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U.S. Monetary Policy, Emerging Market FDI Firms and Trade Credit

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Abstract

This article empirically explore a trade credit channel through which FDI firms can spread U.S. monetary policy shocks to the host country. Based on the firm-level data in emerging market countries provided by Osiris, This article finds that the U.S. monetary policy has a negative impact on the trade credit supply of FDI companies in emerging market countries and then affects the liquidity of local companies in the host country due to the financing advantages of FDI companies, and this impact is more pronounced for firms with less financing constraints and for firms whose parent companies are located in developed countries. Country heterogeneity analysis shows that the impact is greater in the host countries with more open capital accounts, less flexibility in exchange rates and higher levels of financial development. Further research shows that U.S. monetary policy eventually has an influence on the financial situation of the local firms in the host country by affecting the trade credit of FDI firms, and this channel has a greater impact on local companies which have a smaller scale and sectors that are highly dependent on external financing. Moreover, in this channel, the macro-prudential policies implemented by the host country are ineffective. Only capital controls can effectively weaken the influence, while foreign exchange intervention will amplify this impact.

Keywords

U.S. Monetary Policy, FDI Firm, Credit Trade, Shadow Rate

1. Introduction

During the 2008 financial crisis and the COVID-19 outbreak in 2020, the United States used a series of unconventional monetary policies to revive the domestic economy, which had a huge impact on global liquidity. As the dominant international settlement and reserve currency, the US dollar occupies an important

position in the world monetary system. In the Bretton Woods system, the United States is in the "centre" of the system, while China and other emerging market countries in the "periphery". In such a "center-peripheral" architecture, subject to the "central currency" interest rates and exchange rates of the global capital flows, the monetary policy will not only influence the United States, but also through cross-border capital flows and international trade spillover effects on other countries, resulting in emerging market countries face a high degree of uncertainty in the international economic environment and suffered a drastic impact (Canova, 2005). Hamada (1976) first developed countries to carry out a study on the spillover effects of monetary policy, and found that the economy's own level of economic development, the international economic status of the economy determines the level of the spillover effects of monetary policy. As the world's largest economy, the United States occupies a dominant position in international economic activities, and its spillover effect is naturally more significant (Ehrmann & Fratzscher, 2006). Mackowiak (2007) found that the impact of U.S. monetary policy had an even greater impact on the output and price levels of some emerging market economies than on the US. Emerging market countries should therefore remain vigilant against monetary policy shocks from the "centre country".

Academics are currently engaged in an intense debate on the above issues and have reached some consensus on many important issues, finding that United States monetary policy can have an impact on cross-border capital flows, economic growth, inflation, interest rates, exchange rates and asset prices in emerging market countries (Georgiadis, 2016).

However, most of the existing research is from the perspective of portfolio capital flows, cross-border bank loans and international trade transmission, with few literature exploring the role of foreign direct investment (FDI) capital flows in the international transmission of U.S. monetary policy. In fact, while many emerging market countries strictly restrict non-FDI capital flows, they are very open to FDI capital inflows. FDI firms often act as liquidity providers when there is ample liquidity in international capital markets or when there is a shortage of liquidity in the host country, passing liquidity through trade credit to credit-constrained local firms in the host country (Tong & Wei, 2011). So, does the presence of FDI firms create new channels for the transmission of U.S. monetary policy shocks to emerging market countries? If so, what are the implications for local firms in emerging market countries? To answer the above questions, this article selects 14 emerging market countries in 1994-2018 non-financial enterprises annual data, to explore the influence of the emerging market countries FDI enterprise trade credit, and widely explore the heterogeneity, the relationship between the two from the FDI enterprise characteristics, host country local enterprise characteristics and national characteristics.[1]

[1]The 14 emerging market countries include: Brazil, Bulgaria, Chile, China, Colombia, Croatia, Hungary, Malaysia, Mexico, Pakistan, the Philippines, Romania, Russia and South Africa.

We find that: 1) due to the financing advantages of FDI enterprises, when the monetary policy of the United States is loose, FDI enterprises in emerging market countries will increase the supply of trade credit, and transfer the liquidity obtained to the local enterprises of the host country in the form of trade credit, resulting in the impact of the U.S. monetary policy on China. Moreover, U.S. monetary policy has a greater impact on trade credit for FDI companies located in developed countries. 2) The heterogeneity at the country level shows that the impact is greater in the host countries with a more open capital account, less exchange rate flexibility and higher financial development. 3) U.S. monetary policy eventually affects the financial situation of the local enterprises in the host country by affecting the trade credit of FDI enterprises. When the U.S. monetary policy is loose, FDI enterprises increase the supply of trade credit, reducing the debt financing cost and bank loans of the host enterprises. However, when the U.S. monetary policy is tight, it eventually increases the debt financing cost of the host enterprises. It has a greater impact on smaller local firms that are more dependent on external financing. 4) In this channel, as FDI firms are able to bypass the host country's domestic financial institutions to finance themselves directly in the international market, macroprudential policies implemented by the host country are ineffective, and only capital controls are effective in weakening the impact of U.S. monetary policy, while foreign exchange intervention amplifies this impact.

The article makes a marginal contribution in the following three points. First, it enriches the relevant literature on the spillover effects of U.S. monetary policy on emerging market countries. Although the spillover effect of U.S. monetary policy on emerging market countries has become a hot issue in the academic circle, most of the existing studies focus on the impact of U.S. monetary policy on the macroeconomic, financial and monetary policies of other countries, with few studies on the impact of the micro-enterprise level. We study the influence of the spillover effect of American monetary policy from the enterprise level. After clarifying the channels, we explore the heterogeneity caused by the characteristics at the enterprise level and the national level. Secondly, it expands the study on the influence of FDI enterprises on local enterprises in the host country. Previous literature has found that the inflow of FDI can reduce the financing constraints for domestic enterprises (Harrison et al., 2004). We provide a possible explanation for this phenomenon. FDI enterprises are able to provide trade credit to local enterprises in the host country when the international capital market liquidity is sufficient, which may be one reason why the FDI inflow can ease the financing constraints of domestic enterprises. In addition, this paper also explores how this behavior of FDI enterprises can spread the impact of U.S. monetary policy. Finally, it enriches the relevant research on the influence channels of U.S. monetary policy on emerging market countries. More literature on the influence of the monetary policy spillover effect channel research has found channels, including interest rate channels, exchange rate channels,

credit channels, asset price channels, expected channel, etc. We combine the emerging market FDI capital flows with FDI enterprise trade credit channels and find that macro-prudential policy cannot control the spillover effect of the monetary policy mechanism. Although the host country may have a strict control over non-FDI capital flows, FDI companies can spread U.S. monetary policy shocks to the host country through trade credit channels.

This paper has important policy implications, highlighting the crucial role of often overlooked FDI capital flows in transmitting U.S. monetary policy shocks. Despite some emerging market countries strictly controlling non-FDI international capital flows, FDI companies can still propagate the impact of U.S. monetary policy to host countries through trade credit channels, influencing the financial situation of local companies. Macro-prudential policies, however, are unable to mitigate this impact.

