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Research on the Spillover Effect of Global Liquidity and the Response Space of China's Monetary Policy

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Abstract: *This article takes the global liquidity spillover effect and the response space of China's monetary policy as the research object, systematically explores the theoretical basis, current situation, impact on China's economy, and response strategies of global liquidity spillover. Research has found that global liquidity spillover effects affect China's economy through multiple channels such as trade, capital flows, and financial markets. Although China's monetary policy has some autonomy and regulatory space, it faces internal and external balance constraints. Empirical analysis has verified the transmission mechanism and policy effectiveness, and based on this, it is proposed to enhance the independence of monetary policy, improve the exchange rate formation mechanism, and other multidimensional collaborative responses to maintain economic and financial stability and high-quality development.*

Keywords: *Global Liquidity; Spillover Effect; Monetary Policy*

1. Introduction

In the context of deep integration of economic and financial globalization, the spillover effects of monetary policies in various countries are significant. The policy adjustments of major economies, represented by the Federal Reserve, have a profound impact on emerging economies through channels such as trade, capital flows, and financial market linkage. After the 2008 financial crisis, multiple rounds of quantitative easing by the Federal Reserve boosted global liquidity. In 2020, central banks around the world relaxed again after the pandemic. However, in recent years, due to inflationary pressures turning towards tightening, it has triggered a chain reaction of capital inflows and currency depreciation in emerging markets.

As the world's second largest economy and largest emerging market, China's economic openness continues to increase and it has close ties with the global economy and finance. The cyclical fluctuations in global liquidity pose challenges to the independence, effectiveness, and stability of China's monetary policy and financial markets through channels such as cross-border capital flows and exchange rate fluctuations. For example, the inflow of foreign capital during the easing period may exacerbate the asset foam, the pressure of capital outflow during the tightening period will increase, and the difficulty of the central bank to balance and stabilize growth, stabilize exchange rate and prevent risks will increase.

This study theoretically constructs an analytical framework suitable for China's national conditions by combining the Mundell Fleming model and other methods, enriching the theory of monetary policy in an open economy; In practice, providing reference for the central bank to formulate policies and market entities to cope with risks has important practical significance.

2. Theoretical Basis for Global Liquidity Spillover Effects

2.1 Definition of Global Liquidity Concept

Global liquidity is a complex and multidimensional concept, and there is currently no fully unified definition in the academic community. From a broad perspective, global liquidity encompasses the total amount of funds available for trading and investment worldwide, including both the base currency created by monetary authorities and the broad currency derived by financial institutions through credit expansion, as well as the liquidity represented by various financial assets circulating in the international

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financial market [1]. It not only reflects the total amount of currency, but also the availability, flow rate, and financing costs of funds on a global scale.

From different perspectives, global liquidity can be divided into official liquidity and private liquidity. Official liquidity mainly refers to the foreign exchange reserves held by central banks of various countries, as well as the aid funds provided by international institutions such as the International Monetary Fund. It plays an important role in maintaining international financial stability and responding to short-term liquidity crises. For example, when a country faces international balance of payments difficulties, it can alleviate liquidity constraints by using foreign exchange reserves or applying for loans from international institutions. Private liquidity comes from private sectors such as commercial banks, investment funds, and multinational corporations, including cross-border bank loans, international bond issuances, and stock market financing [2]. It is a major component of global capital flows, and its volatility has a more direct and significant impact on global financial markets.

In measuring global liquidity, due to its wide coverage, a single indicator is difficult to fully reflect it. Common measurement indicators include global broad money supply (such as global M2), international credit scale (such as cross-border bank credit balance), short-term interest rate level (such as LIBOR, SHIBOR, etc.), and financial market spreads (such as treasury bond yield spreads, credit spreads). These indicators reflect the abundance and liquidity of global funds from different perspectives. For example, the rapid growth of global M2 usually means that global liquidity is in a loose state, while the rise in short-term interest rates may indicate a tightening of global liquidity.

