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The Impact of Monetary and Fiscal Policies on the Stock Market and Bond Funds: Evidence from Panel VAR Model

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Abstract

This study examines the relationship between bond fund flows and stock market returns in emerging countries and the impact of monetary and fiscal policies on stock market returns and bond fund flowability. The results of the experiment indicate that, for emerging countries, bond fund flows are related to stock market returns in the previous period, with expansionary monetary policy having a negative impact on bond fund flows and expansionary fiscal policy having a positive impact on bond flows. When stock markets deteriorate and economic conditions are in the doldrums, bond funds flourish and bond fund liquidity increases.

Key Words: Monetary Policy; Fiscal Policy; Stock Market Return; Bond Fund; Panel Vector Autoregressive Model

Introduction

Economic policy is a crucial means of government intervention. The monetary and fiscal tools used in economic policy have extensive and profound impacts on financial markets at both macro and micro levels. Over the past decade, several scholars have studied and analyzed the impact of macroeconomic variables such as monetary policy and fiscal policy on the stock market [3],[9],[6],[5],[8],[14],[7],[22] proposes that the stock market's role is to establish a link between the real economy and the financial sector [16], argue that monetary and fiscal policies make stock market returns correlate with the real economy. [12] investigates the relationship between inflation and stock market returns, taking into account the monetary policy effect. They argue that the relationship between stock market returns and inflation depends on the equilibrium process of monetary policy. Subsequently, it has been argued that stock prices contain macroeconomic information and reflect actual economic activity, while macroeconomic variables help explain changes in stock prices. Stoian and Iorgulescu (2020) propose an ARDL Bounds testing approach to studying the relationship between stock returns and

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macroeconomic variables. The results show that stock prices fully and effectively reflect information about past fiscal policy in the long run. In the short term, anticipated fiscal policy information shows a significant lagged relationship with current stock returns. However, [8] came to the opposite conclusion, arguing that a correct understanding of both fiscal and monetary policies can help explain stock market behavior directly or indirectly. All of these studies have shown that price changes in financial securities are related to changes in macroeconomic variables and are susceptible to macroeconomic policies.

There are also studies that find a weaker relationship between stock market returns and real economic activity [4], Stoian & Iorgulescu, 2020). Some scholars have found a direct link between fund liquidity and macroeconomic policies [2]; Stoian and Iorgulescu, 2020). However, most of the literature examines the growth rates and returns of different fund classes from a microeconomic perspective (Edwards & Samant, 2003; [20]. Nevertheless, the existing literature lacks research on the following three points: 1) the relationship between bond fund liquidity and stock market returns; 2) the impact of monetary policy and fiscal policy on bond fund liquidity; 3) the interaction between monetary policy and fiscal policy on stock market returns, which are usually analyzed in isolation.

Furthermore, existing research on the relationship between bond funds and financial policies mainly focuses on the risk-adjusted performance of bond funds for small and micro-enterprises. Additionally, most studies on bond funds have concentrated on developed countries, and research on emerging countries, especially multiple emerging countries, is relatively scarce [15], [21], [2], [1], [10]. Therefore, our primary research objective is to improve this field of research by examining the relationship between bond fund flows and stock market returns in emerging countries and evaluating the impact of monetary and fiscal policies on bond funds and stock market returns.

Compared to the existing literature, this paper aims to contribute in three aspects: 1) examining the relationship between bond flows and stock market returns in emerging countries, which has received little attention in previous research; 2) analyzing the joint effects of fiscal and monetary policies on the relationship between bond flows and stock market returns, instead of examining the effects of a single policy in isolation; and 3) utilizing panel data from multiple countries and leveraging the cross-country dimension of the dataset. Previous studies have mainly considered time-series data from a single country.