The rest of this paper is structured as follows: the second part includes the literature review and research hypotheses; the third part covers the empirical methods and data sources; the fourth part presents the empirical results; the fifth part delves into further exploration; the sixth part conducts the robustness test; and the seventh part concludes with policy recommendations.

2. Literature Review and Research Hypotheses

2.1. Trade Credit

Trade credit is a way for enterprises to finance their money. Cuñat (2007) believes that fast-growing companies can use trade credit for financing when other types of financing are insufficient. Moreover, in times of domestic credit tightening, trade credit is an important part of external financing (Petersen & Rajan, 1997; Fisman & Love, 2003; Mateut et al., 2006; Nilsen, 2002).

In addition to receiving trade credit from suppliers, companies also offer trade credit to their customers. The motivation for enterprises to provide trade credit was originally proposed by Schwartz (1974). He believes that because trade credit can provide the time value of money, buyers will be more inclined to choose suppliers who can provide trade credit. As a result, companies with higher market positions will sell as much credit as possible and provide trade credit to improve their competitive position in the market and thus reap higher profits (Petersen & Rajan, 1997).

In order to prevent liquidity shocks that may endanger the survival of their customers, suppliers will also actively choose to act as liquidity providers and increase trade credit (Cuñat, 2007). Because suppliers can closely monitor their customers in normal business, get more information, even if the buyer financial crisis, can also threaten to cut off the future supply, forced buyers to repay trade credit, therefore, even if the trade credit to limited financing sources, suppliers will not take greater risk (Petersen & Rajan, 1997). In addition, some companies are able to finance in the capital markets at a lower cost than their customers,

and these companies will be more motivated to use their financing ability to deliver credit to their customers. Through this channel, liquidity is allocated from companies with greater financing capacity to companies with limited credit (Boissay & Gropp, 2007).

The literature has confirmed this conclusion by using data from during the financial crisis. During the financial crisis, enterprises with high liquidity level before the crisis increased the supply of trade credit to other enterprises, and companies with scarce liquidity increased significantly. This suggests that cash-rich suppliers are ready to support the credit needs of their customers when other external sources of financing are limited (Garcia-Appendini & Montoriol-Garriga, 2013).

2.2. The Spillover Effect of U.S. monetary Policy on Emerging Market Countries

Most of the existing literature explores the spillover effects of U.S. monetary policy on the macro level of emerging market countries, such as the impact on cross-border capital flows, economic growth, inflation, interest rates, exchange rates, and asset prices. The results show that the US tightening monetary policy will lead to a massive flight of capital from emerging market countries, lower asset prices and weaker currencies. In addition, when short-term interest rates in the United States rise, short-term interest rates in emerging market countries will also rise, leading to a decline in economic growth and lower inflation levels (Georgiadis, 2016). On the other hand, the change of the US benchmark interest rate and the exchange rate of the US dollar will also have a significant impact on the currency exchange rate of emerging market countries, increasing the exchange rate volatility and affecting the stability of the currency value. On the contrary, the loose monetary policy of the United States will reduce the yields of domestic and foreign long-term bonds, leading to large capital flows and flooding into emerging markets, making stock prices rise and currency appreciation in emerging economies, and eventually lead to overheating in emerging economies such as Brazil and China (Ahmed & Zlate, 2014; Chen et al., 2016).

The monetary policy of the United States will affect the macroeconomic environment of emerging market countries through various overlapping channels, and will eventually lead to changes in the external financing environment of enterprises in emerging market countries. For example, the loose monetary policy of the United States will lead to a large amount of international capital flowing into emerging market countries, increasing the supply of social funds, thus reducing the financing costs of enterprises in emerging market countries and easing the financing constraints of enterprises. At the same time, higher asset prices due to loose U.S. monetary policy will also increase the value of collateral and improve companies' finances, thus easing lending restrictions. Therefore, theoretically, the spillover effect of U.S. monetary policy on the macroeconomic environment of emerging market countries will also be transmitted to micro en-

terprises, which will eventually affect the investment and financing behavior and financing costs of enterprises in emerging market countries. Some scholars have made relevant exploration and confirmed this inference through empirical research. Ma et al. (2020) found that the tight monetary policy in the United States will have a significant negative impact on the investment of Chinese listed companies, and the underlying stocks of "Shanghai-Hong Kong Stock Connect" and "Shenzhen-Hong Kong Stock Connect" will have a greater negative impact.

2.3. Propose a Hypothesis

Comb the existing U.S. monetary policy on emerging market countries spillover effect related literature can be found that the existing research is mostly focus on emerging markets, the national macro level of the influence of economic, financial and monetary policy, and the national characteristics of heterogeneity in the U.S. monetary policy how to affect the micro enterprise, few research, only explore the literature influence direction and size, not explore the influence mechanism, such policy advice is relatively broad, general, is not specific.

On the other hand, much current literature explores the spillover effect of U.S. monetary policy on emerging market countries from the perspective of portfolio capital flows, cross-border bank loans and international trade, and few people pay attention to the role of the opening of FDI flows in the international transmission of the impact of U.S. monetary policy. In fact, while many emerging market countries strictly restrict non-FDI flows, they are very open to FDI capital flows, and FDI capital inflows can ease financing constraints for local companies in the host country (Harrison et al., 2004). This may be due to the fact that FDI companies in emerging markets have the financing advantage to finance in global financial markets (Froot & Stein, 1991; Desai et al., 2006; Wang & Wang, 2015). As a result, FDI companies often act as liquidity providers, transferring liquidity to local companies with sufficient liquidity in trade credit (Tong & Wei, 2011).

The dollar as the main international settlement currency, currency, investment and financing currency and reserve currency, the monetary policy will also affect global liquidity and global financing costs, especially in the 2008 financial crisis and 2020 COVID-19 outbreak, the United States used a series of unconventional monetary policy, a huge impact on global liquidity. Therefore, this study believes that the impact of U.S. monetary policy on emerging market countries may also play a role through the FDI channel. Specifically, when the monetary policy of the United States is loose, the international capital market has sufficient liquidity, and FDI enterprises can make use of their financing advantages to raise funds in the international capital market at a lower cost. In order to improve their competitive position in the market and obtain higher profits, FDI enterprises increase the supply of trade credit, and the impact of U.S. monetary policy can be transmitted to the host country. However, when the monetary policy of the United States is tight, the liquidity of the international

capital market is short of money, and the financing cost is high. The financing advantage of FDI enterprises is no longer, and the financing cost increases, and FDI enterprises will reduce the supply of trade credit. Based on this, our core hypothesis is proposed:

H1: U.S. monetary policy will have a negative impact on the supply of trade credit for FDI companies in emerging market countries.

