A Research on the Cause of China's Capital Flight

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Abstract. Since 1990s, the capital flight has appeared relatively serious to its open economy. We can read the information from China's Balance of Payment. Usually, large scale capital flight will make hazard a country's economy. This paper analyzes the scale and causes of capital flight in China. It is inferred in this paper that the scale of capital flight in China has been greatly affected by the effective exchange rate of RMB, the difference between domestic and foreign asset returns, and the speed of domestic economic growth.

Keywords: Capital Flight, VAR Model, Balance of Payment

1 Introduction

Since the 1970s, economic globalization has become an important economic force driving the development of the world economy. The enormous cross-border capital flow enables more rational and effective allocation of resources internationally. At the same time, the disorderly flow of a large amount of short-term capital has also caused great difficulties for the economic and financial security of many countries.

China's reform and opening up provided preferential policies to foreign-funded enterprises, attracting and utilizing a large amount of foreign investment, and maintaining the high-speed growth of the Chinese economy. At the same time, China's foreign trade exports have grown significantly, leading to a significant surplus in the current account of its balance of payments. In some years, there has been a double surplus in the current account, capital and financial accounts. However, in the errors and omissions term, there are a large scale of borrowers, which economists refer to as capital outflows or capital outflows.

We can read from **Figure.1**. as follows. From 1990 to 2001, capital continued to flow out, with a total outflow of 147.8 billion US dollars, indicating that China's capital outflow phenomenon is very serious. From 2002 to 2008, errors and omissions in China's international balance of payments appeared in credit, indicating that capital flight has disappeared in China. The underlying reason is the huge double surplus between current account and capital financial account, and expectations for the appreciation of the RMB are becoming stronger. The large-scale inflow of short-term hot money results in very small capital outflows. Changes in the economic and financial environment at home and abroad after the 2008 US financial crisis.

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The changing economic and financial environment at home and abroad has led to an increase in risk aversion. Multinational corporations and international financial institutions are redistributing assets on a global scale, resulting in a large number of abnormal cross-border capital flows around the world. Since 2009, there have been a large number of errors and omissions in China's balance of payments, and they are expanding year by year. Between 2015 and 2021, total borrowing reached $1,316.2 billion.

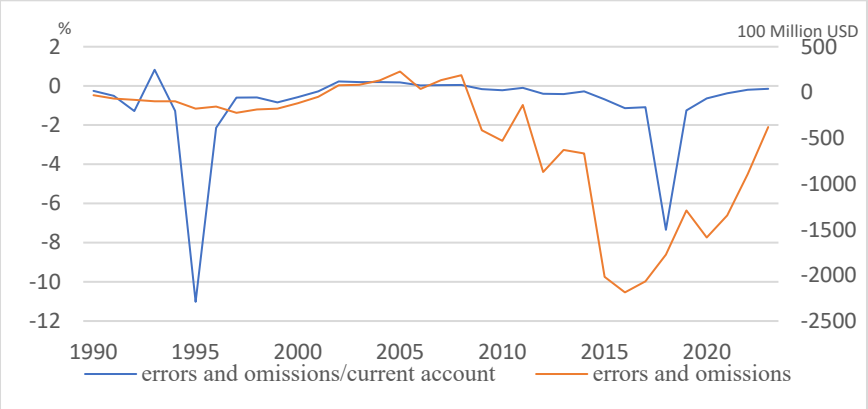

Fig. 1. The trend of capital flight from China from 1990 to 2023. The blue curve shows the ratio of errors and omissions to current account, it means the relative degree of capital flight. If the data shows negative and its absolute value is larger, the capital flight is more serious deterioration. The orange curve shows the scale of capital flight from China, the data used errors and omissions from China's balance of payment. If the data is negative and its absolute value is larger, the capital flight scale from China is larger. The data come from State Administration of Foreign Exchange.

Since 2010, real estate prices and labor prices have continued to rise, resulting in rising manufacturing costs, and China's GDP growth has continued to decline. All of this has led to widespread pessimism among domestic and foreign investors about China's future economic situation, which to some extent has caused concern among domestic capital holders. Some capital holders are withdrawing from the country. At the same time, with the deepening of the RMB internationalization process, China has expanded the cross-border flow mode while expanding the opening of capital and financial accounts, spurring capital flight.

