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Investigating the Effect of Directed Lending Facilities on Imbalances in Iran's Banking System Using the Autoregressive Distributed Lag Model

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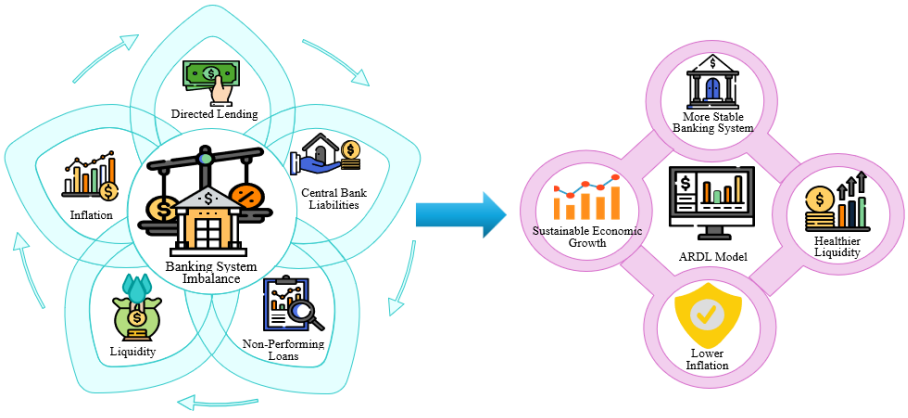
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A B S T R A C T

The imbalance within the banking system constitutes one of the key structural challenges of the Iranian economy, threatening its overall financial stability. This applied study aims to assess the impact of policy-directed lending on the imbalance of the Iranian banking sector measured by banks' liabilities to the Central Bank of Iran (CBI) over the period spanning 1380 to 1404 SH (2001–2026). Employing an Autoregressive Distributed Lag (ARDL) approach and the bounds testing procedure, the study analyzes the dynamics and relationships among the variables. Annual data, including banks' liabilities to the CBI, policy-directed lending, non-performing loans (NPLs), liquidity, and inflation, were sourced from the CBI and analyzed using EViews 13. The bounds test confirmed the existence of a long-run cointegrating relationship among the variables. The empirical results reveal that policy-directed lending (coefficient: 0.0002) and NPLs (coefficient: 0.0009) exert a positive and statistically significant impact on banks' liabilities to the CBI, reflecting the transmission of resource deficits—driven by fiscal dominance—onto commercial banks' balance sheets. Additionally, the inflation rate (coefficient: 0.0064) has a direct positive effect on exacerbating this imbalance. In the short run, the interbank market serves as a liquidity buffer. The error correction coefficient (-1.67) indicates a rapid rate of adjustment toward the long-run equilibrium. Ultimately, the study recommends aligning mandated lending requirements with the actual financial capacity of banks to mitigate systemic imbalances.



1. Introduction

The banking system, as an indispensable cornerstone of any country's economy, plays a pivotal role in ensuring financial soundness, providing financing, and facilitating economic transactions, thereby driving sustainable growth and development [1]. In recent years, banking imbalances have emerged as a fundamental challenge within the financial system, with directed lending and statutory mandates serving as key drivers in exacerbating these imbalances. Furthermore, such mandates lead to a misalignment between resources and uses, as well as assets and liabilities, thereby compromising the financial soundness of banks and the broader economy [2]. Among the various factors contributing to banking imbalances, the role of directed credit policies is of paramount importance. Directed lending refers to those credits that banks are legally obligated to allocate to specific sectors or target groups based on budgetary laws or legislative acts. Although these facilities are designed to achieve supportive, developmental, or equity-oriented objectives, they often

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introduce significant challenges from a balance-sheet management perspective. Allocating resources based on legal requirements without adequate credit risk assessment, economic return evaluation, or maturity matching of assets and liabilities can weaken bank asset quality and intensify liquidity pressures.