3. Data and Methodology

3.1. Research Design

In order to verify the core hypothesis H1 and explore whether the U.S. monetary policy will affect the supply of trade credit for FDI enterprises, this paper uses the benchmark model (1) to analyze:

$$tradecredit_{i,c,t} = \alpha + \beta \times FDI_i \times USMP_t + \delta \times firm_{i,t-1} + \tau \times country_{c,t} + \gamma_i + \mu_t + \varepsilon_{i,c,t} \quad (1)$$

where, the subscript, c, indicate the enterprise, country and time respectively. The explained variable $tradecredit_{i,c,t}$ represents the trade credit. FDI_i is a dummy variable whose value is 1 when the enterprise is an FDI enterprise, otherwise 0. $USMP_t$ indicates the monetary policy of the United States, measured by the shadow interest rate of the United States. $firm_{i,t-1}$ is the control variable at the enterprise level, including the enterprise size, years of establishment, profit margin, leverage ratio and current ratio. In order to avoid possible endogenous problems, we lags the control variable for one time. $country_{c,t}$ is the control variable at the macro level, including the real GDP growth rate, real effective exchange rate and domestic monetary policy. γ_i and μ_t respectively represents the enterprise fixed effect and time fixed effect. The regression equation does not include separate additions of the U.S. monetary policy indicators and FDI virtual variables but the product of them. This is because the monetary policy index does not change with the individual variables, will be fully absorbed by time fixed effect. FDI variable does not change with time, in the regression will be fully absorbed by individual fixed effect. This paper clusters at the enterprise level. For the regression results, we mainly focus on the sign of the β. If the hypothesis holds true, when shadow interest rates decline, FDI companies in emerging market countries are expected to increase the supply of trade credit to enhance profitability. Therefore, the symbol of β is expected to be negative.

In order to further test the heterogeneity of this impact in different countries and among different enterprises, this study introduces enterprise characteristic variables and national characteristic variables in the model (1) to construct interaction terms as follows:

$$\begin{aligned} tradecredit_{i,c,t} = {} & \alpha + \beta_1 \times X_{i,c,t} \times FDI_i \times USMP_t + \beta_2 \times FDI_i \times USMP_t \\ & + \beta_3 \times X_{i,c,t} \times FDI_i + \beta_4 \times X_{i,c,t} \times USMP_t \\ & + \delta \times firm_{i,c,t-1} + \tau \times country_{c,t} + \gamma_i + \mu_t + \varepsilon_{i,c,t} \end{aligned} \quad (2)$$

$X_{i,c,t}$ includes corporate financing constraints, monetary policy of the host

country, capital account openness, exchange rate flexibility and financial development degree. This model tests the heterogeneity at the enterprise and national level.

Further, to test the effectiveness of the host country's response in this channel, we replace $X_{i,c,t}$ as macro-prudential policies, capital control measures and foreign exchange intervention implemented by the host country

3.2. Variable Measurements

[2]In this paper, the annual data of non-financial enterprises in 16 emerging market countries from 1994 to 2018 in the global Listed Enterprise analysis database (Osiris database) are taken as the original sample. After excluding the observed values of enterprises and export enterprises with missing final owner information, the non-equilibrium panel data containing a total of 16,063 observations of 2505 non-financial enterprises is obtained. The continuous variables at the enterprise level are reduced by 1%. The definition and calculation methods of the main variables are as follows:

1) Trade credit (trade credit)

In this paper, net accounts receivable is used as a proxy variable for enterprise trade credit in the benchmark regression, which is specifically calculated as net accounts receivable/sales volume 100.

2) FDI enterprise virtual variable (FDI)

Osiris The database provides the shareholder data of the enterprise, and constructs the FDI enterprise virtual variable according to the country information of the final owner of the enterprise. When the enterprise is an FDI enterprise, its value is 1, otherwise 0.

3) U.S. monetary policy

This article uses shadow interest rate constructed by Wu and Xia (2016) as the proxy variable of U.S. monetary policy. When the US interest rate is at the zero interest rate limit, the Federal Reserve usually adopts unconventional monetary policy. At this time, the federal funds rate cannot truthfully reflect the situation of the U.S. monetary policy. Therefore, this article uses interest rate as the proxy variable of the U.S. monetary policy. In order to ensure the robustness of the results, the US federal funds rate is used to measure the U.S. monetary policy in the robustness test.

4) The agent variable for the enterprise characteristics

The KZ and SA indices are often used in the literature (Kaplan & Zingales, 1997; Hadlock & Pierce, 2010). Because the Tobin Q index required for the KZ index has many missing values in the Osiris database, the SA index was used to measure the financing constraint.

Given the relatively developed financial market and a sound legal and institu-

[2]The 16 emerging market countries include: Brazil, Bulgaria, Chile, China, Colombia, Croatia, Hungary, Malaysia, Mexico, Pakistan, the Philippines, Romania, Russia, South Africa, Ukraine and Venezuela.

tional environment, it is generally believed that the external financing dependence index of industries calculated using US corporate data is more accurate (Rajan & Zingales, 1998). This study uses the financial data of listed companies in the United States and uses the practice of Rajan and Zingales (1998) to calculate the degree of external financing dependence in various industries. First, calculate the degree of external financing dependence of the enterprise. The calculation formula is as follows:

$$\text{External financing dependence degree} = (\text{capital expenditure} - \text{cash flow}) / \text{capital expenditure}$$

Among them, cash flow = operating cash flow + decrease in inventory + decrease in accounts receivable + increase in accounts payable. After obtaining the external financing dependence of each enterprise in each year, the average of each enterprise is taken as the external financing dependence of the enterprise; then, for each industry, the median of all enterprises in the industry is taken as the external financing dependence of the industry, and finally get the external financing dependence index of each industry.

5) Proent variables for national characteristics of the host country

The degree of capital account openness is measured by the financial openness index constructed by Chinn and Ito (2006). The level of financial development is measured by the IMF's financial Development Index. Exchange rate elasticity is measured by the difference between 1 and the "Exchange Rate Stability Index" constructed by Aizenman et al. (2016).[3] In order to control the active adjustment of domestic monetary policy, the regression of the residual item of the deposit interest rate in emerging markets and the US shadow interest rate is used as the proxy variable of the monetary policy of the host country. However, since the residual item reflects the active adjustment part of the domestic monetary policy, it does not fully reflect the tightening degree of domestic monetary policy, the growth rate can be used to measure the monetary policy of the host country.[4]

6) Enterprise-level control variables

Enterprise-level control variables include enterprise size, years of establishment, profit margin, leverage ratio and flow ratio. Enterprise size is measured by the log value of the total assets. The period of establishment of an enterprise is measured by the value of the difference between the current year and the initial year of the enterprise. Margins are measured as the ratio of total profit to sales revenue. Leverage ratio is measured by the corporate financial leverage ratio. The current ratio is measured as the ratio of current assets to current liabilities.

7) Control variables at the national level

[3]The Aizenman et al. (2016) ranges from 0-1.

[4]Since emerging market countries often use quantitative tools rather than price tools as monetary policy control tools, the money supply is a better indicator of the host country's domestic liquidity situation than interest rates.

Control variables at the national level include the real GDP growth rate, the real effective exchange rate and the domestic monetary policy. Emerging market countries often make passive adjustments with the changes of monetary policy of the U.S. In order to control the active adjustment of domestic monetary policy, the residual item of the return of the deposit interest rate of emerging market countries and the shadow interest rate of the United States is used as the proxy variable of domestic monetary policy. National level control variables data were obtained from the EIU database (Table 1).

