

The Effects of Central Bank Policy on the Stock Market: A Dynamic Stochastic General Equilibrium Model

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Citation: Morsali Arzanagh, Z., & Valadpour, H. (2027). The Effects of Central Bank Policy on the Stock Market: A Dynamic Stochastic General Equilibrium Model. *Business, Marketing, and Finance Open*, 4(5), 1-22.

Received: 01 April 2026

Revised: 20 August 2026

Accepted: 27 August 2026

Initial Publication: 30 September 2026

Final Publication: 01 May 2027



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Abstract: This study aimed to develop a New Keynesian dynamic stochastic general equilibrium model to investigate how central bank interest-rate and reserve-requirement policies affect Iran's stock market through the interest-rate, asset-price, bank-lending, interbank-market, and bank portfolio-allocation channels. The study used a quantitative macroeconomic modeling design based on quarterly data from Iran for 1991Q1–2023Q4. Data were obtained from the Central Bank of the Islamic Republic of Iran, the Statistical Center of Iran, and the Tehran Stock Exchange. The model incorporated households, firms, commercial banks, the interbank market, the stock market, the government, and the central bank, with 42 endogenous variables and seven structural shocks. The series were seasonally adjusted, converted into real terms, logarithmically transformed, and detrended using the Hodrick–Prescott filter with $\lambda=1600$. Structural parameters were calibrated using previous Iranian DSGE studies, direct calculations, and simulated moment matching. The nonlinear system was log-linearized around the deterministic steady state, solved under the Blanchard–Kahn conditions, and simulated using Dynare 5.4 in MATLAB R2023a. Model validation was conducted through moment comparison, correlation analysis, impulse-response functions, forecast-error variance decomposition, and sensitivity analysis. A contractionary monetary-policy shock reduced output by a peak of 0.58%, consumption by 0.45%, investment by 0.89%, inflation by 0.34%, stock returns by 1.12%, stock-market volume by 0.96%, and bank lending by 0.71%. In contrast, bank deposits increased by 0.41%, the interbank rate by 0.78%, and the lending rate by 0.65%. Stock returns responded faster than output and investment, confirming the forward-looking nature of asset prices. Monetary-policy shocks explained 31.2% of stock-return variability, 27.8% of trading-volume variability, 24.6% of bank-loan variability, and 38.4% of interbank-rate variability. Sensitivity analysis showed that the direction of the results remained stable across alternative parameter values. Central bank policy significantly influences Iran's stock market through interconnected valuation, credit, interbank, and banking portfolio channels, with financial-market variables adjusting more rapidly than real-sector variables.

Keywords: Central bank policy; stock market; DSGE model; monetary transmission; interbank market; bank lending; Iran.

1. Introduction

Monetary policy is one of the principal instruments through which central banks influence inflation, output, credit conditions, asset valuation, and financial stability. Although the traditional analysis of monetary transmission has concentrated mainly on consumption, investment, employment, and the general price level, the growing importance of capital markets has made the stock market a central component of the transmission process. Changes in policy interest rates alter the opportunity cost of holding money, the cost of borrowing, expected

corporate profitability, investors' required rates of return, and the discount rate applied to future cash flows. Consequently, even a relatively modest monetary-policy adjustment may generate an immediate and substantial response in stock prices, trading activity, portfolio allocation, and market liquidity. Interest rates therefore serve not merely as the price of borrowing but as an intertemporal valuation mechanism connecting central bank decisions to financial-market behavior and real economic outcomes [1].

The relationship between central bank policy and the stock market operates through several theoretically distinct but empirically interconnected channels. Through the interest-rate channel, monetary tightening raises the cost of external financing and reduces the present value of expected dividends. Through the credit channel, higher rates weaken bank lending, constrain firms' working capital and investment expenditure, and reduce expected future earnings. Through the wealth channel, falling stock prices lower household wealth and may suppress consumption. The portfolio-rebalancing channel encourages investors to shift from equities toward bank deposits, bonds, and other interest-bearing instruments when risk-free or regulated rates rise. Monetary policy may also affect market liquidity by influencing investors' financing constraints, trading incentives, risk tolerance, and willingness to hold illiquid assets. Evidence indicates that policy shocks can produce dynamic and asymmetric effects on stock-market liquidity, suggesting that the consequences of monetary tightening cannot be understood solely through stock-price responses [2].

The stock market is inherently forward-looking, and market participants continuously revise the valuation of securities in response to information about future policy, inflation, output, and corporate profitability. This feature explains why financial-market variables often respond more rapidly than real-sector variables to central bank announcements. In the United States, for example, monetary tightening after the COVID-19 pandemic exerted substantial pressure on stock valuations as markets incorporated higher discount rates and expectations of weaker economic activity [3]. Cross-country evidence similarly demonstrates that monetary-policy decisions significantly affect stock-market performance, although the magnitude and persistence of the response vary according to the structure of domestic financial systems, the credibility of monetary authorities, the degree of market development, and the prevailing macroeconomic environment [4]. These findings reinforce the importance of analyzing monetary transmission within an economy-specific institutional framework rather than assuming that a uniform mechanism applies across countries.

The impact of monetary policy on equity markets may become even more complex in economies characterized by structural breaks, regulatory intervention, inflationary instability, and changes in policy regimes. Empirical findings from India show that the dynamic relationship between monetary-policy variables and the stock market changes when structural breaks are explicitly considered, indicating that conventional constant-parameter models may conceal important shifts in financial transmission [5]. Monetary-policy volatility itself may also act as an independent source of macro-financial disturbance. Evidence from Brazil suggests that uncertainty or volatility in policy actions can affect output, inflation, credit, and asset markets beyond the effects generated by the expected level of the policy rate [6]. Therefore, an adequate analysis must account not only for systematic policy responses but also for unexpected innovations and disturbances in the central bank's reaction function.

The banking sector occupies a central position in this mechanism because monetary policy is transmitted to households, firms, and financial markets through bank balance sheets, deposit rates, lending rates, liquidity positions, and interbank transactions. This role is particularly significant in bank-based economies, where commercial banks remain the dominant providers of external finance. Interest paid on reserves and changes in central bank operating procedures may alter banks' incentives to lend in the interbank market, hold reserves,

extend private credit, or acquire financial assets [7]. The structure of the interbank market consequently affects the speed and strength with which policy changes pass through to lending rates and asset-market conditions. When interbank markets function efficiently, liquidity can be redistributed from banks with surplus funds to those experiencing shortages. Conversely, when interbank activity weakens or breaks down, policy transmission may become impaired, bank funding conditions may become more heterogeneous, and the contractionary effects of monetary tightening may intensify [8].

The relationship between banks and the stock market is also bidirectional. Monetary tightening may reduce bank lending and bank investment in equities, while falling stock prices may weaken banks through valuation losses, lower collateral values, deteriorating borrower balance sheets, and increased systemic risk. Recent evidence from South Asian economies points to significant systemic-risk spillovers between stock markets and banking deposits, illustrating that disturbances in equity markets can alter depositor behavior and banking-sector stability [9]. Bank risk-taking is further shaped by governance mechanisms, social responsibility, regulatory conditions, and institutional incentives, implying that banks may react differently to identical policy shocks depending on their internal structure and risk-management practices [10]. Liquidity risk among listed banks is likewise influenced by changing financial and macroeconomic conditions, and nonlinear responses may arise when banks move between different liquidity regimes [11]. These interactions suggest that a model of monetary policy and the stock market should explicitly include the banking system rather than treating it as a passive conduit.

The Iranian economy provides a particularly important setting for examining these relationships. Its financial structure remains predominantly bank-based, yet the Tehran Stock Exchange has become increasingly important as a channel for corporate finance, household investment, and speculative portfolio allocation. Monetary policy in Iran is implemented through a combination of regulated interest rates, reserve requirements, liquidity management, credit controls, and intervention in the interbank market. These instruments operate in an environment characterized by persistent inflation, rapid liquidity growth, fiscal pressures, oil-revenue dependence, external sanctions, exchange-rate instability, and periods of political uncertainty. Consequently, the effects of central bank policy on the stock market may differ from those documented in more market-oriented economies.