From a theoretical standpoint, an increase in directed lending can exacerbate banking imbalances through several channels. First, extending facilities at preferential rates or yields below the cost of funding reduces bank profitability. Second, concentrating credit in specific sectors without rigorous risk appraisal increases default rates and drives up non-performing loans (NPLs). Third, if these resources are not recovered in a timely manner, banks are forced to utilize high-cost funds or borrow from the central bank to meet their obligations. This borrowing subsequently increases their debt to the central bank and deepens the balance-sheet imbalance. Despite the expansion of directed lending in recent decades and its growing share in banks' credit portfolios, the majority of domestic studies have primarily focused on descriptive analyses of the banking network or general evaluations of soundness indicators, paying less attention to the empirical and econometric assessment of this credit policy's impact on banking imbalances. Within this framework, a research gap exists regarding the dynamic and long-run relationship between directed lending and imbalances in Iran's banking system. Accordingly, this study aims to investigate the impact of directed lending facilities on the imbalance of Iran's banking system using the Autoregressive Distributed Lag (ARDL) model, analyzing the short-run and long-run relationships among these variables over the studied period. The findings of this research can provide a deeper understanding of the consequences of directed credit policies on the health of the banking network, offering valuable insights for designing banking restructuring policies and enhancing financial stability [3].

Chenarani et al. [4], in a study titled "Analysis and Assessment of Imbalances in Iran's Banking System and Its Impact on Economic Growth Using a DSGE Model: Countermeasures," investigated the imbalances within the Iranian banking system, the volume of banks' fictitious (non-performing/frictional) assets, and the impact of shocks resulting from these imbalances on macroeconomic variables using a Dynamic Stochastic General Equilibrium (DSGE) model. Their findings indicate that the banking imbalance crisis leads to a decline in production, reduced economic growth, higher inflation, and intensified economic volatility. Furthermore, reduced capital formation along with increased wage and capital costs for firms were identified as the primary channels through which this crisis affects the Iranian economy.

Pourzarashki et al. [5], in a report titled "An Analysis of the Approvals of the Budget Bill Integration Committee for the Fiscal Year 1401 AP regarding Note 16 (Directed Lending)," evaluated Note 16 of the 1401 AP budget bill and the subsequent approvals of the Integration Committee concerning directed lending. The study concludes that the extensive expansion of these directed facilities exerts severe pressure on banking resources, highlighting the urgent need for structural reform and prioritization.

Gorji et al. [6], in their article "Estimating and Comparing the Imbalances of Banks Listed on the Tehran Stock Exchange Using a Fuzzy Goal Programming Model," analyzed the imbalances of listed banks from 2016 to 2021. Their analysis revealed that Bank Saderat exhibited the highest level of imbalance, whereas Middle East Bank (Khawarmianeh) exhibited the lowest. The primary drivers of these imbalances were identified as non-performing loans (doubtful accounts), fixed assets, and claims on the government (government debt).

Mousavi [7], in a paper titled "Imbalance in Banks and Solutions to Overcome It," employed a descriptive-analytical methodology to examine the phenomenon of banking imbalances and their consequences on liquidity and inflation based on evidence from the Iranian banking system. The results demonstrate that unbalanced banks drive sustained high liquidity growth and fuel inflation in the economy. Ultimately, the study proposes reforming bank management structures, strengthening corporate governance, controlling the government's budget deficit, and enhancing central bank supervision as key strategies to mitigate banking imbalances.

From an international perspective, Haan et al. [8] investigated whether risks residing on bank balance sheets could predict banking crises. They identified low levels of liquid assets and domestic financial liabilities, coupled with high levels of external debt and elevated financial leverage, as the primary indicators of banking crises.

Hu et al. [9], in their paper "Long-Term Funding: National Development Banks vs. Private Banks," analyzed a dataset of 1,253 banks across 106 countries from 2011 to 2018 to compare the loan maturities of development banks with those of commercial banks. Their findings indicate that long-term loans constitute a significantly larger share of national development banks' asset portfolios compared to commercial banks. Moreover, the analysis reveals that, given the long-term nature of development bank financing, banks perform more optimally when the government not only provides guarantees but also enables greater debt issuance through these development financial institutions.

In summary, a review of domestic and international studies indicates that while directed lending serves as a policy instrument for social support and economic development, it can severely exacerbate banking imbalances if it is misaligned with banking resources and capacities. Nonetheless, the existing literature offers limited empirical research examining the direct impact of directed lending on banking imbalances in Iran using dynamic econometric methodologies such as the ARDL approach. Consequently, this study aims to address this research gap by clarifying both the long-run and short-run relationships between directed lending and banking imbalances in the Iranian economy.