4. Empirical Results

4.1. Benchmark Regression

We examine the impact of U.S. monetary policy on FDI enterprise trade credit based on model (1), and the regression results are shown in Table 2. Column (1) shows that the FDI × USMP cross-multiplication coefficient is significantly negative, and the FDI × USMP coefficient remains significant at the 1% confidence level after adding the national level control variable. Based on the regression coefficient in Table 2, the 1 percentage point decrease in US shadow rates increases the ratio of net receivables to sales for FDI companies in emerging markets by about 0.9% compared to local companies in the host country. According to the descriptive statistics, this impact is equivalent to a 5% increase in the supply of trade credit for companies at the median level of trade credit. This shows that when hypothesis 1 is established and the monetary policy of the United States is loose, FDI enterprises will increase the supply of trade credit compared to local companies of the host country, which leads to the liquidity shocks to the country. After excluding the financial crisis, the results remained robust.

Net accounts receivable consist of accounts receivable and accounts payable. The empirical results are presented in Table 3. The findings indicate that U.S. monetary policy and FDI dummy variables are significantly negative only when receivables are the dependent variable, with significance observed at least within the 5% confidence interval. However, when accounts payable is the dependent variable, neither the U.S. monetary policy nor FDI dummy variables show significance. This suggests that U.S. monetary policy does influence trade credit by affecting the receivables of FDI companies.

Trade credit is not only reflected in the amount of credit supply but also in the lending time. FDI enterprises may provide trade credit to local enterprises in the host country by adjusting the turnover time of accounts receivable. The dependent variable was replaced with the turnover time of accounts receivable and accounts payable, and the empirical results are presented in Table 4. The results indicate that U.S. monetary policy not only influences the number of accounts receivable for FDI enterprises but also affects the duration of accounts receivable. When U.S. monetary policy is loose, the accounts receivable turnover days of FDI enterprises also increase. Based on the regression coefficient in Table 4, it can be inferred that a 1% decrease in shadow interest rates, compared with local

Table 1. Descriptive statistics for the main variables.

	Variable name	Variable meaning	mean	sd	max	min	number of observations
kernel variable	tradecredit	Net loan receivable/sales of (%)	26.922	30.486	255.195	0.000	16,063
	USMP	US shadow interest rates	0.410	2.166	6.283	−2.736	16,063
	FDI	The FDI enterprise dummy variable	0.059	0.236	1.000	0.000	16,063
Enterprise feature variable	SA	Enterprise financing constraints	2.675	2.879	15.820	−2.495	16,063
	RZ	Industry external financing dependence degree	5.003	30.503	171.158	−108.738	5353
National feature variable	m^2	Host country m^2 growth rate	11.827	8.201	72.736	−10.538	16,063
	kaopen	Capital account openness	0.348	0.252	1.000	0.000	16,063
	erf	Elasticity of exchange rate	0.531	0.254	0.954	0.000	16,063
	fd	Financial development degree	0.514	0.135	0.668	0.134	16,063
Enterprise-level control variables	size	Scale	20.698	2.679	30.131	15.630	16,063
	age	Enterprise establishment years	2.918	0.876	4.736	0.693	16,063
	profit	Profit margin	8.104	17.601	60.960	−66.560	16,063
	lev	Financial leverage ratio	78.704	105.990	640.430	0.090	16,063
	current	Current ratio	1.931	2.071	20.050	0.150	16,063
Control variables at the national level	reer	Real effective exchange rate	0.104	6.313	15.387	−20.137	16,063
	rgdp	Real GDP growth rate	4.996	3.250	11.467	−5.130	16,063
	e	The residual difference of interest rates on shadow rates	−0.794	3.015	17.670	−4.395	16,063
Other dependent variables	day 1	Days of receivables turnover	90.990	95.033	485.650	0.180	16,063
	day 2	Accounts payable turnover days	64.315	83.466	1420.810	0.000	16,063
	receiveble	Accounts receivable/sales volume (%)	29.749	34.842	300.012	0.090	16,063
	payable	Accounts payable/Sales volume (%)	2.541	6.071	53.672	0.000	16,063
	cost	Debt financing costs	3.275	2.900	18.934	0.000	14,119
	loan	Bank advance	0.119	0.119	0.706	0.000	16,063
State regulation measures	imapp	Macro-prudential policy	2.410	2.501	13.000	−7.000	16,063
	ka	Capital control	0.714	0.232	1.000	0.000	14,315
	fxi	Foreign exchange intervention	0.505	4.593	23.194	−9.830	15,796

enterprises in the host country, will result in FDI enterprises extending their accounts receivable turnover days by about two days. This change, equivalent to a 3% extension in the median level of accounts receivable turnover days, holds economic significance.

Table 2. Benchmark regression results.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Benchmark regression		Eliminate the financial crisis	
FDI × USMP	−0.983***	−0.815***	−0.916***	−0.739**
	(−3.294)	(−2.727)	(−3.000)	(−2.418)
Constant	−25.741***	−17.174**	−24.171***	−15.120*
	(−3.344)	(−2.193)	(−3.034)	(−1.859)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.709	0.711	0.715	0.716

Note: Column (1) and (3) report the estimates for the regression with control variables at enterprise level, enterprise fixed effect and time fixed effect. Column (2) and (4) report the estimates for the regression additionally with national-level control variables. Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 3. Change of dependent variables: accounts receivable and accounts payable.

variable	(1)	(2)	(3)	(4)
	accounts receivable		accounts payable	
FDI × USMP	−0.956***	−0.779**	−0.049	−0.030
	(−2.784)	(−2.266)	(−0.694)	(−0.420)
Constant	8.184	17.048*	20.452***	21.433***
	(0.924)	(1.891)	(11.138)	(11.441)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	16,063	16,063
R-squared	0.705	0.707	0.581	0.582

Note: The independent variable in column (1) and (2) is accounts receivable. The independent variable in column (3) and (4) is accounts payable. Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 4. Change of dependent variable: turnaround time.

variable	(1)	(2)	(3)	(4)
	receivables turnover days		payable turnover days	
FDI × USMP	−2.661***	−2.205**	−1.145	−0.892
	(−3.103)	(−2.567)	(−1.271)	(−0.986)
Constant	−119.865***	−96.884***	−127.683***	−114.663***
	(−5.419)	(−4.304)	(−5.497)	(−4.837)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	16,063	16,063
R-squared	0.749	0.755	0.625	0.642

Note: The independent variable in column (1) and (2) is receivables turnover days. The independent variable in column (3) and (4) is payable turnover days. Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

4.2. The Heterogeneity of FDI Enterprises

Cash-rich suppliers are ready to support the credit needs of their customers (Garcia-Appendini & Montoriol-Garriga, 2013). Therefore, it can be inferred that FDI companies with smaller financing constraints are more likely to adjust their credit supply according to U.S. monetary policy. **Table 5** indicates that the coefficient of FDI × USMP × SA has a positive sign and is significant, at least at the 5% confidence level. This implies that U.S. monetary policy has a greater impact on the trade credit of FDI enterprises with fewer financing constraints, significantly affecting the liquidity of trade credit in host countries provided by FDI enterprises with fewer financing constraints. The results remained robust even after excluding the financial crisis period.

