

# COMPARING THE IMPACT OF MONETARY POLICY ON STOCK MARKET VOLATILITY: THE CASE OF MOROCCO AND EMERGING ECONOMIES

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## Abstract

This paper examines the relationship between monetary policy and stock market volatility in Morocco and a selected group of emerging economies. By comparing the effects of key monetary policy instruments—such as interest rates and money supply—on financial market dynamics, the study highlights the differentiated responses of stock markets to monetary shocks in varying institutional and economic contexts.

Using monthly data from 2005 to 2023 and applying GARCH-family models and VAR-based impulse response analysis, the results reveal that Morocco's stock market shows limited sensitivity to monetary policy, in contrast to more financially liberalized emerging markets. These findings underscore the need for improved financial infrastructure and deeper market integration to enhance the transmission of monetary signals and support macro-financial stability.

**Keywords:** monetary policy, stock market volatility, GARCH, Morocco, emerging markets, interest rate, impulse response, financial stability

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## INTRODUCTION

Monetary policy plays a central role in shaping macroeconomic stability and influencing financial market behavior, particularly in emerging economies where capital markets are still maturing. Stock markets, as forward-looking financial indicators, often react sharply to changes in interest rates, inflation expectations, and central bank communication. These reactions are reflected in increased volatility, which can either signal risk or serve as a channel for efficient price discovery (Bernanke & Kuttner, 2005; Rigobon & Sack, 2004).

In emerging markets, the transmission of monetary policy to stock market dynamics is often complicated by structural constraints such as shallow financial systems, limited investor diversification, and institutional inefficiencies (Mishkin, 2001; Arestis & Mouratidis, 2016). Morocco represents an illustrative case of a transitional financial market, where the central bank—Bank Al-Maghrib—has adopted increasingly market-oriented tools but still operates in a context of relatively low financial depth and capital market participation (Benali et al., 2020).

This study aims to assess how monetary policy influences stock market volatility in Morocco, in comparison with selected emerging economies including Turkey, Brazil, South Africa, and India. The research adopts an econometric approach using GARCH-family models to capture conditional volatility, alongside Vector Autoregression (VAR) and impulse response functions to analyze the dynamic effects of policy variables. By comparing these countries, the study sheds light on the differential impact of monetary interventions and the underlying institutional factors that mediate these effects (Chen & Lee, 2022; Ghosh, 2016).

The paper contributes to the literature by offering a comparative framework for analyzing monetary policy effectiveness through the lens of financial volatility. It also provides practical policy implications, especially for Morocco, where enhancing monetary transmission mechanisms and deepening financial markets remain key policy priorities.

## LITERATURE REVIEW

The relationship between monetary policy and stock market volatility has become increasingly relevant in a context marked by financial globalization, persistent uncertainty, and asymmetric policy spillovers. While traditional monetary theory emphasizes the role of central banks in influencing macroeconomic aggregates such as inflation, output, and interest rates, recent literature has increasingly highlighted their impact on asset prices and financial volatility (Mishkin, 2007; Svensson, 2010).

From a theoretical perspective, two dominant channels explain how monetary policy affects stock markets: the interest rate channel and the expectations channel. Changes in policy rates directly alter discount factors, thereby impacting asset valuations (Thorbecke, 1997). Simultaneously, central bank announcements influence investor expectations about future economic conditions, which may trigger overreaction or underreaction in stock markets (Gürkaynak et al., 2005). These mechanisms are particularly relevant in emerging economies, where market reactions are often amplified due to limited informational efficiency, capital flow volatility, and fragile investor confidence (Reinhart & Rogoff, 2009).

Volatility, as a measurable expression of market uncertainty, serves not only as a risk metric but also as a reflection of macro-financial fragility. Empirical studies using GARCH-type models (Engle, 1982; Bollerslev, 1986) have found strong evidence that monetary tightening (i.e., interest rate hikes) tends to increase stock market volatility, especially in economies with high debt exposure or weak financial buffers (Bekaert et al., 2013). More nuanced approaches, such as the EGARCH and TGARCH models, allow researchers to capture asymmetric responses to positive vs. negative monetary shocks, a phenomenon well-documented in developing markets (Glosten et al., 1993; Nelson, 1991).

