VAR Models in Monetary Policy-Financial Market Interconnections

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Abstract. The influence of monetary policy on the financial market and the mechanisms through which it is transmitted have long been a prominent subject of scholarly inquiry, given its role as the primary instrument for macroeconomic control. In recent years, scholars at home and abroad have widely used VAR models to analyze how monetary policy shocks affect financial markets through various channels. In order to fully understand the research status in this field, this paper briefly introduces the research background and significance in the introduction, and gives the structure of the full text. Then, in the literature review, the research methods, model types, variable settings and policy transmission paths of VAR models at home and abroad were systematically reviewed, and the comparison of the role of quantitative and price-based policy tools was emphatically introduced. The research methods section discusses the common recognition strategies and estimation techniques of VAR models. Within the results section, the key findings identified in prior literature are summarized, specifically addressing the characteristics associated with the effects of monetary policy on both macroeconomic and financial variables.

1 Introduction

As an important means of macroeconomic regulation, monetary policy acts on the economic and financial system by influencing interest rates, money supply, exchange rates and other channels [1]. 1Over recent years, amidst the liberalization of financial markets and accelerated globalization, scholarly attention has extensively focused on the effects of

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monetary policy shocks and their transmission mechanisms across domestic and international financial markets. The VAR model has emerged as a principal methodology for investigating monetary policy transmission, owing to its capacity for capturing the dynamic interdependencies among multiple variables. The significance of this study is to summarize the application progress of VAR model in the linkage analysis of monetary policy and financial market through literature analysis, which is helpful to grasp the existing research results, clarify the influence of different models and variable settings on the conclusion, and provide reference for future further research. The main research questions include: What identification strategies and model types are commonly used by VAR models in this field? How were the variables selected for analysis in different studies? What are the main transmission channels for the linkage between monetary policy and financial markets? This paper is organized according to the following structure: Part two undertakes a comprehensive review of relevant research developments within domestic and international contexts. Subsequently, part three presents an overview of the commonly utilized research methodologies, the fourth part summarizes the main conclusions of previous studies, the fifth part discusses the shortcomings and future directions of existing research, and the sixth part gives conclusions.

2 Literature review

Scholars at home and abroad have made abundant achievements in using VAR models to analyze the linkage between monetary policy and financial market. In terms of research methods, the traditional VAR model focuses on impulse response and variance decomposition analysis. Structural VAR identifies monetary policy shocks through methods such as recursive order, long-term and short-term constraints, or symbolic/sequential constraints. Chen et al. constructed a Qual VAR model with potential policy indicators by introducing policy announcement dummy variables into the VAR model and applying sign constraints to extract the easing/tightening shocks of monetary policy. Their findings indicate a resemblance between the influence of China's monetary policy on output/inflation and the corresponding influence documented in advanced economies, but there is an asymmetry in the impact on asset prices: monetary easing significantly pushes up stock prices, while monetary tightening has little effect on stock prices. In addition, scholars also use Markov transform VAR to characterize the state dependence of policy effects. Utilizing the MS-VAR methodology, Sun Yunpeng and Wang Xueying examined the asymmetric effects exerted by China's dual-track (price and quantity) monetary policies across bullish and bearish stock market conditions [2]. The outcomes clearly showed that monetary policy's impact on the market was far more pronounced during bull conditions than during bear conditions. In terms of data types and model extension, Yemba et al. used the FAVAR model to summarize a large number of macro variables into a few common factors, and analyzed the effectiveness of China's monetary policy through maximum likelihood estimation. They grouped external shocks, output, and price factors separately, and found that "Divisia M2", which takes into

account user costs, had the strongest effect on the economy and prices, while traditional tools such as interest rates had a weaker effect [3]. Using SVAR and TVP-VAR models, Liu Xiangli et al. compared and analyzed the differing impacts of rate-based and quantitative monetary instruments. Overall, domestic studies tend to find that the quantitative tools of China's monetary policy are effective in stabilizing the economy and prices, while the effectiveness of price-based tools is relatively weakened in the post-crisis period [4].