FDI companies, whose parent companies are located in different countries, may perform differently when experiencing global shocks. The findings in **Table 6** indicate that the multiplication coefficient of FDI_AE × USMP is significantly negative, at least at a 5% confidence level, while the multiplication coefficient of FDI_other × USMP is only significantly negative in column (1), and only at a 10% confidence level. It is not significant under other control conditions, suggesting that the trade credit of FDI enterprises with the same-country parent company is significantly affected by U.S. monetary policy, whereas the monetary policy of the parent company has little impact on FDI enterprises in non-developed countries. After excluding the financial crisis period, the results remained robust. This conclusion aligns with the research findings in the literature that when the Federal Reserve implements loose monetary policy, international capital tends to flow from developed countries to emerging markets with higher yields.

Table 5. Corporate financing constraints.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
FDI × USMP	−1.741***	−1.461***	−1.499***	−1.202**
	(−3.629)	(−3.043)	(−3.042)	(−2.435)
FDI × USMP × SA	0.222***	0.192**	0.190**	0.157*
	(2.844)	(2.458)	(2.370)	(1.958)
Constant	−198.172***	−188.588***	−193.039***	−182.615***
	(−8.049)	(−7.664)	(−7.652)	(−7.240)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.712	0.713	0.718	0.719

Note: This table reports the results that we introduce an interaction term between corporate financing constraints, U.S. monetary policy, and FDI virtual variables in model (1). That is, using corporate financing constraints as the enterprise characteristic variable, and conducting regression in model (2). Corporate financing constraints are measured using the SA index. Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6. Distinguishes the types of parent countries.

variable	Dependent variable: net receivables / sales			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
FDI_AE × USMP	−1.021***	−0.911***	−1.028***	−0.916**
	(−2.903)	(−2.592)	(−2.860)	(−2.552)
FDI_other × USMP	−0.893*	−0.584	−0.645	−0.309
	(−1.664)	(−1.089)	(−1.173)	(−0.561)
Constant	−25.787***	−17.268**	−24.318***	−15.304*
	(−3.349)	(−2.204)	(−3.051)	(−1.881)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.709	0.711	0.715	0.716

Note: FDI_AE is set to 1 if the parent company of the FDI enterprise is in the same country. Otherwise, FDI_other is set to 1. Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

4.3. National Heterogeneity

For emerging economies with different characteristics, the impact of U.S. monetary policy may be heterogeneous. This section examines whether the above conclusions will change in emerging economies with varying characteristics. Specifically, it considers four aspects of country-level heterogeneity: host country monetary policy, capital account openness, exchange rate flexibility, and the degree of financial development.

The replenishment of capital market credit may reduce the effectiveness of domestic tightening monetary policy (Schwartz, 1974). Atanasova and Wilson (2004) also found that 80% of British companies had trade credit significantly during deflation. Therefore, the impact of U.S. monetary policy on the trade credit of FDI enterprises in emerging market countries may be related to the monetary policy of the host countries. A tightening of monetary policy in emerging market countries will lead to tight domestic liquidity. Therefore, when the domestic monetary policy is tight, if the Federal Reserve cuts interest rates at this time, FDI enterprises tend to provide more trade credit compared with the period of abundant domestic liquidity. If the Federal Reserve raises interest rates at this time, FDI enterprises are more inclined to reduce more trade credit than the period of abundant domestic liquidity.

The empirical results are presented in Table 7. The results in Table 7 show

Table 7. Monetary policy of the host country.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
FDI × USMP	−1.366**	−1.287**	−1.225**	−1.162**
	(−2.461)	(−2.313)	(−2.160)	(−2.044)
FDI × USMP × m^2	0.070***	0.066**	0.068***	0.065**
	(2.690)	(2.561)	(2.588)	(2.471)
Constant	−25.460**	−24.316**	−21.888*	−20.892*
	(−2.264)	(−2.161)	(−1.861)	(−1.776)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.674	0.675	0.684	0.685

Note: This table reports the results that we introduce emerging market monetary policy and domestic monetary policy, along with FDI virtual variables, in model (1). This involves using domestic monetary policy as the national characteristic variable in regression model (2). Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

that the coefficient for FDI × USMP × m^2 has a positive sign and is significant, at least at the 5% confidence level, regardless of the control conditions. This suggests that when domestic monetary policy is tight, U.S. monetary policy has a greater impact on trade credit for FDI businesses. When the host country implements tight monetary policy, loose U.S. monetary policy will reduce the effectiveness of the tight monetary policy by affecting the supply of trade credit for FDI enterprises, while tight U.S. monetary policy will aggravate the liquidity shortage in the host country. After excluding the financial crisis, the results remained robust.

Kearns et al. (2018) believe that the degree of financial openness is the most important factor leading to the heterogeneity of the spillover effects of the U.S. monetary policy. The more open a country's capital account is, the lower the limit on FDI capital inflows, and the closer the FDI company may be with its parent company. Therefore, the impact of U.S. monetary policy on the trade credit for FDI enterprises in emerging market countries may be related to the openness of the capital account in emerging market countries.

In order to test the heterogeneity of U.S. monetary policy on trade credit for FDI enterprises in countries with different levels of capital account openness, the interaction term between capital account openness, U.S. monetary policy, and FDI virtual variables is introduced in the equation, representing the national heterogeneity of capital account openness. Regression is conducted using model (2), and the results are presented in **Table 8**. The findings in **Table 8** indicate that the cross-multiplier coefficient for FDI × USMP × kaopen is significantly negative, reaching the 1% confidence level. This suggests that in countries with higher capital account openness, loose U.S. monetary policy has a more pronounced impact on trade credit for FDI businesses. After excluding the financial crisis, the results remained robust. Despite the coefficient of FDI × USMP becoming positive, given the mean kaopen variable for FDI enterprises at 0.409, the overall effect of FDI × USMP remains negative.[5] This result indicates that the impact of U.S. monetary policy on emerging market countries is largely influenced by the level of capital account openness. As capital account openness increases, the impact of U.S. monetary policy shocks on emerging market countries gradually intensifies.

A flexible exchange rate can help economies mitigate external shocks and reduce the spillover effects of U.S. monetary policy (Georgiadis, 2016). Therefore, the impact of U.S. monetary policy on the trade credit of FDI enterprises in emerging market countries may be related to the exchange rate flexibility of emerging market countries.

In order to test the influence of American monetary policy on trade credit for FDI enterprises in the heterogeneity between countries with different exchange rate elasticity, this paper introduces monetary policy and the interaction between

[5]For column (1), 0.409 × (−5.076) + 2.015 = −0.004, for column (2), 0.409 × (−5.164) + 2.108 = −0.060.