Banking imbalance refers to the mismatch between a bank's assets and liabilities, as well as the misalignment between its resources and uses, which can ultimately lead to financial instability. This imbalance is further exacerbated when banks are legally mandated through directed lending policies to extend loans under specific preferential terms without sufficient regard for their financial capacities [10]. In the Iranian banking system, banking imbalance constitutes a severe structural challenge primarily driven by the imposition of statutory credit mandates on banks. This imbalance can exert detrimental effects on both the financial performance of banks and the broader national economy. Consequently, policy reforms, enhanced supervision, robust risk management, and targeted government support are crucial to mitigating these imbalances and restoring the financial health of the banking sector [11].

Directed lending facilities refer to credit allocations mandated by regulatory authorities and the central bank to banks and financial institutions. Driven by social, economic, or political objectives, these facilities are directed toward specific economic sectors, development projects, or vulnerable groups requiring government support. Crucially, they are often disbursed at preferential, below-market interest rates and allocated without rigorous credit risk assessments or adequate evaluations of the borrowers' repayment capacity [12].

Table 1. Common Objectives of Directed Lending Facilities

Objectives	Description
Supporting Domestic Producers	Particularly in the agriculture, manufacturing, and small and medium-sized enterprise (SME) sectors.
Supporting Vulnerable Groups	To enhance the social welfare of low-income and vulnerable populations.
Developing Public Infrastructure	Including infrastructure and development projects in the energy, transportation, and housing sectors.
Financing Strategic Projects	To support strategic sectors of the economy, such as the energy industry and emerging technologies.
Job Creation	Allocating financial resources to small and medium-sized enterprises (SMEs) to expand their businesses and create employment opportunities.

Source: Ref [12]

Directed lending is provided in various forms [13]. The major types of directed lending are presented in Table 2.

Table 2. Classification of Directed Lending Facilities

Types	Description
Low-Interest Loans	Granted to specific economic sectors or vulnerable groups.
Long-Term Repayment Loans	Provides financing for the implementation of development and infrastructure projects.
Unsecured or Low-Collateral Loans	Facilitates access to bank financing for groups with limited access to conventional banking services.
Employment Generation Loans	Supports sustainable employment generation through: • Financing national production and employment support programs based on proposals submitted by executive agencies. • Financing provincial production and employment support programs approved by Provincial Planning and Development Councils. • Supporting employment initiatives in accordance with the resolutions of the Board of Trustees of the Progress and Justice Fund, including programs implemented by the Imam Khomeini Relief Foundation, the State Welfare Organization of Iran, the Foundation of Martyrs and Veterans Affairs, the Barakat Foundation, the Innovation and Prosperity Fund, the Construction Basij Organization, the Alavi Foundation, charitable centers affiliated with public and charitable organizations, other charitable institutions, jihadi groups, non-governmental organizations (NGOs), and the private sector to promote business development
Housing Deposit, Renovation, Construction, or Purchase Loans	Provides loans for housing construction, purchase, renovation, or rental deposits for low-income households and government employees.
Qard al-Hasan (Interest-Free) Loans	Provides interest-free or low-interest loans to meet the essential financial needs of low-income and disadvantaged individuals.
Marriage and Childbirth Loans	Provides low-interest or interest-free loans to support marriage and encourage childbirth.

Source: Ref [13]

Although directed lending appears to benefit society and the economy, it may pose significant challenges and risks to the banking system. Some of these challenges are presented in Table 3 [12].

Table 3. Significant Challenges and Issues Associated with Directed Lending

Challenges	Description

Increased Credit Risk	Increased non-performing loans and default risk due to granting loans to financially incapable groups without comprehensive risk assessment by banks.
Impact on Banks' Liquidity	Rapid outflow of funds and liquidity shortages resulting from the allocation of banking resources to directed lending facilities.
Reduced Bank Profitability	Increased risk of bankruptcy, weakened financial performance, and reduced bank profitability due to providing low-interest or interest-free loans.
Decreased Banking Efficiency	Reduced productivity and efficiency of banks through the allocation of resources to low-return or high-risk lending facilities.
Balance Sheet Imbalances	Creation of balance sheet imbalances in banks, particularly when the volume of directed lending is high due to irregular repayments or low profitability.