Therefore, we decide to study the capital flight in China. While the direct measures used in this paper tend to underestimate the scale of capital flight, capital flight from China from 1993-2002 to 2008-2023 was significant. We can get a rough idea from the ratio of errors and omissions to current accounts and the size of the net errors and omissions. In this paper, we can find that there are four factors affecting China's capital flight. The depreciation of RMB, the decline of China's GDP growth rate, the capital return spread of long-term government bonds between China and the United States, and the fluctuation of the currency value of the most important economic countries are the four major factors of China's capital flight.

2 Literature Review

2.1 The Definition of Capital Flight and It's Measuring Method

At present, the academic circle has not yet formed a unified definition of capital flight. Foreign scholars from risk avoidance, Capital flight is defined in terms of control evasion, asset portfolio and breach of contract[1]. In the 1930s, all the outbreak of the economic and financial crisis made investors panic, a large number of capital flows out of the country, causing scholars to this concern of the problem.

Kindleberger was the first to analyze the problem of capital flight in 1937, he defined capital flight as that when the political situation in a country is unstable and the public was unconvinced and brought investors to become nervous. Or even fear, generating an abnormal outflow of capital[2].

Because the property right system is not perfect and other reasons, investors' property can not be guaranteed, in order to avoid this risk, investors will transfers their assets to other countries and generate capital flight[3]. The correlation is greater than the correlation between domestic assets and the rate of return of foreign assets, and a rational investor wants to diversify the risk[4].

The measurement methods and results are also very different. In order to conduct quantitative research on capital flight, it is necessary to measure the scale of capital flight. But because scholars different understanding of capital flight results in different measurement methods. The calculation methods are mainly divided into direct calculation method and indirect calculation method. The first direct measurement was taken by Cuddington, he argued that hidden capital flows and "hot money" that respond quickly to uncertainty constitute capital flight, a country's normal investment and financing activities generally produce only long-term capital flows, so they are used in the balance of payments, capital flight is measured by adding "errors and omissions" and "short-term capital outflows from the non-bank private sector"[5]. In this measurement method, data are extracted directly from the balance of payments, also known as the balance of payments method[6].

On this basis, Kant divided "hot capital" into three different levels of capital according to different measurement ranges. The scale of this flight is estimated, and Cardington's algorithm is developed to compare short - and long-term capital outflows[7].

World Bank according to the balance of payments "the source of funds equals the use of funds" equal[8]. The principle of balance, the introduction of the method of measurement, when the source of capital is greater than the use of capital indicates that there is capital flight. Therefore the scale of capital flight is equal to the increase in external debt plus net FDI inflows minus the decrease in official reserve assets. In order to make the measurement more accurate, a number of scholars have modified the indirect measurement method.

In this paper, for the difficulty to obtain suitable data which represent capital flight variable and its factors, we use direct measuring method to calculate capital flight in this paper.

2.2 Influencing Factors of Capital Flight

The academic circle has studied the factors affecting capital flight for many years, and has formed a complete theoretical system. According to the finance theory, the main influencing factors are as follows:

(1) Inflation rate: The inflation rate is projected in local currency

An indicator of the degree of depreciation of domestic production. Once the inflation rate is very high, it is easy to stimulate residents to avoid the risk of inflation transfer wealth, caused capital flight[9].

(2) Economic growth rate: Economic growth rate reflects a country's economy[10].

Speed of development, investment opportunities and overall level of return on assets. Hence higher economic growth attracts capital, while vice versa encourages capital flight[11].

(3) Investment returns spreads at home and abroad: Spreads at home and abroad occur without risk[12]. The covered interest rate conditions will cause capital flows. High foreign interest rates will cause capital flight.

(4) effective exchange rate of domestic currency: when domestic currency depreciation, capital will flow out .

3 Variables and Data

According to the analysis of the causes of capital flight by scholars, combined with the stage characteristics and influencing factors of capital flight in China, this paper takes the economic growth rate, the difference of long-term Treasury bond yield between China and the United States, the US dollar exchange rate index and the effective exchange rate of RMB as the main factors affecting capital flight, and uses the econometrics method to make an empirical analysis of the relevant factors.