2.2 Theoretical Model of Spillover Effects of Monetary Policy

2.2.1 Mundell Fleming Model

The Mundell Fleming model was proposed by Mundell and Fleming in the 1960s, extending the IS-LM model of a closed economy to an open economy, analyzing the impact of monetary and fiscal policies on output, interest rates, and international payments under different exchange rate regimes, and providing a theoretical framework for understanding the spillover effects of monetary policy in open economies [3].

The model assumes fixed prices, full employment, and other conditions, and analyzes economic relations through IS (product market equilibrium), LM (money market equilibrium), and BP (balance of payments) curves. The slope of the BP curve depends on capital liquidity. Under a fixed exchange rate system, expansionary monetary policy may be ineffective due to the central bank's maintenance of exchange rates, and spillover effects are mainly transmitted through trade channels, such as increasing imports to drive exports from partner countries. Under the floating exchange rate system, expansionary monetary policy is effective, and currency depreciation enhances export competitiveness. The spillover effects are more complex, which may trigger competitive depreciation of partner countries' exchange rates or push up their asset prices.

2.2.2 Trilemma

The trilemma was proposed by Mundell, and its core is that in an open economy, the independence of monetary policy, exchange rate stability, and free capital flow cannot be achieved simultaneously, at most two can be achieved. If choosing free capital flow and exchange rate stability, it is necessary to give up the independence of monetary policy. If the exchange rate is fixed with major economies and capital flows freely, monetary policy should be adjusted accordingly, otherwise capital flows will impact the exchange rate. If we choose monetary policy independence and free capital flow, we need to give up exchange rate stability. Capital flows caused by interest rate differences can lead to exchange rate fluctuations, affecting international trade and investment. If choosing monetary policy independence and exchange rate stability, it is necessary to restrict the free flow of capital, such as emerging market countries restricting short-term capital flows to stabilize policies and exchange rates. It reveals policy choice constraints and provides a perspective for analyzing the spillover effects of monetary policy.

3. Analysis of the Current Status of Global Liquidity Spillover Effects

3.1 Current Status and Trends of Global Liquidity

In recent years, global liquidity has shown significant cyclical fluctuations, closely related to

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monetary policy adjustments in major economies. After the COVID-19 in 2020, major central banks around the world adopted ultra loose policies: the Federal Reserve reduced the benchmark interest rate to nearly zero, introduced unlimited quantitative easing, and the balance sheet expanded sharply; The European Central Bank increases bond purchases and maintains negative interest rates; The Bank of Japan implements yield curve control. This has led to a significant increase in global money supply, extremely loose liquidity, and a large influx of cross-border capital into emerging markets, driving up global asset prices.

Starting from the second half of 2021, high global inflation has prompted major economies to shift their monetary policies. The Federal Reserve started raising interest rates in March 2022 and has raised interest rates a total of 11 times until July 2023, with the benchmark rate reaching 5.25% -5.5%. It has also initiated balance sheet tightening, leading to a tightening of global liquidity. The European Central Bank, the Bank of England, and others have followed suit with interest rate hikes, leading to capital flowing back from emerging markets to developed economies, putting pressure on emerging market currencies, and some countries showing signs of debt crisis.

In the future, global liquidity changes will depend on inflation and economic growth in major economies, as well as uncertainties brought about by geopolitical conflicts and supply chain restructuring.

3.2 Main Channels of Global Liquidity Spillover Effects

The spillover effects of global liquidity are mainly transmitted through three channels: trade, capital flows, and financial markets. In the trade channel, when global liquidity is loose, the money supply of major economies increases, domestic demand rises, and import demand increases, driving the economic growth of exporting countries. For example, during the quantitative easing of the United States, the export growth of trading partners such as China and Southeast Asia; When liquidity tightens, demand in major economies decreases and exports from exporting countries are suppressed. At the same time, changes in liquidity affect exchange rates. When loose, the depreciation of major currencies enhances their export competitiveness, while the relative appreciation of other countries' currencies is impacted; When tightened, it is the opposite.

The capital flow channel is the most direct and rapid. When loose, developed economies have low interest rates, and capital flows to high interest emerging markets, pushing up asset prices but potentially accumulating risks; When tightening, capital flows back to developed economies, while emerging markets face issues such as capital outflows and currency depreciation. For example, in 2013, the Federal Reserve's reduction of quantitative easing triggered a "contraction panic" in emerging markets.