Previous Iranian research has shown that an interest-rate-based policy rule may outperform a simple money-growth rule in stabilizing inflation and production. Comparisons of alternative monetary-policy regimes indicate that Taylor-type rules can generate different macroeconomic outcomes from policies centered on monetary expansion, particularly when the central bank responds simultaneously to inflation and the output gap [12]. This distinction is highly relevant because liquidity growth has historically played an important role in Iranian inflation and asset-market dynamics, while administratively influenced interest rates may not always adjust freely to macroeconomic conditions. Therefore, a monetary-policy rule designed for Iran should incorporate not only inflation and output but also liquidity growth and the persistence of interest-rate decisions.

The interbank market has increasingly become an important component of Iranian monetary transmission. A DSGE analysis incorporating financial shocks and interbank activity showed that the interbank market can substantially affect the propagation of monetary disturbances throughout the Iranian economy [13]. Changes in interbank funding costs influence banks' willingness to extend credit, maintain liquidity, or transfer resources to other financial uses. Empirical evidence also indicates that interbank interest rates affect stock prices in Iran and that this relationship may vary across major political and institutional episodes, including the period surrounding the Joint Comprehensive Plan of Action [14]. These findings imply that the interbank rate functions not merely as

a short-term money-market price but as a key link between central bank actions, banking-sector liquidity, and equity valuation.

Research on Iranian banks further demonstrates that monetary policy affects their profitability, lending behavior, and financial performance. A DSGE-based investigation of bank performance found that policy changes alter bank balance sheets and thereby influence the broader economy [15]. A withdrawal of banking resources can also reduce consumption and investment by constraining credit availability, confirming the importance of bank financing for real-sector activity [16]. These studies support the inclusion of deposits, bank loans, reserve requirements, capital adequacy, and interbank borrowing within a comprehensive monetary DSGE framework.

The Tehran Stock Exchange is also influenced by factors that extend beyond conventional macroeconomic fundamentals. Price bubbles may arise when stock valuations depart from levels justified by dividends, productivity, and real economic activity. A DSGE investigation of Tehran Stock Exchange bubbles demonstrated that monetary and macroeconomic disturbances can contribute to persistent deviations in asset prices [17]. Political uncertainty likewise intensifies stock-market fluctuations, especially when domestic developments interact with international political changes [18]. More generally, uncertainty in the market for macroeconomic assets affects portfolio allocation and the joint behavior of money, equities, and other financial instruments [19]. When investors are risk-averse, changes in perceived risk and value at risk can substantially modify the composition of their macroeconomic asset portfolios [20]. Accordingly, the stock-market response to monetary policy depends not only on expected returns but also on uncertainty, risk tolerance, and investors' willingness to rebalance between deposits and equities.

External disturbances further complicate monetary transmission in Iran. Economic sanctions can generate shock spillovers among the stock, foreign-exchange, and gold markets, thereby altering the way domestic monetary measures affect asset prices [21]. Under sanctions, higher exchange-rate volatility, import costs, inflation expectations, and uncertainty may weaken standard interest-rate channels or cause policy effects to be transmitted through alternative asset markets. In such circumstances, investors may move rapidly among stocks, foreign currency, gold, deposits, and real assets. The stock market may therefore respond to a policy-rate shock differently depending on whether the shock occurs during a period of relative stability or one characterized by external financial pressure.

Existing Iranian DSGE studies provide valuable foundations but leave several issues insufficiently integrated. Some models emphasize inflation and output stabilization without explicitly modeling the stock market. Others include financial or banking disturbances but do not distinguish between household stock demand and bank equity investment. Studies of the stock market frequently focus on asset-price bubbles or the direct effects of monetary and fiscal policy but simplify the interbank market and bank portfolio decisions. Rahmani and colleagues incorporated financial and monetary policy into a DSGE analysis of the Iranian stock market and showed that policy disturbances can significantly affect equity-market outcomes [22]. However, additional modeling is needed to identify the specific mechanisms through which policy rates, reserve requirements, deposits, bank loans, interbank transactions, and bank stock holdings jointly determine stock-market adjustment.

A further gap concerns the treatment of capital loans and bank resources. Conventional DSGE models often assume that investment is financed internally or through a simplified credit constraint, even though banking facilities are a primary source of investment financing in Iran. Incorporating investment-related loans directly into capital accumulation makes it possible to capture the consequences of tighter credit for productive capacity and future corporate earnings. Similarly, allowing banks to allocate excess liquidity between private loans, interbank

lending, reserves, and stocks provides a more realistic representation of how monetary policy influences the capital market. Under monetary tightening, higher interbank returns may encourage banks to redirect funds away from equity investment and private lending. This portfolio adjustment can simultaneously reduce stock demand, investment, output, and firm profitability, thereby reinforcing the initial decline in equity prices.

A DSGE framework is particularly appropriate for examining these mechanisms because it combines optimizing behavior, market-clearing conditions, policy rules, structural shocks, and forward-looking expectations within a coherent system. The approach allows researchers to derive household consumption and portfolio choices, firms' production and pricing decisions, banks' balance-sheet behavior, government budget dynamics, and central bank policy from explicit structural relationships. It also permits counterfactual experiments in which monetary-policy, reserve-requirement, technology, banking, fiscal, and stock-market shocks are introduced separately. The resulting impulse-response functions show the direction, magnitude, timing, and persistence of each shock, while variance decomposition identifies the proportion of stock-market fluctuations attributable to monetary and nonmonetary disturbances.

DSGE models also facilitate model validation through the comparison of simulated and actual moments. In economies such as Iran, where some financial data may be incomplete, subject to definitional changes, or influenced by regulation, calibration and moment matching may be more practical than full-information estimation. Calibration allows structural parameters to be drawn from national data, earlier Iranian DSGE research, and widely accepted theoretical values. This approach has been used to analyze monetary rules, banking shocks, and financial transmission in Iran and can reproduce the principal volatility and co-movement patterns of macroeconomic variables when the model structure is appropriately specified [13, 16]. Nevertheless, the reliability of policy conclusions depends on sensitivity testing because parameters governing price stickiness, policy responses, interbank-market behavior, and bank portfolio allocation may materially affect the magnitude of simulated responses.

The theoretical expectation of the present study is that a contractionary monetary-policy shock will reduce stock prices and trading volume through higher discount rates, weaker expected dividends, reduced bank credit, and a portfolio shift toward deposits and interbank assets. Output, consumption, and investment are expected to decline, while bank deposit rates, lending rates, and interbank rates are expected to rise. Inflation is expected to decrease with a lag because nominal price rigidity delays the adjustment of the general price level. The stock market is expected to react more quickly than real-sector variables because stock prices immediately capitalize expectations regarding future profitability and financing conditions. The strength of these effects is likely to depend on the inflation and output coefficients in the central bank's reaction function, the degree of price rigidity, the sensitivity of interbank supply and demand, and the share of bank liquidity allocated to equities.

By simultaneously modeling households, firms, banks, the interbank market, the government, the central bank, and the stock market, the proposed framework extends the existing literature in several respects. It integrates the direct interest-rate valuation effect with the bank-lending, interbank, and bank-portfolio channels. It distinguishes between consumption and investment loans, incorporates bank-financed capital accumulation, and allows excess banking resources to be allocated to stock-market investment. It also reflects the Iranian monetary environment by including policy responses to inflation, output, and liquidity growth, along with a separate reserve-requirement rule. In doing so, the model connects the literature on monetary transmission, bank behavior, interbank-market functioning, systemic risk, asset-price uncertainty, and stock-market dynamics within a single structural framework [7, 9, 20].

Accordingly, the aim of this study was to develop and simulate a New Keynesian DSGE model to determine how central bank interest-rate and reserve-requirement policies affect Iran's stock market through the interest-rate, asset-price, bank-lending, interbank-market, and bank-portfolio-allocation channels.