Table 8. Degree of capital account openness.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
FDI × USMP	2.015***	2.108***	1.963***	2.044***
	(3.443)	(3.594)	(3.310)	(3.438)
FDI × USMP × kaopen	−5.076***	−5.164***	−4.735***	−4.815***
	(−4.613)	(−4.692)	(−4.230)	(−4.299)
Constant	−29.816***	−27.624**	−27.400**	−25.321**
	(−2.669)	(−2.469)	(−2.347)	(−2.165)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.675	0.675	0.684	0.685

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

FDI virtual variables into the equation, specifically addressing the country heterogeneity in exchange rate elasticity. Regression is conducted using model (2), and the results are presented in Table 9. The findings in Table 9 show that the FDI × USMP × erf cross-term coefficient is positive and significant at the 1% confidence level under all control conditions. This indicates that for countries with lower exchange rate flexibility, U.S. monetary policy has a positive impact on trade credit for FDI enterprises, and a floating exchange rate system can help emerging economies absorb part of the impact of U.S. monetary policy. After excluding the financial crisis, the results remained robust.

Georgiadis (2016) found that the spillover effect of U.S. monetary policy was more pronounced for countries with lower financial development. Therefore, the impact of U.S. monetary policy on the trade credit of FDI enterprises in emerging market countries may be correlated with the degree of financial development in those countries. In order to test the influence of monetary policy on trade credit for FDI enterprises in different degrees of financial development, this paper introduces financial development into the equation along with monetary policy and FDI virtual variables. Financial development is measured by the degree of national heterogeneity in financial development, and regression is performed using model (2). The results, shown in Table 10, indicate that the coefficient for FDI × USMP × fd is significantly negative, while the FDI × USMP coefficient is no longer significant. This suggests that for countries with higher

Table 9. Exchange rate elasticity.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
FDI × USMP	−2.429***	−2.305***	−2.131***	−2.017***
	(−4.295)	(−4.077)	(−3.674)	(−3.478)
FDI × USMP × erf	2.999***	3.011***	2.562***	2.611***
	(3.204)	(3.220)	(2.659)	(2.713)
Constant	−29.032***	−20.625***	−27.521***	−18.598**
	(−3.782)	(−2.627)	(−3.464)	(−2.283)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.712	0.713	0.717	0.718

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 10. Degree of financial development.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
FDI × USMP	1.301	1.207	1.598	1.477
	(1.271)	(1.177)	(1.526)	(1.409)
FDI × USMP × fd	−4.700**	−4.326*	−5.211**	−4.789**
	(−2.030)	(−1.867)	(−2.203)	(−2.023)
Constant	−19.763**	−11.688	−17.923**	−9.472
	(−2.529)	(−1.472)	(−2.211)	(−1.146)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	15,098	15,098
R-squared	0.710	0.712	0.715	0.717

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

financial development, U.S. monetary policy has a more pronounced impact on the trade credit of FDI enterprises, highlighting the important role of financial development in this context. After excluding the financial crisis, the results remained robust.

The empirical results presented here contradict those of Georgiadis (2016). This discrepancy arises from the fact that the degree of financial development influences the spillover effect from two channels in response to exogenous changes in U.S. monetary policy. On one hand, economies with higher financial development tend to have higher leverage, leading to the credit channel of U.S. monetary policy. On the other hand, financial systems with stronger competitive pressure and fewer frictions can more effectively reduce information asymmetry, thereby mitigating the financial accelerator effect (Georgiadis, 2016). The influence of the two channels is in opposite directions, and determining which channel dominates depends on the specific circumstances. In Georgiadis (2016), a substantial number of developed countries were included alongside emerging markets. His empirical results from heterogeneity tests reveal that only financial development in developed countries can mitigate the spillover effects of U.S. monetary policy. Research by Nier et al. (2014) has found that financial development in emerging market countries amplifies the impact of global financial shocks on capital flows. Therefore, our findings are consistent with existing research. Based on our research results, it can be inferred that in the trade credit channel of FDI enterprises, the degree of financial development predominantly amplifies the influence on the credit channel of American monetary policy, while the mitigating effect on the financial accelerator effect is relatively small.

The IMF's financial development degree index comprises two sub-indexes: the financial market index and the financial institutions index. To validate our conclusion, both sub-indices are incorporated into model (2) for illustration. If the degree of financial development predominantly amplifies the influence of the credit channel of U.S. monetary policy, then more developed financial institutions will be more affected by U.S. monetary policy. Conversely, if the degree of financial development primarily mitigates the financial accelerator effect, then the more developed the financial market, the less it will be affected by U.S. monetary policy. The empirical results are presented in **Table 11**, where (1) and (2) showcase the empirical results of the financial institutions index, while (3) and (4) present the empirical results of the financial market index. The findings indicate that the amplifying influence of the degree of financial development on the credit channel of U.S. monetary policy is predominant. This amplification intensifies the impact of U.S. monetary policy on the trade credit of FDI enterprises in emerging market countries. As financial institutions continue to develop in emerging market economies, the impact of U.S. monetary policy on the trade credit of FDI enterprises in these countries will be further enhanced.

4.4. Response Measures to the Inflow Country

Emerging markets often respond by taking measures to mitigate the impact of

Table 11. Degree of financial development items.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Index of financial institutions		Financial Market Index	
FDI × USMP	1.901*	1.685	−0.866	−0.753
	(1.724)	(1.525)	(−1.327)	(−1.154)
FDI × USMP × fd	−6.758***	−6.026***	0.280	0.168
	(−2.944)	(−2.622)	(0.187)	(0.112)
Constant	−36.625***	−27.398***	−21.874***	−16.338**
	(−4.669)	(−3.402)	(−2.803)	(−2.072)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	16,063	16,063	16,063	16,063
R-squared	0.711	0.712	0.710	0.712

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

global financial shocks on their domestic economies and financial markets. We introduce an interaction term between macroprudential policies, capital controls, foreign exchange interventions, U.S. monetary policy, and FDI virtual variables into the equation. Model (2) is employed for regression, and the results are presented in Table 12. The findings in Table 12 indicate that the FDI × USMP × iMapp coefficient is not significant, the FDI × USMP × ka coefficient is significantly negative, and the FDI × USMP × fxi coefficient, after incorporating national-level control variables, is also significantly negative. This suggests that macroprudential policies alone cannot weaken the influence of monetary policy, while capital controls prove effective in mitigating this influence. On the other hand, foreign exchange intervention amplifies the effect. This may be attributed to the ability of FDI companies to raise funds directly in the international market, bypassing domestic financial institutions, and consequently, the effectiveness of macroprudential policies is limited. Therefore, to mitigate the shocks from U.S. monetary policy, emerging market countries can consider adopting capital controls if necessary.