The financial market channel is achieved through asset price linkage and risk transmission. Global liquidity changes affect international asset prices, which are transmitted to the domestic market. Moreover, cross-border business of international financial institutions will exacerbate spillover effects, affecting the financial stability of other countries.

3.3 The Impact of Global Liquidity Spillover Effects on China's Economy

The global liquidity spillover effect has multiple impacts on China's economy, including monetary policy, exchange rates, financial markets, and the real economy.

In terms of the independence of monetary policy, the loose period of international capital inflows, the central bank's purchase of foreign exchange to inject base currency to increase the money supply, and the effectiveness of sterilization operations are limited; The release of liquidity during the tightening period may conflict with domestic targets, such as when the Federal Reserve raises interest rates, China's interest rate policy faces a dilemma and its autonomy is limited. The impact on exchange rate stability is significant, with capital inflows during the easing period driving up the appreciation of the renminbi, which benefits imports but impacts exports; The capital outflow during the tightening period has led to the depreciation of the RMB, which is beneficial for exports but has pushed up inflation and external debt pressure, and the exchange rate has obvious two-way fluctuations. For the stability of the financial market, the inflow of foreign capital during the easing period may lead to asset foam, the outflow of capital during the tightening period may cause market turbulence, and also affect the risk taking of financial institutions and investor confidence. For the real economy, by influencing exchange rates and external demand on imports and exports, as well as affecting international

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commodity prices and cross-border financing costs for enterprises, enterprises with large external debt scales are more under pressure.

4. Empirical Analysis of China's Monetary Policy in Response to Global Liquidity Spillover Effects

4.1 Variable Selection and Data Sources

The selection of variables requires a comprehensive analysis of global liquidity spillover indicators, China's monetary policy variables, and economic performance indicators to capture dynamic relationships. In terms of global liquidity spillover, the US M2 is selected as the core indicator, and its changes reflect the global liquidity situation; The US dollar index serves as an auxiliary indicator, reflecting exchange rate fluctuations and capital flows; Introducing commodity price indices such as CRB, as their fluctuations have an input impact on China's real economy. The monetary policy variables in our country include M2 and the one-year benchmark loan interest rate (or interbank lending rate), which reflect the money supply and financing costs; Include the central parity rate of the Chinese yuan against the US dollar as a channel for internal and external economic transmission. Economic performance indicators include GDP growth rate and CPI, which measure economic growth and inflation. In terms of data sources, international data comes from the IMF database, while domestic data comes from the National Bureau of Statistics. The sample range is from 2008 to 2023, covering multiple periods of liquidity volatility. The data is seasonally adjusted and logarithmized to reduce heteroscedasticity.

4.2 Model Construction and Estimation Methods

This study constructs a Vector Autoregression (VAR) model to analyze the dynamic interaction and lagged effects of global liquidity spillover effects and China's monetary policy. This model considers all variables as endogenous variables and captures dynamic linkage through lagged regression without the need for pre-set causal relationships, making it suitable for multivariate complex interaction analysis.

The endogenous variables of the model include global liquidity indicators (US M2, US dollar index), China's monetary policy variables (M2, interest rates, exchange rates), and economic performance indicators (GDP growth rate CPI). This study determines the optimal lag order based on AIC, SC, and other criteria (usually attempting 1-4 cycles), while considering the capture of degrees of freedom and dynamic relationships between variables.

This study is based on the VAR model, further analyze the dynamic response of variables to shocks through the impulse response function (IRF), and present the impact path and duration of global liquidity shocks; Clarify the contribution of each shock to variable volatility through variance decomposition, and determine the proportion of spillover effects and policy effectiveness.

The ordinary least squares (OLS) method is used to estimate parameters, and a unit root test is required before estimation to ensure that the variables are stationary or have cointegration relationships. If necessary, differential processing or the establishment of a vector error correction (VEC) model is necessary. At the same time, sensitivity analysis such as changing the lag order and replacing variables is used to test the robustness of the model and ensure the reliability of the results.