2. Methodology

This study employed a quantitative macroeconomic modeling design to examine the effects of central bank policies on stock-market dynamics in Iran. The analytical framework was based on a dynamic stochastic general equilibrium model developed within the New Keynesian tradition. The model was designed to identify the transmission mechanisms through which monetary-policy shocks, reserve-requirement changes, interbank-market conditions, and banking-sector balance-sheet adjustments influence stock prices, stock demand, investment, output, inflation, and other macroeconomic variables. Unlike conventional monetary DSGE models that treat the financial sector in a highly simplified manner, the present framework explicitly incorporated commercial banks, bank lending, interbank transactions, capital-adequacy requirements, bank investment in equities, household stock demand, and firms' issuance of shares. This structure made it possible to investigate both direct and indirect monetary-policy channels affecting the stock market.

The general structure of the model was adapted from monetary and banking DSGE models developed by Tatzak, Dib, and Hofstede and Smith, while being modified to reflect the institutional characteristics of Iran's bank-based financial system. The economy consisted of representative households, intermediate-goods firms, final-goods firms, commercial banks, the stock market, the government, and the central bank. Households consumed goods and services, supplied labor, accumulated physical capital, held money and bank deposits, purchased shares, and borrowed from banks for consumption and investment purposes. Firms employed labor and capital, obtained working-capital credit, issued shares, and made investment decisions. Banks collected deposits, extended loans, borrowed or lent in the interbank market, maintained statutory reserves and capital-adequacy ratios, and allocated part of their excess liquidity to the stock market. The central bank implemented policy through the deposit interest rate, reserve requirement, liquidity management, and intervention in the interbank market.

The empirical sample consisted of quarterly Iranian macroeconomic and financial observations corresponding to the period for which consistent data were available from official national sources. The unit of analysis was therefore the Iranian economy in each quarter rather than individual households, firms, or investors. Quarterly frequency was selected because it provided an appropriate balance between the availability of macroeconomic data and the need to capture short-run monetary-policy transmission. The observable series included real gross domestic product, private consumption, gross fixed capital formation, government expenditure, the consumer price index, liquidity, bank deposits, banking facilities, the policy-related deposit rate, the interbank interest rate, required reserves, oil revenue, and a broad stock-market price index. Nominal variables were converted into real terms using the consumer price index or an appropriate implicit price deflator. Variables with pronounced seasonal patterns were seasonally adjusted, while real quantity and price variables were generally transformed into natural logarithms before estimation or moment calculation.

The nonlinear model contained the structural relationships required to characterize household optimization, firm production and pricing, bank behavior, stock-market equilibrium, government finance, monetary policy, and market clearing. Although the initial conceptual formulation identified 25 core endogenous variables and 25 corresponding equations, the fully articulated version contained 42 endogenous variables because it distinguished among household, firm, banking, price, policy, government, and stock-market variables. The main endogenous

variables included consumption, labor, money holdings, deposits, capital, investment, output, inflation, stock prices, household stock demand, bank stock holdings, bank loans, interbank borrowing and lending, marginal cost, Tobin's Q , government expenditure, tax revenue, and the deposit, lending, interbank, working-capital, and government-bond interest rates. The principal stochastic disturbances were technology shocks, monetary-policy shocks, government-spending shocks, oil-revenue shocks, reserve-requirement shocks, interbank-market shocks, and stock-preference shocks.

The representative household maximized expected lifetime utility from consumption and monetary assets while experiencing disutility from labor:

$$U_t = E_t \sum_{j=0}^{\infty} \beta^j [(C_{t+j}^{\wedge}(1-\sigma))/(1-\sigma) - (L_{t+j}^{\wedge}(1+\varphi))/(1+\varphi) + (A_{t+j}^{\wedge}(1-\nu))/(1-\nu)]$$

The household's composite monetary-asset index was specified as

$$A_t = [\mu M_t^{\wedge}((\eta-1)/\eta) + (1-\mu)D_t^{\wedge}((\eta-1)/\eta)]^{\wedge}(\eta/(\eta-1))$$

where μ represented the relative weight of money and η represented the elasticity of substitution between money and deposits. Capital evolved according to

$$K_t = (1-\delta)K_{t-1} + I_t - (\varphi_k/2)[(I_t/K_{t-1})-\delta]^2 K_{t-1} + \psi B_t^k$$

The term ψB_t^k represented the contribution of investment-related bank credit to capital accumulation and constituted an important extension of the conventional capital-accumulation equation.

Intermediate firms produced differentiated goods using Cobb–Douglas technology:

$$Y_{jt} = A_t K_{jt}^{\alpha} L_{jt}^{\alpha} (1-\alpha)$$

with technology following

$$\ln A_t = \varrho_a \ln A_{t-1} + \varepsilon_t^A, \quad \varepsilon_t^A \sim N(0, \sigma_a^2)$$

Nominal rigidities were modeled through Rotemberg price-adjustment costs:

$$\Phi_t^P = (\varphi_p/2)[(P_{jt}/P_{jt-1})-\bar{\pi}]^2 Y_t$$

This formulation generated a New Keynesian Phillips curve linking current inflation to expected future inflation and real marginal cost. Banks were modeled as optimizing financial intermediaries whose balance-sheet condition was

$$(1-\theta_t)D_t + IB_t^d + E_t^{bank} = B_t + IB_t^s + P_t^s S_t^{bank} + R_t$$

where $R_t = \theta_t D_t$. Bank investment in shares was determined by expected stock returns relative to the interbank rate and by available excess liquidity:

$$S_t^{bank} = \omega \{ [E_t(R_{t+1}^s) - r_t^{IB}] / r_t^{IB} \} [(1-\theta_t)D_t + IB_t - B_t]$$

Stock-market equilibrium required equality between the supply and aggregate demand for shares:

$$S_t^s = S_t^{HH} + S_t^{bank} + S_t^{other}$$

The household asset-pricing condition determined the equilibrium price of shares:

$$P_t^s = \beta E_t[(C_{t+1}^{\wedge}(-\sigma)/C_t^{\wedge}(-\sigma))(P_{t+1}^s + \text{div}_{t+1})]$$

This condition established the central connection between monetary policy and equity valuation because changes in interest rates affected the stochastic discount factor, consumption growth, expected dividends, bank liquidity, and the relative attractiveness of stocks.

The study relied on secondary macroeconomic and financial data obtained from official statistical and financial databases. The principal data sources were the Central Bank of the Islamic Republic of Iran, the Statistical Center of Iran, national accounts publications, banking-sector statistical reports, government budget documents, and stock-market data published by the Tehran Securities Exchange and related capital-market authorities. Data series were cross-checked across official publications to ensure consistency in definitions, frequency, base year, and

measurement units. Where quarterly series were not directly reported, annual or monthly data were converted cautiously using standard temporal aggregation or interpolation procedures, provided that such conversion did not distort the economic interpretation of the variable.

The primary dependent variable was the real stock-market price index, represented in the model by P_t^s . The main monetary-policy explanatory variable was the regulated or policy-related deposit interest rate r_t^D . Additional policy variables included the required reserve ratio θ_t , liquidity growth μ_t , and the interbank interest rate r_t^{IB} . Liquidity growth was calculated as

$$\mu_t = (M_t - M_{t-1})/M_{t-1}$$

The transmission variables included bank deposits, total banking facilities, working-capital loans, investment loans, bank stock holdings, private investment, output, inflation, firm profits, dividends, and Tobin's Q. Control and state variables included government expenditure, tax revenue, oil revenue, capital stock, labor, real wages, marginal cost, technology, and government debt.

Central bank behavior was represented by an augmented Taylor-type policy rule:

$$r_t^D = \rho_r r_{t-1}^D + (1-\rho_r)[\bar{r} + \varphi\pi(\pi_t - \bar{\pi}) + \varphi Y(\ln Y_t - \ln \bar{Y}) + \varphi M(\mu_t - \bar{\mu})] + \varepsilon_t^r$$

Reserve-requirement policy followed

$$\theta_t = \rho_\theta \theta_{t-1} + (1-\rho_\theta)[\bar{\theta} + \psi\pi(\pi_t - \bar{\pi}) + \psi Y(\ln Y_t - \ln \bar{Y})] + \varepsilon_t^\theta$$

The interbank rate was specified as

$$r_t^{IB} = r_t^D + \chi_1[(IB_t^d - IB_t^s)/IB] + \chi_2(CAR_t - CAR) + \varepsilon_t^{IB}$$

These equations permitted the simultaneous evaluation of interest-rate policy, liquidity policy, reserve-requirement policy, and interbank-market conditions.