Source: Ref [12]

The Central Bank of Iran, as the most important monetary authority, is responsible for implementing monetary and financial policies and supervising directed lending facilities provided by commercial banks. These responsibilities have created significant challenges for the banking system. Therefore, the Central Bank has pursued reform-oriented policies to reduce risks and improve the performance of the banking system. Accordingly, decisions regarding directed lending facilities are made annually under Note 16 of the national budget law [14]. Based on these decisions, banks' responsibilities regarding compliance with the directives issued by the Central Bank and the government for granting directed lending facilities are communicated as legal obligations, requiring banks to act accordingly.

Legal obligations established by supervisory institutions, including the Central Bank, the Money and Credit Council, and other regulatory authorities, are approved and communicated to banks, requiring them to comply with specific financial ratios, risk management requirements, and investments in designated sectors. These requirements may limit banks' flexibility and ultimately lead to the allocation of banking resources to high-risk or low-return lending facilities, thereby intensifying banking imbalances [15].

The Central Bank is required to ensure that banks and credit institutions allocate Qard al-Hasan (interest-free) loans from Qard al-Hasan deposits and a portion of current deposits to the beneficiaries specified in parliamentary legislation, including the Seventh Development Plan. Details regarding beneficiaries, loan amounts, and repayment periods are determined through regulations that must be prepared by the Plan and Budget Organization in cooperation with the Central Bank and approved by the Cabinet of Ministers within one month after the law is enacted [1].

Directed lending facilities, due to their low preferential interest rates and extended repayment periods, can increase pressure on banks' liquidity and create financial imbalances. Furthermore, such lending increases credit risk and the likelihood of non-performing loans, weakening banks' balance sheets. Consequently, the allocation of resources to low-productivity and low-return activities reduces the efficiency of the banking system [16].

2. Materials and Methods

This study is applied in terms of its objective and descriptive-analytical in terms of its nature. Given that the data used in this study are time-series data, the Autoregressive Distributed Lag (ARDL) approach was employed to estimate the short-run and long-run relationships among the variables. Model estimation and statistical tests were conducted using the EViews 13 econometric software. The selection of this approach is attributed to its high flexibility in dealing with different orders of integration among variables. In financial economics studies, variables often exhibit different stationarity characteristics. The ARDL approach enables the reliable estimation of long-run equilibrium relationships regardless of whether the explanatory variables are stationary at level I(0), stationary after first differencing I(1), or a combination of both. The dynamic structure of this approach, through the inclusion of appropriate lags of the dependent and independent variables, effectively captures the system's dynamics. It also addresses residual autocorrelation issues and provides consistent and unbiased parameter estimates [17,18]. The general form of the model used to examine the impact of directed lending facilities and other variables on banking imbalances is specified as follows:

$$\Delta DEBT_t = \alpha 0 + \sum_{i=1}^{p} \beta_i \, \Delta DEBT_{t-i} + \sum_{j=0}^{q1} \gamma_j \, \Delta Loans_{t-j} + \sum_{k=0}^{q2} \theta_k \, \Delta NPL_{t-K} + \sum_{m=0}^{q3} \emptyset_m \, \Delta LIQ_{t-m} \sum_{n=0}^{q4} \aleph_n \, \Delta Inf_{t-n} + \lambda_1 DEBT_{t-1} + \lambda_2 Loans_{t-1} + \lambda_3 NPL_{t-1} + \lambda_4 LIQ_{t-1} + \lambda_5 Inf_{t-1} + \varepsilon_t$$

In this regard, the research variables are as follows:

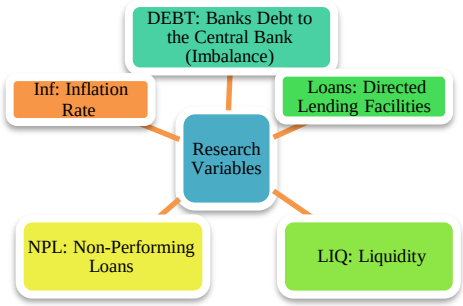


Figure 1. Research Variables

2.1. Pre-Estimation Tests

Prior to estimating the model, examining the characteristics of the time-series variables is essential. To ensure that none of the variables are integrated of order two, unit root tests, including the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, were employed. This step is necessary because the bounds testing approach becomes invalid in the presence of I(2) variables. Subsequently, the optimal lag length ((p, q_1, q_2, q_3, q_4)), which has a direct impact on the estimation results, was determined based on information criteria. Considering the sample size of this study, the Schwarz Bayesian Information Criterion (SBIC) was preferred for lag selection due to its greater efficiency in preserving degrees of freedom.