4.3 Empirical Results Analysis

Through VAR model estimation, impulse response, and variance decomposition analysis, the global liquidity spillover effects and China's monetary policy response can be clarified.

Pulse response shows that when global liquidity is loose (positive impact of US M2), China's M2 rises in the short term due to capital inflows causing the central bank to passively release base currency, which later weakens due to the impact of sterilization operations; The initial slight decrease in interest rates followed by a rebound reflects the central bank's regulation; The short-term appreciation of the RMB and the convergence of long-term fluctuations demonstrate exchange rate elasticity.

When global liquidity tightens (with the rise of the US dollar index), the pressure of capital outflows from China increases, M2 is suppressed in the short term, interest rates rise, and exchange rates are under pressure. However, the monetary policy buffer makes fluctuations controllable,

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indicating room for regulation. Variance decomposition shows that global liquidity contributes 10% -30% to the volatility of China's monetary policy variables, while domestic factors dominate and demonstrate policy independence; The contribution to CPI fluctuations is relatively high, and input inflation needs attention. The contribution to GDP growth is low, and economic growth depends on domestic fundamentals. China's proactive monetary policy adjustment has a positive effect on stabilizing growth, suppressing inflation, and easing exchange rate and capital pressures. However, the regulatory effect weakens when liquidity fluctuates sharply, and policy flexibility and effectiveness need to be enhanced.

5. Strategic Suggestions for China's Monetary Policy to Address Global Liquidity Spillover Effects

5.1 Enhance the Independence of Monetary Policy

Enhancing the independence of monetary policy is the core guarantee for responding to the complex global liquidity environment, which requires coordinated promotion from three aspects: policy framework, tool innovation, and transmission mechanism optimization. In terms of policy framework, it is clear to have a "self-centered" orientation, prioritizing domestic economic growth, employment, and price targets, and reducing dependence on external indicators. For example, when formulating interest rate policies, domestic factors should be comprehensively considered rather than blindly following other countries. At the same time, this study establish a forward-looking evaluation system, dynamically monitor indicators such as output gaps, and predict global liquidity shocks to reserve adjustment space. In terms of tool innovation, we will enrich price based regulatory tools, explore structural tools such as targeted reserve requirement ratio cuts, and guide funds to flow towards weak links in the real economy; We will accelerate the market-oriented reform of interest rates, promote the transmission of policy interest rates, cultivate benchmark interest rate systems such as LPR, and reduce external interest rate shocks. In terms of transmission mechanism, we will deepen financial market reform, break monopolies and divisions, improve the multi-level system of the capital market, broaden direct financing channels for enterprises, and reduce dependence on bank credit; We will strengthen coordination with fiscal and industrial policies, form a joint force, improve regulatory efficiency, and alleviate the pressure of a single monetary policy.

5.2 Improve the Exchange Rate Formation Mechanism

The exchange rate, as an important link between domestic and foreign economies, directly affects China's ability to cope with global liquidity spillover effects in terms of the completeness of its formation mechanism. On the premise of maintaining basic exchange rate stability, we should further enhance the flexibility of the RMB exchange rate and fully leverage the "automatic stabilizer" role of the exchange rate in regulating international payments and absorbing external shocks.

Expanding the floating range of exchange rates is an important measure to enhance flexibility. On the basis of the existing mechanism for forming the central parity rate, the daily fluctuation range of the RMB against the US dollar can be gradually relaxed, reducing the central bank's normalized intervention in the foreign exchange market and allowing market supply and demand to play a greater role in the formation of the exchange rate. When severe fluctuations in global liquidity trigger short-term exchange rate overshoots, central banks can make moderate countercyclical adjustments, but such adjustments should focus on easing market panic rather than maintaining a fixed exchange rate level to avoid accumulating long-term exchange rate imbalance risks.

A sound foreign exchange market system is the foundation for improving the exchange rate formation mechanism. We should further enrich the participants in the foreign exchange market, introduce more types of financial institutions, enterprises, and individual investors, and improve market trading activity and liquidity. At the same time, expanding the types of foreign exchange derivative products, such as launching more maturity forward, options, and swap products, provides market entities with richer exchange rate risk management tools, and reduces the impact of exchange rate fluctuations on enterprise import and export business and cross-border investment. In addition, we will strengthen the infrastructure construction of the foreign exchange market, improve transaction clearing efficiency, improve the market supervision system, prevent foreign exchange market manipulation and speculative behavior, and maintain market order.