Model Construction and Data Description

Data Source Description

This study employs quarterly data for five emerging countries for the period 2001-2018. Quarterly data can effectively monitor long-term macroeconomic behavior, and the data for this period are selected mainly considering the following two points: 1. Since the Asian financial crisis in 2004, the global financial industry has experienced explosive growth. Therefore, the selection of data from this period for analysis is useful in studying the impact of monetary and fiscal policies on the real economy; 2. Data availability. The sample data for five emerging regions are: China, Thailand, Malaysia, Taiwan and South Korea. The selection of emerging regions was based on the mutual fund's Net Asset Value (NAV) reported in 2015.

Data on mutual fund flows in emerging regions were obtained from the Bloomberg database. Total fund flows for each sample region are calculated according to the calculation given in [15] as shown in

equation (1).

$$Flows_{i,t} = [TNA_{i,t} - TNA_{i,t-1}(1 + R_{i,t})]/TNA_{i,t-1} \quad (1)$$

Where $TNA_{i,t}$ is the net asset value of the i th fund at the end of the t th quarter, and r is the original return of the i th fund at the end of the t th quarter. Stock market returns are calculated using non-identical stock indices according to different countries.

Variable Selection

Monetary policy is universally reflected by acting as an intermediate variable for monetary policy. Generally speaking, money supply, national debt interest rate and credit amount are selected as proxy variables of monetary policy. In this paper, we choose money supply and treasury bond interest rates as the representatives of monetary policy. M1 is a leading indicator of economic cycle fluctuations, which can reflect changes in the stock market and have a magnifying effect on currency changes. Therefore, we choose the year-on-year growth rate of M1 to represent the money supply. We choose the March term Treasury rate to represent the interest rate on the national debt. Similarly, fiscal policy is manifested by acting as an intermediate economic variable for fiscal policy, and in this paper, we use the ratio of government budget deficit to GDP and the ratio of public debt to GDP as fiscal policy measures. A higher money supply indicates good stock market performance and economic conditions, while an increase in budget deficits predicts poor market and economic conditions, and studies of fiscal and monetary policy help explain stock market behavior directly or indirectly [8]. Therefore, we consider both monetary and fiscal policy variables when measuring bond fund liquidity and equity market returns. There is a negative relationship between bond funds and money supply, and a positive relationship between bond funds and Treasury bill rates and fiscal policy. Bond fund flows increase during periods of sluggish stock market performance and deteriorating economic conditions. In addition, bonds are fixed income securities, and investors who hold fixed income securities invest in bonds when the market is highly volatile and economic conditions are harsh. Table 1 below gives a description of the variables used and the statistical results

Table 1. Variable Description and Statistical Results

Variable	Description	Mean	Deviation (S)
Bond Liquidity	Formula (1)	0.0381	0.097614
Stock Market Returns	Calculation of Stock Index Representation	0.0376	0.1174044
Money supply	M1 Year-on-Year Growth	0.0314	0.0390248
Treasury Bond Rate ΔTB	3-Month Treasury Bond Rate	−0.715	0.32396
Budget Deficit as % of GDP ΔDG)	Budget Deficit /GDP	−0.125	0.2925711
Public Debt as % of GDP ΔPD	Public Debt /GDP	−0.132	0.2298701

Note: Edited according to relevant data

Model Building

Vector Autoregressive (VAR) is an econometric model used to calculate linear relationships between multiple time series. The model treats all variables as endogenous variables without applying the variables to the model based on any prior assumptions. This makes the VAR model widely used in financial markets and macroeconomics. The panel VAR includes the advantages of the general vector autoregressive model, treats all variables as endogenous variables of panel data, and allows unobserved factors in the model. In this paper, a panel vector autoregressive model is used and the variables in the model are calculated as shown in equations (2)-(5).