2.2. Model Estimation and Cointegration Test

Model estimation and cointegration testing were conducted to investigate the existence of a long-run equilibrium relationship among the variables. In the bounds testing approach, the null hypothesis of no cointegration is examined, and the calculated F-statistic is compared with the lower-bound critical value I(0) and upper-bound critical value I(1). If the calculated F-statistic exceeds the upper bound, the existence of a long-run relationship is confirmed. After confirming cointegration, the long-run coefficients are estimated, and subsequently, the short-run dynamics are linked to the long-run equilibrium path through the Error Correction Model (ECM). In this framework, the error correction coefficient should be negative and statistically significant, indicating the proportion of short-run disequilibrium in banking imbalances that is adjusted toward the long-run equilibrium path each year.

2.3. Post-Estimation and Diagnostic Tests

To ensure the validity of the estimated results and evaluate the classical econometric assumptions, diagnostic tests were performed on the model residuals. For this purpose, heteroskedasticity tests, such as the Breusch-Pagan-Godfrey test, were applied to confirm the constancy of residual variance over time.

Furthermore, to assess the structural stability of the estimated coefficients throughout the study period and determine whether the model was significantly affected by shocks, the Cumulative Sum (CUSUM) of residuals test was conducted. If the CUSUM statistics remain within the 5% confidence bands, the stability of the estimated model is confirmed.

2.4. Conceptualization and Variable Definitions

To rigorously investigate and quantify the impact of directed lending facilities on the imbalance within Iran's banking system, a comprehensive set of macroeconomic variables and banking network performance indicators were integrated into a cohesive model. The central focus of this research is banking imbalance, defined as the dependent variable. For its operationalization within the model, banks' debt to the central bank is utilized. This metric signifies the extent to which the banking network borrows from monetary base resources, clearly reflecting situations where banks, facing cash flow deficits and an imbalance between liabilities and assets, are compelled to resort to overdrafts from the central bank. The banking network's indebtedness to the central bank serves as the measurement criterion, quantified in trillions of Rials. To elucidate the underlying causes of this imbalance, three independent variables were employed. The primary and most significant independent variable is directed lending facilities. This variable encompasses the aggregate volume of credit that the banking network is mandated to extend to specific sectors, industries, or societal segments, pursuant to the provisions within annual budget laws and governmental policy directives. The total volume of these facilities is incorporated into the model annually, measured in trillions of Rials. Furthermore, Non-Performing Loans (NPL) are examined as an influential independent variable. The accumulation of these loans, also measured in trillions of Rials, acts as a contributing factor to banks' operational cycles and their structural imbalances. Additionally, the independent variable of liquidity is included in the model as a key macroeconomic monetary indicator. The value of this variable is assessed based on year-end balances, also in trillions of Rials. Conversely, to mitigate potential biases in model estimations and to isolate the nominal effects of price level fluctuations, the inflation rate variable is incorporated as a control variable. This variable is measured in percentage

terms within the research model to account for and control the inflationary impacts across different periods.

2.5. Statistical Population and Research Scope

Given the macroeconomic nature of the variables under examination and the research's emphasis on the systematic behavior of the banking system in its interplay with governmental fiscal and budgetary policies, the requisite data have been gathered in an aggregated, macro-level format. Consequently, the research data are time-series in nature, extracted with annual frequency. The principal source for obtaining data pertaining to the research variables is the time-series database of the Central Bank of the Islamic Republic of Iran. Employing data from this paramount monetary policymaking institution ensures not only the validity and reliability of the data but also guarantees that the variables have been compiled using standard and consistent definitions over time, which is imperative for precise estimations in econometric modeling. The temporal scope of this research spans a twenty-four-year period of the Iranian economy, commencing in 2001 and concluding at the end of 2025. This timeframe represents one of the most volatile and pivotal periods in the history of Iranian banking. The inception of this period is contemporaneous with the establishment and expansion of private banks, structural transformations within the banking system, and the broadening of monetary bases. Throughout these years, governments have recurrently utilized the instrument of directed lending to address fiscal shortfalls and implement their supportive policies. Therefore, encompassing this duration permits the researcher to present a comprehensive, structural, and dependable depiction of the formation of banking imbalances, independent of transient effects, and to meticulously assess and analyze the variables' responses to government budgetary mandates amidst diverse economic cycles and external shocks [19,20].