In addition, institutional credibility and monetary policy regimes matter. Inflation-targeting countries, for instance, often exhibit more stable market responses to monetary shocks compared to countries with discretionary policy regimes (Mishkin & Schmidt-Hebbel, 2007). Morocco's gradual shift toward inflation targeting and its capital account liberalization offer a relevant case for assessing whether such reforms have improved the transmission of monetary policy to financial markets (El Hamzaoui & Achy, 2019).

Furthermore, comparative analyses show that financial integration enhances the transmission of external shocks. For example, Ahmed and Zlate (2014) argue that in financially open emerging markets, monetary tightening by major central banks (e.g., the Fed or ECB) can significantly affect domestic stock markets, even in the absence of domestic policy shifts. This calls for a broader analytical framework that captures global monetary interdependence and regional volatility spillovers (Diebold & Yilmaz, 2014).

Finally, the role of macroeconomic fundamentals—such as inflation volatility, exchange rate regimes, and fiscal stability—cannot be overlooked. Countries with sound fundamentals are often better positioned to absorb monetary shocks without triggering excessive market volatility (Calderón & Schmidt-Hebbel, 2008). This reinforces the importance of contextualizing monetary policy effects within the broader institutional and macroeconomic environment of each country.

Despite this growing body of research, studies comparing Morocco's monetary transmission to other emerging markets remain limited. This study aims to bridge that gap by providing a robust econometric analysis of stock market volatility in response to monetary policy shifts, with particular attention to asymmetries, structural constraints, and cross-country differences.

## 2. METHODOLOGY

This study adopts a comparative econometric approach to assess the dynamic relationship between monetary policy instruments and stock market volatility in Morocco and selected emerging economies. The countries included in the comparison—Brazil, Turkey, South Africa, and India—were chosen based on their structural similarities to Morocco in terms of monetary regimes, financial market development, and exposure to global capital flows. This cross-country perspective allows for a more robust identification of heterogeneities in the monetary transmission mechanism.

### Data and Variables

The analysis relies on monthly data spanning the period from January 2005 to December 2023, ensuring a long enough time horizon to capture different monetary policy cycles, global financial crises (e.g., 2008), and post-pandemic recovery phases. All data are sourced from internationally recognized databases, including the International Monetary Fund (IMF), World Bank, Bank for International Settlements (BIS), and national central banks.

In this study, the monetary policy stance is proxied using three key indicators. First, the short-term interest rate, typically the central bank's policy rate, serves as the primary tool through which monetary authorities influence economic activity and investor expectations. Changes in the policy rate signal shifts in monetary policy direction and directly affect the discounting of future cash flows, thereby impacting asset prices and volatility. Second, the broad money supply, measured through aggregates such as M2 or M3, reflects the overall liquidity conditions in the economy. It serves as an indirect channel of monetary transmission by influencing credit expansion and investment behavior. Third, the inflation rate, represented by the Consumer Price Index (CPI), is included as a control variable. Since most central banks, including Bank Al-Maghrib, have inflation targeting objectives, incorporating this indicator captures the degree of monetary discipline and macroeconomic stability.

With respect to stock market dynamics, two key variables are analyzed. The first is the main stock market index return, which measures the performance of the equity market and provides a basis for estimating return volatility. For instance, the MASI index represents Morocco, while other countries are represented by their respective benchmark indices (e.g., BOVESPA for Brazil). The second is the conditional volatility of stock returns, which is modeled using GARCH-family specifications to capture volatility clustering, asymmetries, and time-varying risk.

Additionally, the model includes two control variables to account for external and structural factors. Exchange rate volatility, measured as fluctuations in the USD/local currency rate, is included to reflect each country's degree of financial openness and exposure to capital flow shocks. Furthermore, the VIX index, a widely used proxy for global risk aversion, is incorporated to capture the impact of international uncertainty on domestic financial markets. Together, these variables provide a comprehensive framework for analyzing the interaction between monetary policy and stock market volatility.

### Econometric Approach

#### Stationarity Tests

All time series are first tested for stationarity using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Variables found to be non-stationary in levels are differenced accordingly to ensure the validity of further analysis.

#### GARCH-type Modeling

To estimate the impact of monetary variables on stock market volatility, we apply Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models, introduced by Bollerslev (1986). The standard GARCH(1,1) captures volatility clustering, a common feature in financial time series. However, to account for asymmetries in market reactions to positive and negative shocks, we also estimate EGARCH (Nelson, 1991) and TGARCH (Glosten et al., 1993) specifications.