5. Further Explore

5.1. Economic Consequences of Local Enterprises in the Host Country

FDI companies in emerging markets transmit the impact of U.S. monetary policy

Table 12. Response measures for the incoming countries.

variable	Dependent variable: net receivables/sales					
	(1)	(2)	(3)	(4)	(5)	(6)
	Macroprudential		Capital control		Foreign exchange intervention	
FDI × USMP	−0.910***	−0.669*	−2.517**	−2.267**	−0.941***	−0.750**
	(−2.620)	(−1.927)	(−2.467)	(−2.224)	(−2.845)	(−2.264)
FDI × USMP × imapp	−0.143	−0.159				
	(−1.172)	(−1.299)				
FDI × USMP × ka			2.990**	2.688*		
			(1.984)	(1.786)		
FDI × USMP × fxi					−0.071	−0.105*
					(−1.216)	(−1.793)
Constant	−31.728***	−22.694***	−21.026**	−14.759*	−44.318***	−33.477***
	(−3.959)	(−2.799)	(−2.572)	(−1.775)	(−5.382)	(−3.989)
Enterprise FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes	no	yes
Obs	15,931	15,931	14,000	14,000	15,525	15,525
R-squared	0.709	0.711	0.713	0.715	0.720	0.722

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

to China through changes in trade credit. For local enterprises in the host country, when U.S. monetary policy is loose, accounts payable increase by obtaining trade credit provided by FDI enterprises. Trade credit and bank loans are two alternative methods of enterprise financing (Schwartz, 1974). Therefore, in theory, by affecting the supply of trade credit for FDI enterprises, the U.S. shadow interest rate will have a positive impact on local corporate bank loans. On the other hand, interest expenses for trade credit are usually low. Thus, theoretically, by influencing the supply of trade credit for FDI enterprises, the U.S. shadow interest rate will have a positive impact on the bond financing cost of local enterprises.

To verify the economic consequences of this channel for local enterprises in the host country, we use the debt financing cost and bank loans of local enterprises as dependent variables. The transfer term of American monetary policy and trade credit is constructed as the independent variable for empirical evidence. The results are presented in **Table 13** and **Table 14**. The findings in

Table 13. Changes in the debt financing costs of local enterprises.

variable	Dependent variable: debt financing costs			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
USMP × tradecredit	0.001***	0.001***	0.001***	0.001***
	(3.274)	(3.023)	(2.964)	(2.640)
Constant	7.440***	8.972***	7.671***	9.598***
	(7.438)	(9.019)	(7.565)	(9.479)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	13,073	13,073	12,370	12,370
R-squared	0.605	0.622	0.610	0.625

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 14. Changes in local corporate bank loans.

variable	Dependent variable: Bank loans/total assets			
	(1)	(2)	(3)	(4)
	Full sample		Excluding the financial crisis	
USMP × tradecredit	0.002*	0.002**	0.002	0.002**
	(1.736)	(1.992)	(1.632)	(2.047)
Constant	29.943***	28.322***	31.564***	28.900***
	(9.746)	(9.057)	(10.037)	(9.003)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	no	yes	no	yes
Obs	15,117	15,117	14,232	14,232
R-squared	0.725	0.725	0.730	0.730

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 13 reveal that the coefficient of USMP × tradecredit is significantly positive when using debt financing costs as the dependent variable, and all are significant at the 1% confidence level. As demonstrated earlier, when U.S. mone-

tary policy is loose, the supply of trade credit for FDI companies increases, leading to a decline in net receivables for local companies. Combined with the results of Table 13, it can be inferred that the loose monetary policy of the U.S. reduces the debt financing cost of local enterprises by increasing the supply of credit through FDI's trade credit. Loose U.S. monetary policy can thereby reduce financing costs for local companies in emerging markets, while tighter U.S. monetary policy worsens financing conditions for local companies. After excluding the financial crisis, the results remained robust.

Table 14 shows that the coefficient of USMP × tradecredit is significantly positive when using corporate bank loans as the dependent variable, and it remains significant at the 5% confidence level after adding the macro-level control variable. Combined with the above, this indicates that the loose monetary policy in the U.S. reduces the bank loans of local companies by increasing the supply of trade credit to FDI companies. When U.S. monetary policy tightens, local companies have to increase bank loans to compensate for reduced trade credit. After excluding the financial crisis, the results remained robust.

5.2. Heterogeneity of Local Enterprises in the Host Country

In order to explore whether there is heterogeneity in the influence of U.S. monetary policy for different local enterprises, the structural enterprise characteristics are regressed against the multiplication terms of U.S. monetary policy as independent variables.

Berger and Udell (1998) observed that data from the 1993 United States showed that 15.78% of the total assets of smaller businesses came from trade credit. This could be attributed to the fact that SMEs are more likely to utilize other external financing options, including trade credit (Petersen & Rajan, 1997; Casey & O'Toole, 2014). Therefore, the impact of U.S. monetary policy on the trade credit of local enterprises in emerging market countries may be associated with the size of enterprises. To test the heterogeneity of the impact of U.S. monetary policy on local enterprises, the empirical results are presented in Table 15, where (1) (2) (4) (5) do not control the time fixed effect, and (3) (6) control the time fixed effect. The results in Table 15 indicate that USMP × size is significantly negative, and the coefficients are significant at the 1% confidence level, suggesting that smaller host companies rely more on trade financing and are more affected by U.S. monetary policy. When the U.S. monetary policy is tight, the financial situation of these companies will be more negatively affected. After excluding the financial crisis, the results remained robust.

As the liquidity channel plays a crucial role in the spillover effect of the Fed's monetary policy, its impact is expected to be more pronounced in industries that heavily rely on external financing (Laeven & Tong, 2012). Therefore, it can be inferred that the influence of U.S. monetary policy on the trade credit of local enterprises in emerging market countries may be linked to the degree of external financing dependence within the industry. The RZ index measures the extent of

Table 15. Size of local enterprises.

variable	Dependent variable: net receivables/sales					
	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample			Excluding the financial crisis		
USMP	1.016***	7.720***		1.001***	7.546***	
	(11.251)	(11.527)		(10.849)	(11.065)	
USMP × size		−0.319***	−0.267***		−0.311***	−0.267***
		(−10.102)	(−8.218)		(−9.685)	(−8.053)
Constant	−0.229	2.928	−19.796**	9.668	12.242*	−17.709**
	(−0.035)	(0.446)	(−2.413)	(1.395)	(1.772)	(−2.079)
Enterprise FE	yes	yes	yes	yes	yes	yes
Time FE	no	no	yes	no	no	yes
Control variables at the national level	yes	yes	yes	yes	yes	yes
Obs	15,117	15,117	15,117	14,232	14,232	14,232
R-squared	0.705	0.707	0.712	0.711	0.713	0.717

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

external financing dependence in the industry and tests the heterogeneity of the impact of U.S. monetary policy on local enterprises across different degrees of external financing dependence. The empirical results are presented in Table 16. The findings in Table 16 reveal a significantly positive relationship between USMP × RZ, indicating that local enterprises in the host country, more reliant on external financing, are more susceptible to the effects of U.S. monetary policy. The financial situation of these enterprises is substantially negatively affected during periods of U.S. monetary policy tightening. After excluding the financial crisis, the results remained robust.

6. Robustness Tests

This section presents the results of the robustness test, which primarily includes independent variable selection, consideration of different sample screening criteria, and the elimination of potential loopholes.