Structural parameters were obtained through a combination of calibration, direct calculation from Iranian data, and values commonly used in the DSGE literature. The discount factor was set at $\beta = 0.96$, relative risk aversion at $\sigma = 1.5$, the inverse Frisch elasticity at $\varphi = 2$, the capital share at $\alpha = 0.35$, and the quarterly depreciation rate at $\delta = 0.025$. The elasticity of substitution among differentiated goods was set at $\varepsilon = 6$, the working-capital share at $\xi = 0.30$, and the capital-adjustment parameter at $\varphi_k = 2.48$. The steady-state reserve requirement was calibrated at $\bar{\theta} = 0.13$, while the target capital-adequacy ratio was set at $CAR = 0.08$. The interest-rate smoothing coefficient was $\rho_r = 0.75$, with policy responses of $\varphi\pi = 1.5$, $\varphi Y = 0.5$, and $\varphi M = 0.2$. Parameters without reliable direct estimates, including the bank stock-allocation coefficient ω , were calibrated and subjected to sensitivity analysis.

The model was implemented and solved using Dynare 5.4 within MATLAB R2023a. The first analytical stage involved computing the deterministic steady state by setting all stochastic shocks equal to zero and solving the resulting nonlinear system. A Newton–Raphson numerical procedure was used to identify steady-state values satisfying all equilibrium, optimality, budget, balance-sheet, and market-clearing conditions. Residual checks were performed to ensure that the numerical steady state was consistent with the complete structural system.

The nonlinear equations were subsequently log-linearized around the deterministic steady state. For a generic variable X_t , its log deviation was defined as

$$\hat{x}_t = \ln X_t - \ln \bar{X}$$

The log-linearized stock-price equation was

$$\hat{p}_t^s = \beta(1-\delta_s)E_t \hat{p}_{t+1}^s + \beta\delta_s E_t \text{div}_{t+1} - \sigma(E_t \hat{c}_{t+1} - \hat{c}_t)$$

where

$$\delta_s = \text{div}/(\bar{P}^s + \text{div})$$

represented the steady-state dividend yield. The linearized policy rule was

$$\hat{r}_t^D = Q_r \hat{r}_{t-1}^D + (1-Q_r)(\varphi\pi\tau\hat{\tau}_t + \varphi Y\hat{y}_t + \varphi M\hat{\mu}_t) + \varepsilon_t^r$$

The complete rational-expectations system was expressed as

$$E_t[z_{t+1}] = Az_t + B\varepsilon_t$$

where z_t denoted the vector of endogenous variables and ε_t represented the vector of structural shocks. The existence and uniqueness of the solution were evaluated using the Blanchard–Kahn conditions. Accordingly, the number of unstable eigenvalues had to equal the number of non-predetermined or forward-looking variables. After satisfying these conditions, the policy-function representation was obtained as

$$z_t = Pz_{t-1} + Q\varepsilon_t$$

Impulse-response functions were the principal instrument for evaluating the dynamic effects of central bank policy. For a horizon h , the response was computed as

$$\text{IRF}(h) = P^h Q$$

The responses of stock prices, stock returns, household equity demand, bank equity holdings, investment, output, inflation, credit, deposits, and interbank borrowing were traced following positive shocks to the policy interest rate, reserve requirement, and interbank rate. Particular attention was given to the sign, magnitude, timing, persistence, and convergence of each response. A contractionary interest-rate shock was expected to reduce stock prices through a higher discount rate:

$$\partial P_t^s / \partial r_t^D = -\text{div} / (\bar{r} + Q)^2 < 0$$

It was also expected to reduce banks' equity demand through the interbank-cost channel:

$$\partial S_t^{\text{bank}} / \partial r_t^{\text{IB}} = -\omega[(1-\theta_t)D_t + IB_t - B_t]E_t(R_{t+1}^s) / (r_t^{\text{IB}})^2 < 0$$

Model validity was assessed through theoretical consistency, moment matching, variance decomposition, historical decomposition, and sensitivity analysis. Simulated standard deviations, autocorrelations, and cross-correlations were compared with their empirical counterparts. Forecast-error variance decomposition was used to estimate the proportion of stock-price fluctuations attributable to monetary-policy, reserve-requirement, technology, oil-revenue, fiscal, and interbank-market shocks. Historical decomposition was employed to identify the contribution of each structural shock to observed stock-market movements over the sample period. Finally, sensitivity analyses were conducted by varying key parameters, particularly Q_r , $\varphi\pi$, φY , ω , φCAR , γ_1 , and γ_2 , to determine whether the main conclusions remained robust under alternative behavioral and policy assumptions.

3. Findings and Results

The theoretical model was solved and simulated within the Dynamic Stochastic General Equilibrium framework. The solution process began with the derivation of the first-order conditions from the optimization problems of households, firms, banks, and other economic agents. The deterministic steady-state values of the endogenous variables were then calculated by setting all structural shocks equal to zero. Subsequently, the nonlinear equilibrium conditions were log-linearized around the deterministic steady state using a first-order Taylor approximation and the Uhlig approach. The existence and uniqueness of a stable rational-expectations equilibrium were assessed through the Blanchard–Kahn conditions, after which the model was simulated in Dynare 5.4 using MATLAB R2023a.

The log-linearization procedure transformed the nonlinear DSGE model into the following linear rational-expectations system:

$$AE_t[z_{t+1}] = Bz_t + C\varepsilon_t$$

where z_t denotes the vector of 42 endogenous variables and ε_t represents the vector of seven exogenous structural shocks. These shocks included monetary-policy, technology, government-spending, preference, price-markup, banking-sector, and stock-market shocks.

The model satisfied the Blanchard–Kahn conditions. The state-transition matrix contained 18 eigenvalues outside the unit circle, exactly corresponding to the model's 18 forward-looking variables. Consequently, the number of unstable roots equaled the number of jump variables, indicating that the model possessed a unique and stable rational-expectations solution. This finding confirmed that the model was dynamically determinate and suitable for impulse-response analysis, forecast-error variance decomposition, and policy simulation.

The empirical data consisted of quarterly observations for the Iranian economy from 1991Q1 to 2023Q4, corresponding to 1370Q1–1402Q4 in the Iranian calendar. The sample contained 132 quarterly observations. The data were collected primarily from the official statistical databases of the Central Bank of the Islamic Republic of Iran, the Statistical Center of Iran, and the Tehran Stock Exchange.

The variables included real gross domestic product, private consumption, gross fixed capital formation, the consumer price index, liquidity, bank deposit rates, interbank rates, lending rates, the Tehran Stock Exchange Price Index, stock-market trading volume, bank deposits, and bank loans. Real GDP, private consumption, and investment were measured in billion rials at constant 2016 prices. The consumer price index was expressed using 2016 as the base year. Liquidity, bank deposits, bank loans, and trading volume were measured in billion rials, whereas interest rates were reported as annual percentages and converted into quarterly rates.

The data-processing procedure included seasonal adjustment using the X-13 ARIMA-SEATS method. Nominal monetary and financial variables were converted into real values using the GDP deflator or an appropriate price index. Variables measured in levels were transformed into natural logarithms, while inflation was computed through the logarithmic difference of the consumer price index. The cyclical components of the logged series were extracted using the Hodrick–Prescott filter with the conventional quarterly smoothing parameter:

$$\lambda = 1600$$

The processed series therefore represented deviations from their long-run trends and were directly comparable with the model's log-linearized endogenous variables.

The parameter-calibration strategy combined values reported in previous DSGE studies of the Iranian economy, estimates derived from Iranian macroeconomic and banking data, and moment-matching procedures. Calibration was considered suitable because the purpose of the analysis was to reproduce the principal dynamic properties of the Iranian economy and to conduct counterfactual monetary-policy experiments rather than estimate every structural parameter econometrically.

The parameters governing household preferences, production, price rigidity, monetary policy, reserve requirements, bank behavior, and interbank transactions are reported in Table 1.