In terms of variable setting, the variables selected by different studies differed. Common macro variables include output growth rates, inflation rates, money supply, policy rates, and stock indices that represent financial markets, interest rate term structures, exchange rates, or commodity prices, among others. For example, Sun et al.'s model includes stock prices, GDP, and monetary policy tools; Yemba et al.'s FAVAR model introduces the nominal exchange rate of the US dollar against the renminbi in addition to output and inflation, and finds that a depreciation of the renminbi will significantly increase China's economic output and inflation levels after 8 to 11 months. In terms of external transmission, conducted in 2021, research by Zhong Linha constructed a transnational SVAR model featuring an array of high-frequency financial indicators. This methodology was applied to investigate cross-border spillover effects arising from U.S. monetary policy shocks, specifically concerning the financial markets of Australia, Canada, and South Korea. The analysis uncovered that, in addition to provoking rapid exchange rate movements, U.S. monetary shocks exert a powerful and long-lasting influence on the financial markets of other countries, frequently exceeding in magnitude the effects generated by their domestic policy shocks [5]. In terms of policy transmission paths, the research mainly focuses on interest rate channels, credit channels, asset price channels and international transmission channels. Chen Hongyi et al. found that Chinese bank credit is insensitive to policy shocks, suggesting that window guidance is still necessary in China; And the monetary easing shock drove the stock market higher, showing the importance of asset price channels. Analysis conducted by Sun Yunpeng and Wang Xueying identifies differentiated influences of quantitative and price-targeting monetary policy measures on stock market performance, with the associated transmission mechanism gaining substantially greater potency in bull markets. Complementing this, Ferriani and Gazzani's (2024) VAR-based findings point out that the rapid transmission of US monetary policy, chiefly facilitated by global financial markets, differs fundamentally from the more gradual transmission patterns evident elsewhere, China's monetary policy mainly works at the international level through physical channels such as commodity demand and infrastructure investment: the 1% contraction of China's M2 ultimately reduces world industrial output by nearly 1.5% and pushes commodity prices down by about 10% [6]. Overall, these studies reveal that monetary policy has an impact on financial markets through multiple pathways, including interest rate changes, exchange rate adjustments, asset price fluctuations, and capital flows.

3 Research findings

Synthesizing a broad body of literature indicates shared conclusions concerning the impact of monetary policy on both the macroeconomy and financial markets, alongside notable variations evident among distinct research investigations. First, in the Chinese context, a number of empirical studies have shown that monetary expansion is beneficial to promote economic growth and increase inflation. Based on the empirical findings derived from 13 trivariate FAVAR models, Sun Yunpeng and Zhang Jingjia (2019) demonstrate that China's monetary policy exerts a positive impact on both economic output and price levels in aggregate. Moreover, after the 2008 financial crisis, the role of quantitative policy tools such as money supply has become more significant, while the marginal impact of traditional interest rate tools has tended to weaken [7]. Similarly, Yemba et al. have shown that when measured by Divestia M2, which reflects the cost of money, it has the greatest effect on economic activity and prices. On the other hand, asset prices, as the core variable of financial markets, also show sensitivity to policy shocks. Chen et al. found that monetary easing significantly raises stock market prices, while tightening shocks have little impact on stock prices, meaning that monetary policy is not suitable as a tool to stabilize asset prices. Sun and Wang (2018) further argue that this effect is state-dependent: Chinese equities are particularly sensitive to monetary policy shocks during bull markets, while reactions are relatively muted during bear markets. According to the study, alterations in the renminbi's exchange rate constitute a key transmission mechanism – for example, Yemba and others report that the depreciation of the renminbi significantly boosts China's output and inflation.