$$Flows_{i,t} = \alpha_1 + \sum_{i=1}^{n} \beta_1 Flows_{i,t-1} + \sum_{i=1}^{n} \beta_2 MR_{i,t-1} + \sum_{i=1}^{n} \gamma_1 MP_{i,t-1} + \sum_{i=1}^{n} \lambda_1 FP_{i,t-1} + \varepsilon_{1i,t} \quad (2)$$

$$MR_{i,t} = \alpha_2 + \sum_{i=1}^{n} \beta_3 Flows_{i,t-1} + \sum_{i=1}^{n} \beta_4 MR_{i,t-1} + \sum_{i=1}^{n} \gamma_2 MP_{i,t-1} + \sum_{i=1}^{n} \lambda_2 FP_{i,t-1} + \varepsilon_{2i,t} \quad (3)$$

$$MP_{i,t} = \alpha_3 + \sum_{i=1}^{n} \beta_5 Flows_{i,t-1} + \sum_{i=1}^{n} \beta_6 MR_{i,t-1} + \sum_{i=1}^{n} \gamma_3 MP_{i,t-1} + \sum_{i=1}^{n} \lambda_3 FP_{i,t-1} + \varepsilon_{3i,t} \quad (4)$$

$$FP_{i,t} = \alpha_4 + \sum_{i=1}^{n} \beta_7 Flows_{i,t-1} + \sum_{i=1}^{n} \beta_8 MR_{i,t-1} + \sum_{i=1}^{n} \gamma_4 MP_{i,t-1} + \sum_{i=1}^{n} \lambda_4 FP_{i,t-1} + \varepsilon_{4i,t} \quad (5)$$

where $Flows_{i,t}$ is the net financial flows of country i at the end of quarter t, $MR_{i,t}$ tabulates the stock market returns of country i at the end of quarter t, *MP* refers to monetary policy, which in this paper refers to the year-on-year M1 growth rate and the treasury rate, and FP refers to fiscal policy, which in this paper refers to the budget deficit-to-GDP ratio and the public debt-to-GDP ratio.

We anticipate obtaining the following results: Firstly, we expect a positive relationship between stock market returns and the growth rate of the money supply because stock market returns are positively correlated with good economic conditions, and good economic conditions usually correspond with a higher growth rate of the money supply. Secondly, we expect a negative correlation between bond fund flows and money supply growth because bond flows tend to decline when economic conditions are unfavorable.

Conversely, stock market returns are negatively related to treasury rates and fiscal policy variables, as increases in treasury rates and fiscal problems indicate expected reductions in economic activity, leading to lower market returns. Bond liquidity is positively related to treasury rates and fiscal policy variables, as increases in treasury rates and fiscal problems indicate expected reductions in economic activity, leading to increased bond liquidity. Before applying the panel VAR model, we should first conduct experiments to determine the choice of model lag order.

Experimental Results

Correlation Matrix

The correlation matrix for all variables is provided in Table 2 and the correlation matrix is a lower triangular

matrix. As can be seen from the data in the table, the correlation between the various variables is not sufficient to cause multicollinearity. Column 1 in Table 2 shows the correlation between the dependent variable (bond liquidity) and explanatory variables (market returns and macroeconomic variables), and the correlation coefficient between the dependent variable (bond liquidity) and explanatory variables is significant. From the correlation coefficient matrix, we can see that bond fund liquidity is negatively correlated with stock market returns, and bond fund liquidity is significantly positively correlated with fiscal policy variables (budget deficit-to-GDP ratio and public debt-to-GDP ratio). Stock market returns are positively correlated with money supply and treasury bond rates, and significantly negatively correlated with fiscal policy (budget deficit-to-GDP ratio and public debt-to-GDP ratio).

Table 2. Correlation Coefficient Matrix

Variable	Bond Liquidity	Stock Market Returns	M1 growth rate	Budget Deficit as % of GDP	Treasury Bond Rate	Public Debt as % of GDP
Bond Liquidity	1					
Stock Market Returns	−0.4911	1				
M1 growth rate	−0.40	0.26	1			
Budget Deficit as % of GDP	0.320	−0.179	−0.043	1		
Treasury Bond Rate	0.36	0.27	0.772	0.630	1	
Public Debt as % of GDP	0.162	−0.25	−0.087	0.79	0.014	1

3.2. Panel Unit Root Test and Lag Order Selection

Before employing the PVAR model for analysis, we first performed a unit root test to verify that the panel data were stationary. We used two unit root test methods: ADF unit root test and PP unit root test. The test results are shown in Table 3. The hypothesis of the existence of a unit root is rejected at the 1% level, that is, the data of each variable are stationary.