3. Results and Discussion

This section commences with an examination of the stationarity of the variables. Subsequently, the optimal lag length is determined, and the model is estimated. Finally, after confirming the existence of a long-run relationship, diagnostic tests are presented for model validation.

3.1. Stationarity Results

Prior to model estimation, and to prevent spurious regression, the stationarity of the research variables was investigated using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The results obtained from these tests, presented in Table 4, indicate that all research variables namely, banks' debt to the central bank, inflation rate, directed lending facilities, liquidity, and non-performing loans are non-stationary at their levels. However, they become stationary at the 95% confidence level after first differencing. In other words, all variables are integrated of order one ($I(1)$), which fulfills the necessary conditions for employing the Bounds Test approach and the Autoregressive Distributed Lag (ARDL) model.

Table 4. Stationarity Test Results of Variables

Variable	Augmented Dickey-Fuller (ADF)		Phillips-Perron (PP)	
	Probability Value at Level	Probability Value at First Difference	Probability Value at Level	Probability Value at First Difference
Banks' Debt to the Central Bank	0.9852	0.0031	0.9927	0.0032
Inflation Rate	0.8320	0.0146	0.7790	0.0146
Directed Lending Facilities	0.9924	0.0017	0.9924	0.0017
Liquidity	0.5366	0.0000	0.9932	0.0000
Non-Performing Loans	0.9946	0.0074	0.9933	0.0078

Source: Research Findings

3.2. Determination of Optimal Lag Length

In the subsequent step, to determine the dynamic structure of the model, the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn (HQ) information criteria were employed. Based on the results presented in Table 5, all three criteria suggest an optimal lag length of 2, indicating a high explanatory power of the model at this lag level. With the optimal lag length determined, the model was estimated, and its results are presented in Table 6.

Table 5. Optimal Lag Length Results

Pause	AIC	SC	HQ
0	58.4128	58.5976	58.3507
1	50.8688	51.9774	50.4963
2	*47.2924	*49.3249	*46.6960

Source: Research Findings

3.3. Model Estimation

The findings obtained from the model, as presented in Table 6, indicate that non-performing loans (NPLs), mandated lending facilities, liquidity, and inflation have a direct and statistically significant impact on banks' debt and imbalance at the 5% significance level. The positive and significant coefficient of non-performing loans (0.0009) suggests that a one-unit increase in NPLs leads to a direct rise in banks' liabilities to the Central Bank (i.e., banking imbalance) due to liquidity shortages. The positive and significant effect of mandated lending (0.0002) confirms the fiscal dominance hypothesis and the imposition of government obligations on banks' balance sheets, indicating a direct transmission channel through which resource deficits are converted into increased borrowing from the Central Bank. The positive coefficient of the inflation rate (0.0064) implies that, under inflationary conditions, deposit outflows from the banking system and increased demand for credit push banks toward overdrawing from the Central Bank. The negative coefficient of liquidity (-0.00007) highlights the role of the interbank market as a short-term liquidity buffer, reducing banks' need for direct borrowing from the Central Bank; however, in the long run, reliance on Central Bank financing increases. The error correction coefficient, with a value of -1.67 and significance at the 1% level, indicates a high speed of adjustment of banks' liabilities toward long-run equilibrium.

Table 6. Estimation results of the autoregressive distributed lag model

Variable	Coefficient	Probability Value (p-value)	t-Statistic
Banks' Debt to the Central Bank (1)	-0.6702	0.1087	-1.7798
Inflation Rate	0.0064	0.0539	2.2151
Non-Performing Loans (NPLs)	0.0009	0.0013	4.5597
Mandated Lending Facilities	0.0002	0.0015	4.4904
Liquidity	-0.00007	0.0361	-2.4607
Intercept	8.1932	0.0015	4.4570
Error Correction Coefficient	-1.6702	0.0000	-7.6678

Source: Research Findings

3.4. Bounds Test Results and Cointegration Time-Series Plot

The results of the bounds test, presented in Table 7, indicate that the calculated F-statistic is greater than the upper critical bound at the 99% confidence level. The fact that the F-statistic exceeds the upper bound confirms the existence of a cointegration relationship and a stable long-run equilibrium relationship between banks' debt to the Central Bank and the explanatory variables. Based on this test, the null hypothesis of no cointegration is rejected, and the validity of the long-run estimates of the model is statistically confirmed.