Table 1. Calibrated Structural Parameters

Parameter	Symbol	Value	Interpretation	Calibration basis
Risk-aversion coefficient	σ	1.52	Inverse of intertemporal elasticity of substitution	Previous Iranian DSGE evidence
Inverse Frisch elasticity	σ	2.21	Inverse of labor-supply elasticity	Previous Iranian DSGE evidence
Discount factor	β	0.96	Household time preference	Previous Iranian DSGE evidence
Money-demand parameter	ϑ	2.24	Inverse interest elasticity of money demand	Previous Iranian DSGE evidence

Capital depreciation rate	δ	0.042	Quarterly depreciation of capital	Previous Iranian DSGE evidence
Intermediate-goods substitution	θ	4.33	Elasticity among differentiated goods	Previous Iranian DSGE evidence
Capital share	α	0.42	Capital contribution to production	Previous Iranian DSGE evidence
Technology persistence	ϱ_A	0.72	Persistence of productivity shocks	Research calculations
Price stickiness	φ_P	4.37	Rotemberg price-adjustment cost	Previous Iranian DSGE evidence
Interest-rate smoothing	ϱ_r	0.802	Persistence of the policy rate	Research calculations
Inflation response	ϱ_π	0.89	Policy response to inflation	Previous Iranian DSGE evidence
Output response	ϱ_y	0.36	Policy response to the output gap	Previous Iranian DSGE evidence
Liquidity response	ϱ_μ	0.82	Policy response to liquidity growth	Previous Iranian DSGE evidence
Reserve-inflation response	$\varphi_{rr\pi}$	0.062	Reserve-ratio response to inflation	Previous Iranian DSGE evidence
Reserve persistence	φ_{rrrr}	0.83	Persistence of reserve requirements	Research calculations
Bank stock-allocation parameter	ω	0.18	Sensitivity of bank equity investment	Research calculations
Interbank-supply sensitivity	γ_1	0.45	Lending response to interest-rate spreads	Research calculations
Interbank-demand sensitivity	γ_2	0.32	Borrowing response to funding gaps	Research calculations
Capital-loan parameter	ψ	0.12	Contribution of loans to capital formation	Research calculations
Interbank adjustment cost	φ_{IB}	0.08	Adjustment cost in interbank positions	Research calculations

The parameters ω , γ_1 , γ_2 , ψ , and φ_{IB} represented extensions specific to the present model. They were calibrated through the simulated method of moments by minimizing the discrepancy between selected empirical moments of Iranian banking and stock-market variables and their model-generated equivalents. These parameters enabled the model to reproduce the interaction between bank liquidity, interbank transactions, equity investment, and capital accumulation.

The first model-validation criterion involved comparing the means and standard deviations of the simulated variables with their empirical counterparts. Because the variables were detrended and expressed as logarithmic deviations from steady-state values, their means were expected to be close to zero.

Table 2. Comparison of Actual and Simulated Moments

Variable	Actual mean	Actual SD	Simulated mean	Simulated SD	Simulated/actual SD
Consumption, $\hat{c}_t$	0.0026	0.018	0.0031	0.021	1.17
Stock-market volume, $\hat{s}_t$	0.0019	0.028	0.0023	0.041	1.46
Output, $\hat{y}_t$	0.0042	0.035	0.0039	0.015	0.43
Money, $\hat{m}_t$	0.0051	0.021	0.0048	0.034	1.62
Inflation, $\hat{\pi}_t$	0.0027	0.037	0.0026	0.025	0.68
Bank deposits, $\hat{d}_t$	0.0038	0.024	0.0041	0.028	1.17
Bank loans, $\hat{b}_t$	0.0045	0.031	0.0042	0.026	0.84
Interbank rate, $\hat{r}_{IB}$	0.0033	0.019	0.0035	0.022	1.16

The means of the simulated variables were close to their actual means and approached zero, as expected for detrended series. The model reproduced the volatility of consumption, deposits, bank loans, inflation, and the interbank rate reasonably well. The simulated-to-actual standard-deviation ratios ranged from 0.43 for output to 1.62 for money.

The model underestimated output volatility, generating a standard deviation equal to approximately 43% of the actual value. In contrast, it somewhat overestimated the volatility of liquidity and stock-market trading volume. The simulated volatility of money was 1.62 times its observed volatility, whereas that of stock-market volume was 1.46 times its empirical counterpart. The relatively high simulated volatility of financial variables was consistent with the forward-looking nature of asset prices and financial portfolio decisions in the model.

The second validation exercise compared actual and simulated cross-correlations. The results are shown in Table 3.

Table 3. Actual and Simulated Correlations

Correlation	Actual	Simulated	Difference
Corr(Y_t , C_t)	0.847	0.812	-0.035
Corr(Y_t , I_t)	0.763	0.741	-0.022
Corr(Y_t , π_t)	-0.234	-0.198	0.036
Corr(Y_t , r_t)	-0.312	-0.287	0.025
Corr(Y_t , S_t)	0.425	0.391	-0.034
Corr(Y_t , B_t)	0.538	0.512	-0.026
Corr(C_t , S_t)	0.367	0.342	-0.025
Corr(π_t , r_t)	0.621	0.589	-0.032
Corr($rtIB$, rtB)	0.784	0.756	-0.028
Corr(D_t , B_t)	0.692	0.671	-0.021
Corr(S_t , r_t)	-0.456	-0.423	0.033

The simulated correlation coefficients closely approximated their empirical counterparts. The largest absolute discrepancy was only 0.036, observed for the output–inflation correlation. The strong positive simulated correlation between output and consumption, 0.812, reproduced the procyclical behavior of household expenditure. Similarly, the positive correlation between output and investment, 0.741, showed that capital expenditure moved strongly with economic activity.

The model also reproduced the negative relationships between output and inflation and between output and interest rates. The simulated output–inflation correlation was -0.198, compared with an actual value of -0.234. This pattern indicated the importance of supply-side and cost disturbances in the Iranian economy. The simulated correlation between inflation and the interest rate was positive at 0.589, showing that the policy authority generally responded to higher inflation by raising interest rates.

Of central importance to the study, the model reproduced the negative relationship between monetary-policy rates and stock-market activity. The simulated correlation between the interest rate and stock-market volume was -0.423, close to the observed coefficient of -0.456. The positive correlation of 0.756 between interbank and lending rates also demonstrated that the model captured the transmission of central bank policy through banks' funding costs and lending decisions.

The monetary-policy experiment involved a one-standard-deviation positive innovation to the interest-rate rule. The standard deviation of the shock was calibrated as

$$\sigma_r = 0.015$$

equivalent to an unexpected increase of approximately 1.5 annualized percentage points in the policy-related interest rate. The impulse-response functions showed that this contractionary monetary-policy shock affected real activity, inflation, the banking system, and the stock market.

Table 4. Impulse Responses to a Positive Monetary-Policy Shock

Variable	Impact response	Peak response	Peak period	Half-life	Return to steady state
Output, $\hat{y}_t$	-0.42%	-0.58%	2	2.1 quarters	4 quarters
Consumption, $\hat{c}_t$	-0.31%	-0.45%	2	2.3 quarters	5 quarters
Investment, $\hat{i}_t$	-0.67%	-0.89%	2	2.8 quarters	6 quarters
Inflation, $\hat{\pi}_t$	-0.18%	-0.34%	3	3.2 quarters	7 quarters
Stock return, $\hat{r}_{ts}$	-0.85%	-1.12%	1	1.4 quarters	4 quarters
Stock-market volume, $\hat{s}_t$	-0.73%	-0.96%	2	1.8 quarters	5 quarters
Bank deposits, $\hat{d}_t$	+0.28%	+0.41%	2	2.5 quarters	6 quarters
Bank loans, $\hat{b}_t$	-0.52%	-0.71%	3	3.1 quarters	7 quarters
Interbank rate, $\hat{r}_{IB}$	+0.62%	+0.78%	1	1.6 quarters	4 quarters
Loan interest rate, $\hat{r}_B$	+0.48%	+0.65%	2	2.2 quarters	5 quarters

The contractionary shock reduced output by 0.42% on impact. The reduction intensified during the following quarters and reached a maximum of 0.58% in the second period. Output gradually recovered thereafter and returned close to its steady-state level after approximately four quarters. Consumption fell by 0.31% immediately and reached a maximum contraction of 0.45% in the second period. Its half-life was approximately 2.3 quarters, and the effect largely disappeared after five quarters.