Table 3. Unit Root Test Results

Variables	ADF Test		PP Test(at level)	
	Without Trend Item	With Trend Item	Without Trend Item	With Trend Item
Bond Liquidity	371.2221***	334.7918***	371.2221***	334.7918***
Stock Market Returns	239.3714***	194.2912***	239.3714***	194.2912***
Money supply	444.3355***	416.8386***	444.3355***	416.8386***
Budget Deficit as % of GDP	226.9365***	269.8404***	226.965***	269.8404***
Treasury Bond Rate	208.4309***	178.6361***	208.4309***	178.6361***
Public Debt as % of GDP	74.0398***	88.7273***	74.0398***	88.7273***

Note: *** represents 1% significance level

Next, we conducted experiments to select the lag order of the model, and the results are shown in Table 4.

According to AIC, BIC and QIC, the lag order of the model can be selected as the first order.

Table 4. Hysteresis Order Selection

Lagging Order	BIC	AIC	QIC
1	-166.46	-30.9127	-85.0451
2	-148.164	-27.6783	-75.796
3	-131.353	-25.9273	-68.0302
4	-119.355	-28.99	-65.0782
5	-99.1378	-23.834	-53.9075

PVAR Model Estimation Results

First, we use the PVAR model to analyze and validate the relationship between bond fund liquidity and stock market returns, and we also conduct a Granger causality test. The experimental results are shown in Table 5, where the first-order lagged term of stock market returns is negatively correlated with the volume of bond funds. This implies that the liquidity of bond funds is affected by past equity market returns, which confirms the negative feedback trading effect in the market. The results of the Granger causality test show that there is no significant two-way causality between stock market returns and bond fund liquidity.

Table 5. The Relationship Between Bond Fund Liquidity and Stock Market Returns

	Current Bond Fund Liquidity	Current Stock Market Returns
L.Flows	-0.200	-0.033
	(3.08)**	(1.02)
Granger Causality Test P-Value	0.00	0.10
L.MR	-0.761	0.223
	(2.08)*	(2.76)*
Granger Causality Test P-Value	0.05	0.00

Note: L.Flows represents the first-order lag term of bond fund liquidity, L.MR represents the first-order lag term of stock market returns, * represents 10% confidence interval, ** represents 5% confidence interval。

Table 6 presents the estimated results of the PVAR model after considering the effects of monetary policy and fiscal policy. As we can see from Table 6, no bivariate relationship is found between bond flows and equity market returns, but bond fund liquidity is affected by a first-order lagged term of equity market returns, which implies that bond funds would react to the past market. In addition, liquidity in bond funds is negatively correlated with an increase in money supply and positively correlated with an increase in treasury rates. This suggests that a contraction in monetary policy heralds worsening economic conditions, leading investors to increase their exposure to fixed-income securities such as bonds. At the same time, bond fund liquidity is positively correlated with fiscal policy, which is also expected. which was in line with expectations. This is because higher budget deficit ratios and public debt-to-GDP ratios have a negative impact on the economy, signaling relatively poor economic conditions and increased bond liquidity. The finding also lends support to the theory that investors prefer safer fixed-income investments, such as bonds, when markets are highly volatile and economic conditions are tough. For emerging countries, the liquidity of their bond funds is influenced by prior-period equity market returns, but there is no direct causal relationship with current-period equity market returns. This is related to the

characteristics of equity markets in emerging countries - weak market mechanisms, difficult access to information, inadequate regulatory systems, high volatility in equity markets, and the relatively weak ability of equity markets to act as macroeconomic 'barometers'.

