63958	-0.53	0.650	-152.8279	119.4403
l_ia	-23.13311	26.29802	-0.88	0.472	-136.2844	90.01814
Short term						
l_rwa						
D1.	-20.61769	7.840455	-2.63	0.119	-54.35244	13.11706
l_hla						
D1.	-5.052091	.9110891	-5.55	0.031	-8.972191	-1.131991
l_ia						
D1.	14.93535	5.731652	2.61	0.121	-9.725953	39.59666
_cons	13.12419	10.02516	1.31	0.321	-30.01061	56.25898

Continuing our research, we focus on identifying and assessing how the bank's financial indicators influence Turonbank ATB's investment trends from 2015 to 2025. In this case, since the indicators are stationary and other tests have been conducted and changes have been implemented, we will not carry out these processes. Additionally, when using the ARDL model, we will split the indicators into two groups. Specifically, we separate indicators such as assets (risk appetite) and credit policy and conduct the analyses accordingly.

In our model presented in Table 4, we can see how bank assets are developing in line with investment trends. Due to the small number of observations, it should be noted that broader modeling was not possible. Nevertheless, in our developed model we were able to draw certain scientific conclusions.

First, it should be noted that over the long term, the full impact of the selected asset operation indicators on the bank's investment policy is not statistically significant. Based on these analytical stages, it should be outlined that over the past ten years, the bank's asset operations have not had a significant impact on its investment policy.

Secondly, it can be seen that the increase in highly liquid assets during the execution of asset operations is leading to a contraction of the bank's investment policy. This means that the bank is focusing on purchasing highly liquid assets rather than implementing investment projects.

Table 5 shows how the trends in changes in the bank's long-term loans and retail loan volumes can be used to illustrate how they might affect the bank's investment policy. The test results of our model demonstrate the existence of integration among the selected

indicators. Specifically, the fact that $L1_inv = -1.2809$ and $p = 0.035$ demonstrates that the integration between them is statistically significant at the 5 percent probability level.

Table 5. The Effect of Bank Credit Composition on Bank Investments: An ARDL Model

ARDL(1,1,1) regression		Sample: 2016-2025		Number of obs		10
				R-squared		0.7773
				Adj R-squared		0.4990
Log likelihood		-4.0150136		Root MSE		0.5716
D.l_inv	Coefficient	Std. err.	t	P>t	[95% conf. interval]	
ADJ						
l_inv						
L1.	-.3947445	.2607903	-1.51	0.205	-1.118814	.3293254
Long term						
l_ltc						
l_ltc	-2.144285	.7573772	-2.83	0.047	-4.247101	-.041469
l_ret						
l_ret	3.180227	.8139588	3.91	0.017	.920315	5.440139
Short term						
l_ltc						
D1.	2.487842	1.570037	1.58	0.188	-1.871279	6.846962
l_ret						
D1.	-1.652336	1.58575	-1.04	0.356	-6.055084	2.750412
_cons						
_cons	1.838601	1.948397	0.94	0.399	-3.571016	7.248218

This reflects that when the bank develops its investment policy based on a long-term strategy, it operates in a state of equilibrium between long-term and retail loans.

4. Discussion

Loan operations account for a high share of the assets of our country's commercial banks. Overall, lending practices have a significant impact on the development of banks' investment activities. In our view, lending practices are characteristic of traditional banks in advancing their investment activities. In many developing countries, the operation of traditional banks is widespread. This is reflected in banks' income, which is generated by attracting funds based on deposits and redistributing them to the economy through lending activities. In developed countries, it should be noted that alongside the presence of traditional practices in banking, there also exist separate types of banks focused on investment activities. The main difference between investment banks and traditional banks is explained by the fact that the funds they attract are not managed through deposit policies but are instead used for investment purposes.

The study highlights the need to strengthen investment lending practices in commercial banks by improving credit mechanisms, diversifying funding sources, and adopting international best practices. Special attention should be given to reducing credit risks and increasing the share of long-term financial resources such as term deposits. Enhancing institutional frameworks and promoting innovative financial instruments will further support sustainable development.

In the short term, it can be seen that no economic relationship is forming between these indicators. This demonstrates that the bank does not take the short-term period into account when analyzing the alignment of its investment policy with lending.

In the long run, however, it indicates that the bank develops its investment policy in inverse proportion to long-term loans. Therefore, it confirms that the bank is prioritizing the financing of long-term loans over the margin on investments.

5. Conclusion

In conclusion, there is a need for banks to analyze their investment policy in a broader context when forming their long-term loan portfolios. Therefore, it becomes clear that banks should shape their strategy in financing investment projects not only as lenders but also as project financiers and managers. In other words, this shows that the assets created for the bank's investment activities are emerging as an alternative to long-term loans.

In summary, the investment activities of banks are dependent on the bank's lending portfolio. This indicates that banks are evolving into portfolio management institutions. It can also be assumed that other sources of investment financing are emerging besides the bank. In turn, banks are active in the economy not as partners in enterprises' investment projects, but as institutions that expand the practice of providing liquidity and financing working capital.

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