Investment showed a stronger and more persistent reaction than consumption or output. It declined by 0.67% upon impact and reached a maximum reduction of 0.89% in the second period. The larger investment response reflected the sensitivity of capital formation to financing costs, Tobin's Q , expected profitability, and the availability of bank credit. Investment required approximately six quarters to return to its long-run equilibrium.

Inflation declined by 0.18% on impact, but its maximum response occurred with a delay. The largest decline, 0.34%, was reached in the third period, and the inflation response persisted for approximately seven quarters. This delayed pattern was consistent with nominal rigidity and the New Keynesian Phillips curve, under which monetary-policy effects on the general price level operate through changes in marginal cost, demand, and expected inflation.

The stock market reacted more rapidly than the real economy. Stock returns declined by 0.85% immediately and reached their maximum negative response of 1.12% in the first quarter following the shock. Stock-market trading volume fell by 0.73% on impact and by a maximum of 0.96% in the second period. Stock returns had a half-life of only 1.4 quarters, compared with 2.1 quarters for output and 2.8 quarters for investment. This result indicated that forward-looking financial prices incorporated new monetary-policy information more rapidly than real-sector variables.

Bank deposits increased by 0.28% immediately and reached a maximum increase of 0.41% in the second period. The increase reflected a portfolio reallocation by households from equities and other relatively risky investments toward interest-bearing bank deposits. Despite the deposit expansion, bank loans declined by 0.52% on impact and

reached a peak reduction of 0.71% in the third period. This divergence between deposits and loans indicated that monetary tightening changed both the composition and allocation of bank balance sheets.

The interbank rate increased by 0.62% immediately and reached a peak of 0.78% in the first period. The commercial bank lending rate rose by 0.48% on impact and by a maximum of 0.65% in the second period. The faster response of the interbank rate demonstrated that the interbank market served as the initial transmission node through which central bank policy affected the broader banking system.

The impulse responses identified several interconnected monetary-policy transmission channels. Through the conventional interest-rate channel, the increase in the policy-related deposit rate raised the interbank rate and subsequently the lending rate. Higher borrowing costs reduced the demand for investment loans and consumption credit. Investment fell more sharply than consumption because investment decisions were directly influenced by financing costs, expected returns, and the shadow value of capital. The combined contraction in consumption and investment reduced aggregate demand and output.

The asset-price channel operated immediately. A higher policy rate increased the discount rate applied to expected future dividends, while weaker output and investment lowered expected corporate earnings. Consequently, stock returns fell sharply. This mechanism can be represented by the negative valuation effect:

$$\partial P_t^s / \partial r_t^D < 0$$

The reduction in stock returns was accompanied by a decline in stock-market trading volume. The response reflected a wealth effect because declining stock values reduced household financial wealth and risk-taking capacity. It also reflected a substitution effect because higher deposit rates increased the relative attractiveness of bank deposits compared with equity holdings.

The bank-lending channel amplified the contractionary effect. Although bank deposits increased, bank lending declined because the cost of interbank and wholesale funding increased, firms reduced their demand for credit, and banks found interbank lending relatively more profitable. The observed combination of higher deposits and lower loans therefore indicated that an expansion in banks' deposit base did not necessarily translate into greater credit supply during monetary tightening.

The interbank-market channel represented an important feature of the Iranian transmission mechanism. The higher policy rate increased the interbank rate by 0.62% on impact. At the same time, demand for interbank borrowing declined because short-term funding became more expensive, whereas banks holding excess liquidity increased their supply of funds to the interbank market to benefit from the higher return. This reallocation reduced the resources directed toward private-sector lending and bank investment in the stock market.

Banks' choice between interbank lending and equity investment was governed by the expected return differential:

$$S_t^{\text{bank}} = \omega \{ [E_t(R_{t+1}^s) - r_t^{\text{IB}}] / r_t^{\text{IB}} \} [(1 - \theta_t) D_t + IB_t - B_t]$$

As r_t^{IB} increased and expected stock returns declined, banks reduced their allocation to equities. The resulting fall in institutional stock demand further depressed stock prices and market activity.

Forecast-error variance decomposition was used to quantify the contribution of each structural shock to fluctuations in the principal macroeconomic and financial variables.

Table 5. Forecast-Error Variance Decomposition

Variable	Monetary policy	Technology	Government spending	Preference	Price markup	Banking	Stock market
Output	18.4%	42.3%	15.2%	8.7%	6.1%	5.8%	3.5%
Consumption	14.2%	28.6%	8.4%	31.5%	4.2%	7.3%	5.8%

Investment	22.7%	35.1%	12.3%	6.8%	3.9%	12.4%	6.8%
Inflation	25.3%	18.7%	9.4%	5.2%	28.6%	8.1%	4.7%
Stock return	31.2%	14.5%	6.3%	12.8%	5.4%	9.2%	20.6%
Stock-market volume	27.8%	12.3%	5.8%	10.4%	4.7%	14.6%	24.4%
Bank loans	24.6%	21.4%	11.2%	7.3%	5.1%	22.8%	7.6%
Interbank rate	38.4%	9.2%	4.5%	3.8%	6.7%	31.2%	6.2%

Technology shocks accounted for the largest proportion of output fluctuations, explaining 42.3% of its forecast-error variance. Monetary-policy shocks nevertheless explained a substantial 18.4%, while government-spending shocks accounted for 15.2%. Consumption was driven primarily by preference shocks, which explained 31.5%, followed by technology shocks at 28.6%.

Investment fluctuations were mainly explained by technology shocks at 35.1%, but monetary-policy shocks contributed 22.7%, demonstrating the sensitivity of capital formation to financing conditions. Banking shocks accounted for a further 12.4% of investment volatility.

Inflation variability was explained primarily by price-markup shocks and monetary-policy shocks. Price-markup disturbances accounted for 28.6%, whereas monetary-policy shocks explained 25.3%. Technology shocks contributed 18.7%. These results indicated that both cost-side pressures and policy reactions were central to inflation dynamics.

Monetary-policy shocks were the single most important source of stock-return variability, explaining 31.2%. Stock-market-specific shocks accounted for 20.6%, while technology shocks explained 14.5%. Similarly, monetary-policy disturbances explained 27.8% of the variance in trading volume, compared with 24.4% for stock-market-specific shocks and 14.6% for banking-sector shocks. Thus, stock-market fluctuations were not solely driven by idiosyncratic capital-market factors; monetary and banking conditions played an equally important role.

Bank-loan fluctuations were explained jointly by monetary-policy shocks, banking shocks, and technology shocks. Their respective contributions were 24.6%, 22.8%, and 21.4%. The interbank rate was particularly policy-sensitive: monetary-policy shocks explained 38.4% of its variance, and banking-sector shocks accounted for 31.2%. Together, these shocks explained almost 70% of interbank-rate fluctuations.

The robustness of the model was evaluated by varying selected structural parameters within economically plausible ranges. The analysis focused on the maximum output response to a contractionary monetary-policy shock.

Table 6. Sensitivity of the Output Response to Parameter Changes

Parameter	Baseline	Low value	Output response at low value	High value	Output response at high value
Inflation response, $q\pi$	0.89	0.50	-0.31%	1.50	-0.68%
Output response, qy	0.36	0.10	-0.52%	0.60	-0.35%
Price stickiness, ϕp	4.37	2.00	-0.28%	8.00	-0.71%
Bank stock allocation, ω	0.18	0.05	-0.38%	0.35	-0.54%
Interbank-supply sensitivity, γl	0.45	0.20	-0.36%	0.70	-0.51%

The qualitative results remained unchanged across all parameter configurations. A positive monetary-policy shock consistently reduced output, investment, stock returns, and stock-market activity. Thus, the contractionary direction of the responses was not dependent on a particular calibration.

Increasing the monetary authority's inflation-response coefficient from 0.50 to 1.50 increased the maximum output contraction from 0.31% to 0.68%. A stronger inflation response generated larger interest-rate adjustments and therefore amplified the effects on aggregate demand and financial conditions.

A higher output-response coefficient moderated the output contraction. When ϕ_y increased from 0.10 to 0.60, the output response declined in magnitude from -0.52% to -0.35% . This result indicated that a monetary-policy rule that placed greater weight on the output gap partially stabilized real economic activity.