Table 6. The Relationship Between Bond Fund Liquidity, Stock Market Returns and Macroeconomic Policies

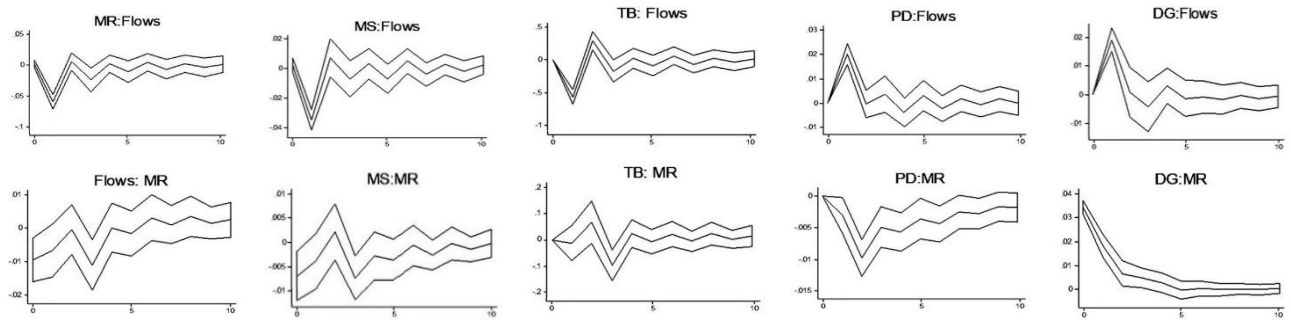
	Current Bond Fund Liquidity	Current Stock Market Returns
L.Flows	-0.204	-0.049
	(2.99)**	(0.05)
Granger Causality Test P-Value	0.03	0.10
L.MR	-0.629	0.212
	(2.45)*	(3.39)**
Granger Causality Test P-Value	0.04	0.00
L.MP1	-0.728	4.022
	(2.85)**	(3.25)**
Granger Causality Test P-Value	0.05	0.00
L.DG	0.398	-0.325
	(2.33)*	(3.21)**
Granger Causality Test P-Value	0.00	0.00
L.MP2	0.115	-0.566
	(2.62)*	(2.08)*
Granger Causality Test P-Value	0.04	0.05
L.PD	0.139	-0.124
	(2.99)**	(2.56)*
Granger Causality Test P-Value	0.00	0.00

Note: L.Flows represents the first-order lag term of bond fund liquidity, L.MR represents the first-order lag term of stock market returns, L.MP1 represents the first-order lag term of money supply, and L.MP2 represents the first-order lag term of treasury bond interest rate. First-order lag term, L.DG represents the first-order lag term of the budget deficit-to-GDP ratio, L.PD represents the first-order lag term of the public debt-to-GDP ratio, * represents a 10% confidence interval, ** represents a 5% confidence interval.

Impulse Response Function Analysis

We analyze bond liquidity, stock market returns, and impulse response results for monetary and fiscal policy. We determined in previous experiments that the optimal lag order for the model is order 1. We performed 1000 model Carlo simulations and the results are shown in the figure below.

Figure 1. Analysis of The Impulse Effect Function



Note: The horizontal abscissa represents the time period, the top and bottom curves represent plus or minus 5% confidence intervals, and the middle curve represents the change trend of one variable's impact on another variable.