Strengthening expectation management is crucial for stabilizing exchange rates. The central bank should improve policy transparency and guide the market to form reasonable exchange rate

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expectations through timely release of foreign exchange market operation data, policy interpretations, and other means. When irrational exchange rate fluctuations occur in the market, effective communication mechanisms are used to convey policy intentions and stabilize market confidence. At the same time, this study establish a monitoring system for exchange rate expectations, track market sentiment and expected changes in real time, provide a basis for policy adjustments, and avoid exchange rate fluctuations caused by self-realization of expectations.

5.3 Strengthen the Management of Cross-border Capital Flows

The disorderly flow of cross-border capital is an important channel for global liquidity to impact China's financial stability. It is necessary to establish a multi-level management system that combines macro prudential and capital control, and achieve full process monitoring and regulation. Improving the macro prudential policy framework is the core, and it is necessary to establish a sound macro prudential evaluation system for cross-border capital flows, dynamically adjust policy tools, such as increasing the foreign exchange risk reserve ratio during peak capital inflows and reducing tool intensity during periods of high outflow pressure; At the same time, it will be included in the MPA to strengthen the supervision of cross-border business of financial institutions and prevent systemic risks. Strengthening monitoring and early warning is a prerequisite, relying on big data and artificial intelligence to establish a comprehensive monitoring platform, track fund flows, establish monitoring mechanisms in key areas, and enhance international information sharing to improve predictive capabilities. Reasonably utilizing capital controls as a supplement, temporary measures can be taken to maintain stability under extreme shocks, but they need to be temporary, transparent, and targeted, avoiding interference with normal economic and trade investment, and in line with the direction of market-oriented reform.

5.4 Promoting International Monetary Policy Coordination

Under globalization, it is difficult for a single country's monetary policy to isolate the spillover effects of global liquidity. It is necessary to participate in international monetary policy coordination, promote a fair and reasonable international monetary system, and jointly address liquidity fluctuations. We have continuously strengthened policy communication with major economies, established regular dialogue mechanisms between China and the United States and between China and Europe, exchanged economic and policy information, and reduced information asymmetry. At global liquidity inflection points such as the Federal Reserve's interest rate hike cycle, we call on emerging markets to consider policy spillover effects and promote responsible monetary policies. We actively participated in the reform of global financial governance, enhanced the say of emerging market countries in the International Monetary Fund and the World Bank, and reformed the system dominated by the US dollar. We have been constantly promoting the diversification of SDR currencies, increasing the proportion of the RMB in international reserves, and participating in the formulation of global capital flow rules and financial regulatory standards. We have expanded the use of the RMB by deepening regional currency cooperation, strengthening cooperation with ASEAN and countries along the Belt and Road Initiative. We have been constantly establishing regional foreign exchange reserves, currency swap agreements, etc., such as expanding the scale of swaps, providing emergency liquidity, and enhancing shock resistance capabilities.

6. Conclusion

This study focuses on the global liquidity spillover effect and China's monetary policy response space. Through theoretical analysis, current situation analysis, empirical testing, and strategic exploration, the core conclusion is drawn that the global liquidity spillover effect has complexity and multi-channel transmission characteristics. Its cyclical fluctuations affect China's economy through channels such as trade, capital flows, and financial markets, and the effectiveness and differences in impact of each channel are empirically verified; China's monetary policy has demonstrated a certain degree of autonomy and regulatory space in response, and can hedge against negative impacts by adjusting the money supply, interest rates, etc. However, in the face of severe fluctuations in global liquidity, it faces internal and external balance problems, and its effectiveness is constrained by factors such as international capital flows; Multi-dimensional strategy coordination is needed to enhance the independence of monetary policy, improve the exchange rate formation mechanism as the key, strengthen cross-border capital flow management as the guarantee, promote international monetary policy coordination as a supplement, and create a favorable environment.

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