Table 7. Bounds Test Results

F-statistic: 6.3012					
1%		5%		10%	
I(1)	I(0)	I(1)	I(0)	I(1)	I(0)
5.84	4.28	4.22	3.058	3.56	2.52

Source: Research Findings

Figure 2 presents the cointegration series of the model. The deviations of the model from the equilibrium path during the examined period (particularly up to 2014) remained relatively stable and fluctuated around zero, confirming the validity of the estimated long-run relationship. However, the observation of substantial fluctuations in the final years (2023–2024) indicates the occurrence of external shocks or structural changes in the balance sheet of the banking system during this period, which caused temporary deviations from the equilibrium path. Nevertheless, due to the statistical significance of the error correction coefficient, the model is gradually adjusting and returning toward its long-run equilibrium.

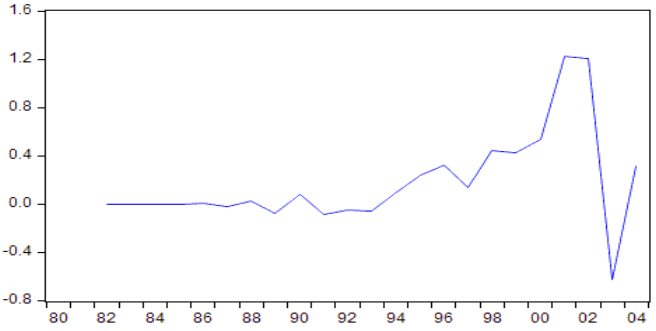


Figure 2. Model cointegration series

Source: Research Findings

3.5. Model Validation

To ensure the reliability of the estimated model results, diagnostic tests were conducted on the model residuals. The results of the Breusch–Pagan–Godfrey test, performed to examine heteroskedasticity, are presented in Table 8. Given the probability value of 0.4284, the null hypothesis of homoscedasticity cannot be rejected. Therefore, the results indicate that the model residuals have constant variance, confirming the absence of heteroskedasticity.

3.5.1. Breusch–Pagan–Godfrey Test Results

Table 8. Results of the Breusch–Pagan–Godfrey Test

Test Statistic		Degrees of Freedom (df)		Probability (p-value)	
F	x^2	**F**	x^2	**F**	x^2
1.0600	5.5146	12.5	5	0.4284	0.3563

Source: Research Findings

3.5.2. Cumulative Sum of Recursive Residuals (CUSUM) Test

Furthermore, to examine the structural stability of the model coefficients over the study period, the CUSUM test was employed. The results of this test indicate that the corresponding statistic remained within the 5% critical bounds throughout the research period, confirming the structural stability of the model coefficients and the persistence of the long-run relationship. The findings of the study, as illustrated in Figure 3, demonstrate the significant impact of banks' balance sheet structure on their level of indebtedness to the Central Bank in the Iranian economy.

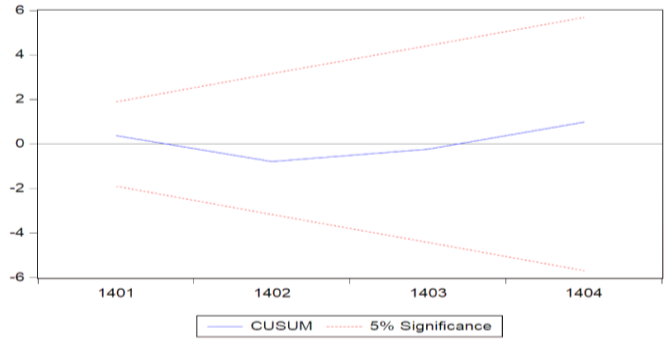


Figure 3. Results of the CUSUM Test

Source: Research Findings

4. Conclusions

The objective of this study was to empirically assess the effect of mandated lending facilities on the imbalance of Iran's banking system, measured by banks' debt to the Central Bank, using the Autoregressive Distributed Lag (ARDL) approach over the period 2001–2025. The bounds test confirmed the existence of a long-run equilibrium relationship among the research variables, and the validity of the dynamic model estimations was statistically verified.