At the 95% confidence interval, the value of the response function of bond fund liquidity to stock market return shocks is negative when lagged by one period; this result is in line with expectations. This is because, based on the results of the previous PVAR model analysis, there is a negative correlation between bond liquidity and equity market returns. The change trend of the response function of bond liquidity to the shock of money supply growth rate and government bond interest rate is consistent with the trend of stock market return shock: that is, it is negative in the first period, and fluctuates positively and negatively in the subsequent period. The response functions of bond fund liquidity to shocks to the budget deficit-to-GDP ratio and public debt-to-GDP ratio are positive. This shows that bond flow is positively correlated with these two variables, which is also expected because the budget deficit-to-GDP ratio and the public debt-to-GDP ratio both represent economic conditions. With larger ratios indicating poorer economic conditions and further increases in bond fund liquidity when economic conditions are poor. The results of the impulse response function are also in line with expectations, with bond flows and stock market returns being negatively correlated. In addition, when considering the impact of stock market returns on bond flows, the impact of stock market returns on bond flows is much weaker if macroeconomic variables are present. Overall, the results of the analysis of the impulse corresponding function are generally consistent with the panel VAR estimates.

Variance decomposition results

We evaluate the percentage size of the contribution of each variable, so that we can assess the degree of influence of one variable on another. Table 7 presents the results of the variance decomposition for emerging countries and shows that for emerging countries, bond flows themselves contribute 40% of the variation in bond flows and stock market returns contribute 15%. The relatively small proportion of the impact of flow changes may be due to the fact that the impact of stock market returns in emerging countries on bond flows is temporally sequential and there is no two-way causality. The money supply growth rate contributed 11%, the national debt rate contributed 8%, the contribution of the budget deficit to GDP ratio was at 16%, while the contribution of the public debt to GDP ratio was at 10%. The reason for the relatively high contribution rate of the budget deficit to GDP ratio is: this is because the budget deficit to GDP ratio reflects the economic situation. When the ratio is high, it indicates that the economic situation is expected to be poor, so when the economic situation is expected to deteriorate, Bond flows would increase.

From Table 7 we also know that the contribution rate of money supply and treasury bond interest rates to changes in stock market returns is greater than that of changes in bond flows,

The budget-to-deficit ratio to GDP ratio and the public debt-to-GDP ratio contribute more to changes in bond

flows than to changes in stock market returns. We can thus conclude that bond flows are more influenced by fiscal policy, while stock market returns are more influenced by monetary policy. This conclusion is also consistent with that of [18].

Table 7. Variance Decomposition Results in Emerging Countries

	Bond Flows	Stock Market Returns	Money Supply Growth	Budget Deficit to Gdp Ratio	Treasury Interest Rate	Public Debt As % of Gdp
Bond Flows	0.40	0.15	0.11	0.16	0.08	0.10
Stock Market Returns	0.15	0.40	0.20	0.10	0.09	0.06

Conclusion

This paper examines the relationship between bond fund flows and stock market returns in emerging countries, as well as their responses to changes in monetary and fiscal policies. The study results demonstrate that, in emerging countries, bond fund flows are affected by prior stock market returns when considering monetary and fiscal policies. These findings confirm the existence of negative feedback trading behavior in stock market trading.

Moreover, there is a negative correlation between expansionary monetary policy and bond fund flows, while expansionary fiscal policy is positively correlated with bond fund flows. This suggests that expansionary monetary policy predicts better expected economic conditions and thus has a negative impact on bond fund flows, whereas expansionary fiscal policy reflects anticipated poor economic conditions and thus has a positive impact on bond flows. Additionally, this indicates that bond funds, being fixed income securities, experience rapid growth during economic downturns and high-risk periods as investors prefer to purchase bonds during such conditions. In emerging countries, investment decisions are more cautious, and behavioral biases are more pronounced due to the incomplete development of financial markets, high access costs to information, and weak regulatory systems. These factors result in greater behavioral bias in market-based investment by investors.

The insights gained from the conclusions presented in this paper are valuable for market analysts and investors to enhance their understanding of the relationship between institutional investment and stock market returns. Policymakers and portfolio managers can make more informed investment decisions during crises and unfavorable economic conditions. Bond funds provide investors with a safe haven, particularly during times of declining stock markets and fragile economic conditions. Hence, investors are more inclined to utilize bond funds as an investment vehicle to safeguard themselves from potential setbacks during economic downturns.

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