In the benchmark model, this paper measures U.S. monetary policy using the US shadow interest rate. Another commonly used index is the U.S. federal fund interest rate. To ensure the reliability of the conclusions, the U.S. monetary policy is also measured by the federal effective fund rate. The results are displayed in columns (1) and (2) of Table 17, where the FDI × USMP cross coefficient is significantly negative and significant at the 5% confidence level, confirming the robustness of the findings.

Table 16. Degree of external financing dependence in non-FDI enterprises.

variable	Dependent variable: net receivables/sales					
	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample			Excluding the financial crisis		
USMP	1.016***	−0.129		1.001***	−0.225	
	(11.251)	(−0.718)		(10.849)	(−1.193)	
USMP × RZ		0.010**	0.010**		0.012***	0.012***
		(2.196)	(2.259)		(2.686)	(2.628)
Constant	−0.229	−9.140	−16.969	9.668	7.805	−7.570
	(−0.035)	(−0.668)	(−1.027)	(1.395)	(0.528)	(−0.434)
Enterprise FE	yes	yes	yes	yes	yes	yes
Time FE	deny	deny	yes	deny	deny	yes
Control variables at the national level	yes	yes	yes	yes	yes	yes
Obs	15,117	4856	4856	14,232	4249	4249
R-squared	0.705	0.692	0.695	0.711	0.708	0.710

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 17. Test of robustness.

variable	Net accounts receivable/sales volume			
	(1)	(2)	(3)	(4)
	Federal effective fund rate measures the USMP		Incorporated into export enterprises	
FDI × USMP	−0.928**	−0.798**	−0.653***	−0.578***
	(−2.348)	(−2.019)	(−3.647)	(−3.227)
Constant	−25.949***	−17.193**	−10.770**	−4.514
	(−3.371)	(−2.195)	(−2.573)	(−1.059)
Enterprise FE	yes	yes	yes	yes
Time FE	yes	yes	yes	yes
Control variables at the national level	deny	yes	deny	yes
Obs	16,063	16,063	41,245	41,245
R-squared	0.709	0.711	0.641	0.642

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Text samples exclude export enterprises. To ensure the robustness of the conclusions, various sample screening criteria are considered, including the inclusion of export enterprises in the samples. The results, shown in Table 17, columns (3) and (4), indicate that the FDI × USMP cross coefficient is significantly negative and significant at the 1% confidence level, reaffirming the robustness of the conclusions.

Since the Osiris database does not provide import data, import enterprises cannot be excluded from the sample. Although has found that the U.S. monetary policy easing FDI enterprises will increase trade credit supply, local enterprises will absorb more trade credit, but can not rule out the local import enterprises also get trade credit from foreign companies, this causes we can not judge the economic consequences of local enterprises (the change of debt financing costs, bank loans) is by the U.S. monetary policy on FDI enterprise trade credit impact or caused by the U.S. monetary policy on the influence of foreign enterprises trade credit supply.

In order to eliminate this possible loophole and ensure the robustness of the conclusion, we excluded the trading sector from the sample of local enterprises and the impact of trade credit of foreign enterprises, and demonstrated the non-trading sector enterprises. The results are shown in Table 18. The empirical results show that the U.S. monetary policy will have a significant negative impact on the trade credit of local non-trading sector enterprises, and the USMP coefficient is significant at the 1% confidence level under all control conditions. This shows that the U.S. monetary policy will affect the local enterprises of the host

Table 18. Local non-trade sector enterprises.

variable	Dependent variable: net receivables/sales			
	(1)	(2)	(3)	(4)
	Benchmark regression		Eliminate the financial crisis	
USMP	1.351***	1.311***	1.385***	1.306***
	(11.144)	(9.958)	(11.310)	(9.739)
Constant	−17.873*	−3.972	−15.751*	4.619
	(−1.936)	(−0.414)	(−1.653)	(0.457)
Enterprise FE	yes	yes	yes	yes
Time FE	deny	deny	deny	deny
Control variables at the national level	deny	yes	deny	yes
Obs	8146	8146	7659	7659
R-squared	0.697	0.699	0.703	0.706

Note: Coefficients are listed in the first row, t-value are reported in the row below. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

country through the supply of trade credit of FDI enterprises.

7. Conclusion

FDI companies in emerging markets may act as disseminators of U.S. monetary policy shocks. Based on Osiris data from 1994 to 2018, encompassing enterprise-level data from 18 listed companies in emerging market countries, we explore the impact of monetary policy on FDI enterprise trade credit. The results indicate that during periods of U.S. monetary policy easing, FDI enterprises in emerging market countries increase trade credit supply. This, in turn, enables them to secure financing in the international capital market at a lower cost, thereby affecting local enterprises in the host country and transmitting the impact of U.S. monetary policy.

Moreover, U.S. monetary policy has a more pronounced effect on FDI companies characterized by smaller financing constraints and parent companies located in developed countries. At the country level, heterogeneity reveals a more substantial impact on host countries with a more open capital account, less exchange rate flexibility, and higher financial development.

Further research reveals that this channel, in turn, affects the financial situation of local companies in the host country. For local enterprises, on the one hand, by influencing the supply of trade credit for FDI enterprises, the US shadow interest rate will impact local corporate bank loans. On the other hand, the interest expense of trade credit is usually low. Therefore, by influencing the supply of trade credit for FDI enterprises, the US shadow interest rate will affect the financing cost of local corporate bonds. In other words, during U.S. monetary policy easing, the increase in FDI enterprise trade credit can reduce local enterprise debt financing costs and bank loans. However, during U.S. monetary policy tightening, the impact on FDI enterprise trade credit can ultimately increase local enterprise debt financing costs and bank loans, affecting the financial situation of local enterprises. Additionally, this channel has a more pronounced impact on local enterprises with a smaller scale or industries that heavily rely on external financing.

In addition, since FDI companies can bypass domestic financial institutions to finance directly in the international market, the host country's macro-prudential policies cannot weaken the impact of U.S. monetary policy. Only capital controls can effectively weaken this impact, which is exacerbated by foreign exchange intervention.

Our study reveals that, firstly, despite the strict control of non-FDI capital flows in most emerging markets, FDI companies can still transmit U.S. monetary policy shocks to host countries through trade credit channels. Via this channel, U.S. monetary policy can significantly influence the trade credit of FDI enterprises, consequently impacting the financial situation of local enterprises in the host country. Therefore, while actively welcoming FDI, emerging market countries should also be attentive to the potential adverse effects of FDI capital in-

flows and closely monitor the activities of FDI enterprises to mitigate related risks.

On the other hand, local enterprises in emerging market countries should exercise vigilance when engaging in transactions with FDI enterprises. They should proactively manage liquidity and avoid excessive reliance on trade credit, especially during periods of loose U.S. monetary policy, to prevent liquidity shortages when the policy tightens.

Secondly, given that host countries with lower exchange rate flexibility are more susceptible, emerging market countries can enhance their exchange rate flexibility to better withstand the impact of U.S. monetary policy.

Finally, recognizing that macro-prudential policies may not effectively mitigate the impact of trade credit channels for FDI enterprises, capital control measures should be considered when necessary to stabilize the domestic economy.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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