The model estimation results revealed that mandated lending facilities, with a coefficient of 0.0002, have a positive and statistically significant effect on banks' debt to the Central Bank. This finding supports the "fiscal dominance" hypothesis in the Iranian economy. Specifically, imposing budgetary obligations and legal mandates on the banking system without accurate credit risk assessment and without considering the actual capacity for resource absorption directly transfers the imbalance between resources and expenditures to banks' balance sheets, forcing them to borrow from the Central Bank (thereby contributing to monetary base growth).

In addition, non-performing loans (NPLs), with a positive and significant coefficient of 0.0009, act as another key driver of asset stagnation and the deepening of liquidity shortages. At the macroeconomic level, inflation (with a coefficient of 0.0064) directly intensifies banking imbalances. Under inflationary conditions, on the one hand, the incentive to hold deposits in domestic currency declines, accelerating deposit outflows; on the other hand, demand for bank credit by economic agents increases. The resulting gap between these two flows deepens banks' liquidity imbalances and activates the overdraft channel more intensively. One of the key findings of the study concerns the analysis of short-run dynamics among the variables. The negative coefficient of liquidity (-0.00007) in the short run indicates that the interbank market acts as a "liquidity buffer" in response to temporary liquidity and inflationary shocks, reducing banks' immediate pressure to borrow directly from the Central Bank. However, this mechanism loses its effectiveness in the long run due to the persistence of structural imbalances. Furthermore, the error correction term (ECT), with a significant value of -1.67, indicates a very high speed of adjustment of short-run deviations toward the long-run equilibrium path. The system converges toward equilibrium through a damped oscillatory adjustment process. Managerial strategies can assist both state-owned and private banks in reducing imbalances arising from mandated lending and legal obligations through improvements in management practices and internal processes. These strategies are presented in Table 9.

Table 9. Managerial Strategies

Strategy	Description
Optimization of the Loan Portfolio	Evaluating and prioritizing lending activities based on risk and return considerations to reduce the level of non-performing loans.
Strengthening Internal Supervision	Establishing strong monitoring systems to control and evaluate lending processes and identify risks in a timely manner.
Enhancing Financial Transparency	Providing accurate and transparent reports to stakeholders, particularly regarding mandated lending and its effects on banks' balance sheets.
Developing Training Programs	Training bank employees in risk management and lending practices to enhance the required knowledge and skills.
Strengthening Cooperation with Government Institutions	Establishing close cooperation with government institutions to determine financing priorities and reduce pressure on banks in providing mandated lending facilities.
Developing Information Technology	Utilizing modern technologies to improve credit assessment and risk management processes, thereby reducing time and operational costs.
Diversifying Financing Sources	Using various financing sources to reduce dependence on mandated lending and enhance financial sustainability.
Revising Regulatory Requirements	Cooperating with relevant authorities to review and revise regulatory requirements in order to reduce the financial burden imposed on banks.
Operational Risk Management	Developing and implementing effective policies for managing operational risks and reducing vulnerability to economic fluctuations.
Developing New Financial Products	Creating new financial products to meet diverse customer needs and reduce pressure arising from mandated lending obligations.
Expanding Cooperation Networks	Establishing cooperation with other banks and financial institutions to exchange information and experiences in lending and risk management.
Big Data Analytics	Applying big data analytics to forecast financial trends and proactively identify potential risks.
Supporting Innovation	Encouraging innovation in banking services and products to attract new customers and increase revenues.
Interbank Debt Management	Monitoring interbank liabilities and adopting strategic decisions to reduce risks arising from such debts.
Developing Marketing Strategies	Improving marketing strategies to attract new customers and retain existing ones through enhanced services.
Timely and Effective Reporting	Establishing timely and effective reporting systems to identify and analyze strengths and weaknesses in bank performance.
Designing Incentive Policies	Developing incentive policies for employees to improve performance and reduce banking imbalances.

Source: Research Findin

Author Contribution

The author was solely responsible for the conception, preparation, and writing of this manuscript.

Conflict of Interest

The author, while observing publication ethics in the referencing, declares the absence of any conflict of interest.

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