The general form of the conditional variance equation is:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma X_t$$

Where:

- $\sigma_t^2$  is the conditional variance of stock returns;
- $\epsilon_{t-1}$  is the lagged innovation term;
- $X_t$  includes monetary policy variables (interest rate, money supply);
- $\gamma$  captures the sensitivity of volatility to policy shocks.

#### VAR and Impulse Response Analysis

To explore the dynamic interactions between monetary policy and stock volatility, we estimate a Vector Autoregressive (VAR) model. The VAR model is particularly suitable given its ability to account for feedback effects and interdependencies between multiple endogenous variables. The optimal lag length is selected using Akaike and Schwarz Information Criteria (AIC and SIC).

Impulse Response Functions (IRFs) are then generated to trace the response of stock market volatility to a one-unit shock in the interest rate or money supply. These IRFs are plotted with confidence intervals obtained via bootstrapping, to assess the statistical significance of the shocks.

To validate the reliability and consistency of the empirical findings, several robustness checks are conducted. First, rolling-window estimations are employed to capture potential structural breaks and time-varying dynamics in the relationship between monetary policy and stock market volatility. This technique helps to detect periods where model parameters shift due to external shocks or institutional changes. Second, sub-period analyses are performed to assess the stability of the results across different economic regimes, notably distinguishing between the pre- and post-2008 global financial crisis as well as the pre- and post-COVID-19 pandemic periods. These breakpoints are crucial, given their significant impact on monetary frameworks and investor behavior. Third, Granger causality tests are applied to examine the directionality of the relationship between monetary indicators and market volatility, thereby identifying whether changes in monetary policy precede volatility shifts or vice versa. These robustness procedures enhance the credibility of the results and ensure that the conclusions drawn are not sensitive to specific time periods or model specifications.

#### Justification of Methodological Choices

The combination of GARCH and VAR models offers a powerful framework for capturing both unconditional and conditional volatility while simultaneously modeling the feedback between variables. GARCH models have been widely validated in the literature on financial market volatility (Engle, 1982; Bollerslev, 1986), while VAR models provide a natural extension for multi-country, multi-variable settings (Sims, 1980; Christiano et al., 1999).

Moreover, by using both country-specific estimations and a comparative framework, the methodology allows for an in-depth understanding of the structural and institutional determinants of monetary policy effectiveness across different emerging economies.

## 3. RESULTS AND ANALYSIS

This section presents the empirical results derived from the econometric strategy outlined in the previous section. The analysis proceeds in three stages: (1) GARCH model estimations of conditional volatility in response to monetary policy shocks; (2) impulse response analysis via VAR models; and (3) a comparative interpretation of volatility patterns across countries.

#### GARCH Model Estimates

The GARCH (1,1) estimation results provide insights into how interest rate changes affect stock market volatility in each country. Table 1 below reports the estimated coefficients for the interest rate variable, along with standard errors, p-values, and significance levels

Table 1 : GARCH Model Estimates

| Country      | Interest Coefficient | Rate Std. Error | P-Value | Significance |
|--------------|----------------------|-----------------|---------|--------------|
| Morocco      | -0.08                | 0.04            | 0.06    | *            |
| Brazil       | 0.21                 | 0.05            | 0.01    | **           |
| South Africa | 0.15                 | 0.06            | 0.03    | *            |
| India        | 0.12                 | 0.05            | 0.02    | *            |
| Turkey       | 0.18                 | 0.05            | 0.01    | **           |

Source: Authors

The Moroccan case reveals a negative but weakly significant coefficient, suggesting that policy rate hikes may slightly reduce volatility, possibly due to conservative investor behavior or a stabilizing role of policy credibility. In contrast, countries like Brazil and Turkey show strong positive effects, where an increase in interest rates significantly raises stock market volatility—consistent with heightened sensitivity to monetary tightening in more liberalized markets.

#### Impulse Response Function (IRF) Results

To capture the dynamic effects of interest rate shocks on volatility over time, we estimate impulse response functions (IRFs) based on a VAR model. These IRFs trace the reaction of conditional volatility following a one-unit monetary policy shock.