Internationally, extensive empirical research consistently confirms the significant cross-border spillover effects of US monetary policy shocks, which permeate and reshape global financial markets. Ha (2021) uses a structural VAR model with multiple high-frequency financial variables to find that US dollar policy shocks have a greater and lasting impact on asset prices in other open economies, and even if these economies' own policies play a role, dollar shocks can still be significantly transmitted through global risk premiums and financial market linkages. Ferriani and Gazzani (2024) further analyze and find that China's monetary policy contraction indirectly affects the world economy through the global commodity demand channel: a 1% M2 decline ultimately leads to a decline in world industrial output of about 1.5%, and commodity prices fall by nearly 10%, while the impact on global financial cycle indicators is relatively weak [8]. Zhang Mi et al. (2022) identified and compared three channels of U.S. Transmission of monetary policy to China was analyzed across trade, exchange rate, and financial conduits. Causal effects of policy shocks on economic fundamentals were quantified via an agency VAR model incorporating high-frequency identification. Their analysis shows that the tightening of US monetary policy has raised inflation by about 0.2% and output by about 1% in China. Moreover, the study establishes that policy-induced perturbations in the United States produce prompt and measurable cross-border contagion effects throughout China's economy, with distinct channel-specific outcomes detectable across all three pathways. The banking sector serves as a critical conduit for international policy transmission, directly distorting corporate yield curve anticipation while compounding extended-maturity credit surcharges within China's financial system [9].

Crucially, the study verifies sub-quarter transmission latencies for US policy impulses, documenting high-frequency financial market mediation that transmutes exogenous monetary stimuli into endogenous economic adjustments across Chinese manufacturing and services sectors.

In summary, the results of various studies are relatively consistent under the model method and sample conditions: the quantitative tools of China's monetary policy often play a key role in stimulating output and prices, while the marginal effect of price-based instruments is relatively limited [10].[1] Monetary policy frequently magnifies asset appreciation during bull markets or easing periods. Internationally, the US dollar policy has a strong transmission force to emerging markets, while China's policy mainly affects the global economy through commodity and physical channels.

4 Discussion

Previous studies have shown that the VAR model is an effective tool to analyze the linkage between monetary policy and financial market, but there are also some shortcomings and future improvement directions. First, most studies assume that the model is linear and the parameters are fixed, which makes it difficult to capture the nonlinear and temporal variation characteristics of policy effects. The work of Sun Yunpeng and Wang Xueying (2018) highlights the differences in shock effects in bull and bear markets, suggesting that dynamic adjustment models may better reflect the actual situation. Secondly, the selection of variables and the setting of models are not uniform, and the macro and financial variables used in different studies are quite different, which limits the comparability of results. For example, some studies include stock prices and exchange rates in their models, while others focus on money supply and output, requiring a more systematic approach to assessing the impact of variable selection on conclusions. Third, the existing empirical evidence is generally limited by the sample period and policy changes. After 2015, China's monetary policy gradually shifted from interest-based to moderately loose policy framework, and most studies rely on data before and after the crisis or before the adjustment of monetary structure for estimation, and the results may not be fully applicable to the policy transmission in the post-crisis period. Finally, how to accurately identify foreign policy shocks is still a challenge in transnational transmission research. The exogenous instrument method of high-frequency financial variables proposed by Zhong Linha (2021) is worthy of promotion, but it needs to be supported by more extensive data. Future studies should integrate additional market expectation proxies and financial sentiment indicators to elucidate the transmission of monetary policy shocks, employing cutting-edge Bayesian and machine learning methods to enhance VAR model forecasting and identification capabilities.

5 Conclusion

This paper systematically reviews the research on VAR model in the field of linkage analysis

between monetary policy and financial market. Both domestic and international research commonly employs diverse VAR model specifications and identification techniques, consistently demonstrating the significant influence of monetary policy on macroeconomic variables and financial assets, and reflects the differences in channels and scenarios: in the Chinese context, the role of money supply tools on economic output and prices is obvious, while the role of interest rate tools is relatively weak; Internationally, US monetary policy shocks transmit significantly via global financial markets, whereas monetary policy actions by China propagate effects on the world economy primarily through commodity demand. Future research should continue to enrich VAR model specifications, enhance uncertainty quantification, and rigorously investigate the distinctive policy architecture and shock propagation pathways of emerging economies, thereby fortifying theoretical foundations for central bank decision-making processes.

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