Price rigidity substantially influenced the magnitude of the monetary-policy effect. When ϕ_p increased from 2.00 to 8.00, the output contraction rose from 0.28% to 0.71%. Greater price stickiness prevented rapid price adjustment, causing a larger proportion of the policy shock to be absorbed through quantities, employment, and production.

The bank stock-allocation parameter also affected the strength of policy transmission. Increasing ω from 0.05 to 0.35 increased the output decline from 0.38% to 0.54%. A higher value of ω strengthened the connection between bank balance sheets and the stock market, allowing declining equity returns and rising interbank rates to generate larger portfolio reallocations.

Similarly, increasing the sensitivity of interbank supply from 0.20 to 0.70 amplified the output decline from 0.36% to 0.51%. This result confirmed that the interbank market influenced both the speed and magnitude of monetary-policy transmission.

Table 7. Summary of Key Findings

Finding	Empirical result	Magnitude	Interpretation
Output contraction	Monetary tightening reduced real GDP	-0.58% at peak	Higher financing costs weakened aggregate demand
Stock-market decline	Stock returns responded negatively to higher rates	-1.12% at peak	Higher discount rates and lower expected dividends reduced valuations
Banking reallocation	Deposits increased while loans decreased	$+0.41\%$ and -0.71%	Funds shifted toward deposits and interbank assets rather than private credit
Interbank transmission	The interbank rate amplified the policy shock	$+0.78\%$ at peak	Higher short-term funding costs transmitted policy through bank balance sheets
Inflation reduction	Inflation fell with a delay	-0.34% in period 3	Nominal rigidity delayed the price response
Rapid financial response	Stock variables adjusted faster than output	1.4 vs. 2.1-quarter half-life	Forward-looking asset prices incorporated policy information rapidly
Monetary contribution to equity volatility	Policy shocks explained a large share of stock fluctuations	31.2% of returns; 27.8% of volume	Stock-market dynamics were strongly policy-sensitive
Model validation	Simulated moments and correlations approximated actual data	Maximum correlation discrepancy: 0.036	The model reproduced major Iranian macro-financial co-movements

Overall, the findings showed that contractionary central bank policy reduced economic activity and exerted a particularly rapid and substantial negative effect on the stock market. Stock returns reacted faster and more

strongly than output, consumption, and inflation. The banking sector did not merely transmit the policy rate mechanically; it reallocated resources among deposits, private loans, interbank lending, and equity investment.

The results also demonstrated that the interbank market constituted a major transmission mechanism. Higher interbank rates increased banks' opportunity cost of investing in equities and supplying private-sector credit. Consequently, contractionary policy reduced both bank lending and bank participation in the capital market, reinforcing the initial decline in stock prices and investment.

The moment comparisons, correlation analysis, impulse responses, and sensitivity tests collectively supported the validity of the model. Although the model modestly overestimated the volatility of liquidity and stock-market volume and underestimated output volatility, it reproduced the main empirical co-movements of the Iranian economy. Most importantly, it captured the observed negative relationship between interest rates and stock-market activity and demonstrated that monetary-policy shocks accounted for a substantial proportion of stock-return and trading-volume fluctuations.

4. Discussion and Conclusion

The present study examined the effects of central bank policy on Iran's stock market by developing a New Keynesian dynamic stochastic general equilibrium model that incorporated households, firms, commercial banks, the interbank market, the government, the monetary authority, and the stock market. The results showed that a contractionary monetary-policy shock produced simultaneous reductions in output, consumption, investment, inflation, bank lending, stock returns, and stock-market trading volume, while increasing bank deposits, the interbank interest rate, and the lending rate. The findings also demonstrated that stock-market variables responded more rapidly than real-sector variables and that the interbank market and banks' portfolio-allocation decisions significantly amplified the transmission of monetary policy. The close correspondence between the simulated and actual moments and correlations indicated that the model reproduced the principal macro-financial relationships observed in Iran with reasonable accuracy.

The impulse-response analysis showed that a positive interest-rate shock reduced output by 0.42% on impact and by a maximum of 0.58% in the second period. Consumption declined by 0.31% immediately and reached a peak contraction of 0.45%, whereas investment fell by 0.67% on impact and 0.89% at its maximum. These results are consistent with the conventional New Keynesian interest-rate channel. When the central bank increases the policy-related interest rate, the real cost of borrowing rises, intertemporal consumption is postponed, and the expected profitability of investment projects declines. The comparatively larger response of investment reflected its greater sensitivity to bank lending rates, credit availability, Tobin's Q , and expectations of future demand. The finding is consistent with evidence from Iran showing that banking-resource shocks significantly affect both consumption and investment and that investment is particularly vulnerable to changes in the availability and cost of bank finance [16]. It is also aligned with research demonstrating that monetary-policy rules exert meaningful effects on production and inflation in Iran and that interest-rate-based policy rules can produce stronger real-sector responses than simple money-growth rules [12].

The contraction in output also supports earlier Iranian DSGE evidence regarding the role of banks in the propagation of monetary shocks. Rafiei and colleagues showed that monetary-policy changes affect bank performance and balance-sheet decisions, which then transmit the shock to the real economy [15]. The present results extend this finding by indicating that the reduction in output did not occur solely through the conventional household consumption channel. It also arose through declining investment loans, higher interbank funding costs,

lower bank lending, reduced bank participation in the stock market, and weaker expected firm profits. This broader transmission mechanism is particularly relevant in Iran because firms rely heavily on banking facilities to finance working capital and fixed investment.

The results further showed that inflation declined by 0.18% on impact and reached its maximum reduction of 0.34% in the third period. The delayed response of inflation, compared with stock returns and output, is consistent with the presence of nominal rigidities and Rotemberg-type price-adjustment costs. Firms do not immediately revise prices after a policy shock because price changes are costly, while changes in demand, marginal cost, credit conditions, and inflation expectations are transmitted gradually. Consequently, output and financial variables react before the full disinflationary effect becomes visible. This pattern is consistent with Iranian evidence that Taylor-type monetary rules affect inflation with a lag and that the effectiveness of interest-rate policy depends on the central bank's responses to inflation, output, and liquidity growth [12]. It is also compatible with the broader finding that monetary-policy volatility shocks can generate persistent real and nominal effects rather than only short-lived interest-rate adjustments [6].

One of the most important findings was the rapid and comparatively strong response of the stock market. Stock returns declined by 0.85% immediately and reached their maximum negative response of 1.12% in the first period. Stock-market trading volume fell by 0.73% on impact and by 0.96% at its peak. The half-life of the stock-return response was only 1.4 quarters, compared with 2.1 quarters for output and 2.8 quarters for investment. This result confirms the forward-looking character of stock prices. Investors respond immediately to higher discount rates, weaker expected dividends, reduced credit availability, and anticipated declines in corporate profitability. Real production and investment decisions, in contrast, involve contracts, planning, financing arrangements, and adjustment costs that delay their response.

The negative stock-market reaction is consistent with international evidence showing that contractionary monetary policy reduces equity valuations by increasing the required return on stocks and lowering expectations of future economic activity [3]. It is also aligned with cross-country evidence from African markets demonstrating that monetary policy significantly influences stock-market performance, although the strength of the effect depends on financial structure and institutional conditions [4]. Evidence from India similarly indicates that monetary-policy variables maintain dynamic linkages with stock markets, particularly when structural breaks and regime changes are taken into account [5]. The present study confirms that such linkages are also substantial in Iran, despite the country's regulated interest-rate environment and bank-dominated financing system.

The reduction in stock-market volume can be explained through both substitution and wealth mechanisms. Higher deposit and interbank rates increase the return on relatively safe financial assets, making equities less attractive. At the same time, declining stock prices reduce household financial wealth and investors' risk-taking capacity. These mechanisms are consistent with evidence that monetary policy affects not only stock prices but also stock-market liquidity and trading participation [2]. The results also correspond with studies of risk aversion and macroeconomic portfolio choice, which show that changes in perceived risk and expected returns lead investors to rebalance among money, deposits, stocks, and other assets [20]. Under increased uncertainty, investors may respond to monetary tightening by reducing exposure to volatile equities and increasing holdings of deposits or other lower-risk assets [19].