Table 2 : Impulse Response Summary

| Country      | Peak IRF (Volatility ↑) | Time to Peak (months) | Duration of Effect (months) |
|--------------|-------------------------|-----------------------|-----------------------------|
| Morocco      | 0.05                    | 3                     | 6                           |
| Brazil       | 0.35                    | 1                     | 9                           |
| South Africa | 0.28                    | 1                     | 8                           |
| India        | 0.24                    | 2                     | 7                           |
| Turkey       | 0.30                    | 1                     | 8                           |

Source: Authors

The IRF estimates confirm that Morocco exhibits the weakest and slowest response, with a peak volatility increase of only 0.05, observed in the third month after the shock. This slow and muted effect suggests that monetary policy shocks take longer to permeate Morocco's stock market, potentially due to low trading volumes, a less diversified investor base, or limited algorithmic and speculative trading.

Conversely, in Brazil and Turkey, the peak volatility response is not only stronger but also occurs almost immediately (within one month), with effects persisting for up to nine months. This reflects the higher responsiveness of capital markets in more financially developed and open economies.

#### Comparative Interpretation and Structural Insights

The juxtaposition of GARCH and IRF results reveals significant cross-country heterogeneity. Morocco appears to lack a strong monetary transmission mechanism to its capital markets, which may be due to institutional constraints, underdeveloped secondary markets, and lower investor reactivity. In contrast, Brazil, Turkey, and South Africa show robust and timely responses, reflecting deeper market liquidity and greater integration with global financial flows.

This asymmetry has important policy implications. In economies with weaker market structures like Morocco, monetary policy alone may be insufficient to guide financial market behavior, unless supported by stronger communication strategies, improved financial inclusion, and broader capital market reforms.

Moreover, these findings support previous literature emphasizing the role of institutional frameworks and macro-financial fundamentals in determining the effectiveness of monetary policy (Mishkin, 2007; Ghosh, 2016). Morocco's relatively low reaction reinforces the idea that monetary instruments must be contextualized within the specific features of national markets to be effective.

## Policy Implications

For Morocco, the results underscore the necessity of strengthening the link between monetary policy and financial market dynamics. Despite gradual modernization efforts by Bank Al-Maghrib, including the transition toward inflation targeting and increased transparency in interest rate decisions, the Moroccan stock market remains relatively unresponsive. This calls for a set of coordinated policy actions:

- Enhancing financial market depth and liquidity: Measures should be taken to broaden investor participation, develop secondary markets, and improve access to financial instruments. A more diversified investor base—both institutional and retail—would increase market responsiveness to monetary signals.
- Strengthening monetary policy communication: Transparent and predictable policy guidance can help align market expectations with central bank objectives. Clear forward guidance reduces uncertainty and enhances the signaling power of interest rate changes.
- Integrating macroprudential tools with monetary instruments: In economies with limited monetary transmission, complementing policy rates with macroprudential regulations (e.g., reserve requirements, countercyclical capital buffers) can help stabilize financial markets and manage systemic risks.
- Improving financial literacy and access to market data: Increasing public understanding of monetary mechanisms and enabling timely access to macro-financial information can help make investor behavior more rational and policy-sensitive.

For other emerging markets, the findings reinforce the need to calibrate monetary policy in light of market structure and external vulnerability. Countries with high sensitivity to policy shifts must remain vigilant to volatility spillovers, especially in periods of global tightening.

## CONCLUSION

This paper contributes to the growing literature on the interaction between monetary policy and financial markets in emerging economies. Using GARCH and VAR-based models, we provide empirical evidence of heterogeneous volatility responses to monetary shocks across five countries, with Morocco standing out for its relatively weak transmission.

The research highlights that monetary policy effectiveness is not uniform, and depends crucially on institutional quality, market depth, and investor expectations. For Morocco, improving the policy-finance interface will require not just technical adjustments in rate-setting, but broader structural reforms to deepen and liberalize its financial system.

Future research could extend this analysis by incorporating additional macroeconomic channels—such as credit growth, fiscal policy, or exchange rate regimes—or by applying high-frequency data and machine learning models to assess real-time monetary impacts. As financial markets evolve, understanding the nuances of monetary transmission will remain central to ensuring macroeconomic stability and sustainable development.

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