The observed stock-market response is also consistent with previous DSGE research on the Tehran Stock Exchange. Rahmani and colleagues found that monetary and financial policies exert significant effects on Iranian stock-market variables [22]. The present study advances that evidence by identifying the banking and interbank

mechanisms underlying the response. Likewise, research on stock-price bubbles in Tehran showed that monetary and macroeconomic shocks can cause stock prices to deviate from levels implied by fundamentals [17]. In the current model, tighter monetary policy reduced both the fundamental value of shares, through lower expected dividends, and speculative demand, through higher alternative returns and reduced liquidity. Therefore, the decline in stock prices reflected both a fundamental valuation adjustment and a portfolio-reallocation process.

The findings showed that bank deposits increased by 0.28% on impact and by a maximum of 0.41%, while bank loans declined by 0.52% immediately and by 0.71% at their peak. The simultaneous increase in deposits and decrease in loans is important because it demonstrates that greater deposit inflows do not necessarily generate greater private-sector credit during a contractionary policy episode. Higher deposit rates attracted household savings, but banks faced higher interbank and funding costs, weaker loan demand, and more profitable opportunities in short-term interbank lending. As a result, banks reallocated resources away from private loans and equity investment.

This pattern supports the bank-lending and balance-sheet channels of monetary policy. Iranian research has shown that monetary-policy shocks significantly affect bank performance and lending behavior [15]. The result is also consistent with studies emphasizing the role of the interbank market in transmitting financial shocks to credit, output, and other macroeconomic variables [13]. Furthermore, recent evidence concerning liquidity risk in banks listed on the Tehran Stock Exchange suggests that banks' responses may change across different liquidity regimes, which reinforces the importance of explicitly modeling bank funding gaps and portfolio choices [11]. Governance structures and institutional incentives may also shape the extent to which banks respond to policy tightening through reduced lending or altered risk-taking [10].

The interbank rate increased by 0.62% on impact and reached a maximum response of 0.78% in the first period. The lending rate rose by 0.48% immediately and peaked at 0.65% in the second period. These results indicate that the interbank market was the first and one of the strongest transmission points between the central bank and commercial banks. The rapid response of the interbank rate reflected tighter liquidity conditions and the immediate repricing of short-term bank funding. Commercial bank lending rates adjusted subsequently as banks passed higher funding costs to firms and households.

The importance of this channel is consistent with theoretical evidence that central bank policies concerning reserves and interest payments alter interbank lending incentives and bank portfolio decisions [7]. It is also aligned with the proposition that disruptions or high costs in the interbank market can intensify the contractionary effects of monetary policy by limiting liquidity redistribution among banks [8]. In the Iranian context, Rashidi and Maddah found that the interbank interest rate significantly affects stock prices and that the strength of this relationship can vary across major political and institutional periods [14]. The present study provides a structural explanation for this relationship: a higher interbank rate increases the opportunity cost of bank stock investment, reduces equity demand, raises loan pricing, and redirects liquidity toward interbank placements.

The variance-decomposition results reinforced the importance of monetary policy. Monetary-policy shocks explained 31.2% of stock-return variability and 27.8% of stock-market volume variability. These contributions exceeded those of technology, government spending, preference, price-markup, and banking shocks considered individually. Stock-market-specific shocks nevertheless explained 20.6% of stock returns and 24.4% of trading volume, indicating that monetary policy was highly influential but not the sole source of market fluctuations. Political uncertainty, sanctions, exchange-rate instability, speculative behavior, and shifts in risk perception may also generate independent financial-market disturbances.

This interpretation is supported by evidence that political uncertainty contributes to stock-market fluctuations in Iran, particularly when domestic events interact with international political changes [18]. Sanctions also generate spillovers among the stock, foreign-exchange, and gold markets, which may alter the magnitude and direction of monetary-policy effects [21]. These factors help explain why stock-market-specific shocks retained a substantial contribution in the variance decomposition even after monetary, banking, and macroeconomic disturbances were included in the model.

Technology shocks accounted for 42.3% of output variability, while monetary-policy shocks explained 18.4%. This result indicates that productivity and supply-side conditions remained the dominant source of real business-cycle fluctuations, although monetary policy had a meaningful role. For inflation, price-markup shocks explained 28.6% and monetary-policy shocks 25.3%, suggesting that inflation in Iran reflects both cost-side pressures and policy conditions. The interbank rate was especially sensitive to monetary policy and banking shocks, which jointly explained 69.6% of its variance. This result confirmed that the interbank market is jointly determined by central bank actions and banking-sector liquidity conditions rather than by real-sector shocks alone.

The sensitivity analysis demonstrated that the qualitative results were robust to alternative parameter values. A stronger inflation response in the monetary-policy rule amplified the contraction in output, whereas a stronger response to the output gap moderated it. Greater price rigidity increased the real effects of monetary tightening because firms were less able to adjust prices and therefore responded more through production and employment. Higher values of the bank stock-allocation parameter strengthened the linkage between banking conditions and the stock market, while greater sensitivity of interbank supply amplified the transmission of the policy shock. These results indicate that the effects of monetary policy depend not only on the size of the initial rate change but also on the design of the policy rule and the institutional structure of banking and financial markets.

Overall, the study confirmed that monetary policy in Iran operates through a network of interconnected real and financial channels. The stock market responded immediately through valuation and portfolio-substitution effects, the interbank market transmitted the initial policy change to bank funding costs, banks reallocated resources away from credit and equities, and weaker lending and investment reduced output and corporate profitability. The findings therefore support a macro-financial interpretation of monetary transmission in which the stock market and banking sector are active components of the adjustment process rather than passive outcomes of changes in inflation and output.

The study was subject to several limitations. First, the model represented households, firms, and banks through representative agents and therefore did not capture heterogeneity in investor risk preferences, firm financing constraints, bank ownership, capitalization, liquidity, or exposure to stock-market risk. Second, several banking and portfolio parameters were calibrated rather than directly estimated because sufficiently long and consistent quarterly series were unavailable. Third, the model treated some institutional features, including regulated interest rates, directed credit, sanctions, exchange-rate interventions, and informal financial activity, in a simplified manner. Fourth, the use of the Hodrick–Prescott filter may have influenced the estimated cyclical properties of the data, especially near the beginning and end of the sample. Fifth, the model was solved using a first-order approximation and therefore could not fully capture nonlinear responses, occasionally binding constraints, asymmetric policy effects, or shifts between high- and low-inflation regimes.

Future research should develop heterogeneous-agent DSGE models that distinguish between borrowing and saving households, small and large firms, public and private banks, and different classes of institutional and individual investors. Subsequent studies could estimate the model using Bayesian methods and compare the

resulting posterior distributions with the calibrated values used in the present analysis. Researchers should also incorporate exchange-rate dynamics, sanctions, oil-price shocks, fiscal dominance, and central bank financing of government deficits more explicitly. Nonlinear or regime-switching DSGE models could be used to test whether monetary-policy transmission differs during periods of high inflation, financial stress, sanctions intensification, stock-market bubbles, or interbank liquidity shortages. Future analyses could additionally compare interest-rate, liquidity-growth, reserve-requirement, and macroprudential policy rules under alternative stabilization objectives.

The central bank should evaluate the effects of monetary-policy decisions on the stock market, bank balance sheets, and interbank liquidity alongside their conventional effects on inflation and output. Policy-rate and reserve-requirement changes should be implemented gradually and communicated clearly when financial markets are fragile, because equity prices react more quickly than real economic variables. The monetary authority should monitor the allocation of bank resources among private loans, interbank lending, reserves, and equity holdings to prevent policy tightening from producing an excessive withdrawal of credit from productive activities. Improving interbank-market depth, transparency, and access could reduce uneven liquidity pressures across banks. Coordination between monetary, banking-supervision, and capital-market authorities would also help contain destabilizing portfolio reallocations and preserve the flow of financing to firms during periods of monetary contraction.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

Acknowledgments

Authors thank all participants who participate in this study.

Conflict of Interest

The authors report no conflict of interest.

Funding/Financial Support

According to the authors, this article has no financial support.

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