3.1 Dependent Variable and Data

Considering the availability of data, the period of data selection in this paper is 2000-2023. As well as the data of various variables, we use the quarterly data of China's 2000-2023 time series data as the sample for empirical analysis. Considering the availability and matching to various variables of data, we use the direct measurement method for the explained variable capital flight which we name it as CFL. The data are derived from the BOP's errors and omissions published on the website of China's State Administration of Foreign Exchange (SAFE), with negative symbols indicating capital outflow and positive symbols indicating capital inflow.

3.2 Explanatory Variables

Firstly, capital flight depends on such as: macroeconomic stability, the ability to attract foreign capital, the impact of the external economic environment, the revaluation of the domestic currency. Macroeconomic stability determines the risk of investment capital.

A country's large economic quantity means Its capital markets have plenty of liquidity. The higher its economic growth rate and the better the country's economic development prospects, the more it can attract international capital. Therefore, GDP is introduced into the model as an explanatory variable in this paper.

Secondly, for the international capital flight , the return of investment is a very important aspect to be considered. The higher the return on investment of a country, the stronger the ability to attract foreign capital. A large amount of investment capital will flow into the country and the smaller the scale of capital flight will occur. On the contrary, when the level of foreign investment appears less attractive, investors will transfer a large amount of capital to the country with a higher yield level for the purpose of profit, resulting in large-scale capital flight. Therefore, this paper chooses the spread of long-term Treasury bonds between China and the US as an explanatory variable. In this paper we name this variable as R .

Thirdly, the degree of influence by the world's economic powers always affects the capital flight in a country. For a highly open country, its economic development is bound to be affected by its important economic partners. As an important economic partner of China, the United States treasury bond is the most important part of China's foreign exchange reserves, and the change of the US dollar index will have an important impact on the short-term flow of Chinese capital. In this paper, the US dollar index (labeled UE in this paper) is introduced into the model as an explanatory variable as an external influencing factor affecting China's capital outflow.

Fourthly, a country's currency depreciation will affect the capital flight. When a country's currency appears depreciation, the assets denominated the country's currency will suffer loss for international capital which invested in the country. Thus the revaluation of the value of the domestic currency will inevitably cause the flow of capital between the domestic and the outside world. Therefore, the effective exchange rate of RMB (labeled EY in this paper) is taken as the explanatory variable.

4 Model and Empirical Analysis

We construct a VAR model to test the correlation between capital flight and macro variables, and analyze the transmission mechanism between the variables. Based on the above analysis, the measurement model we built is as follows, see equation (1):

$$y_t = \emptyset_0 + \emptyset_1 y_{t-1} + \cdots + \emptyset_p y_{t-p} + \varepsilon_t \tag{1}$$

Let y_t denote the column vector. $y_t = \begin{pmatrix} CFL \\ GDP \\ R \\ UDI \\ EY \end{pmatrix}_t$

Among them, CFL is the dependent variable capital flight. We know that although the direct estimation of capital flight is not very accurate, for that it tends to underestimate. We use direct estimation of capital flight as the way to estimate capital flight volume. As shown in figures 1, the scale of capital flight from China is also not small.

A country's GDP size can represent the economic strength of a country, and the GDP growth rate can represent the country's economic prospect. R in the model represents the difference between long-term Treasury bond yields in China and the United States, a variable that affects the global allocation of capital. In the model, EY represents the effective exchange rate of RMB and the valuation of the intrinsic value of RMB in the international monetary system, which will also affect the flow of capital at home and abroad. a is the constant term, $\emptyset_i\ i = 0,1,2,\ldots,$ p is the coefficient of each explanatory variable, μ is the random error term. The data for the above variables are from the website of the Bank for International Settlements, the website of the State Administration of Foreign Exchange of China and the website of the National Bureau of Statistics of China.

In order to avoid the problem of "spurious regression" in time series analysis, the stationarity of each time series should be essential. In VAR model, ADF test method is generally used to check whether the time series has stationarity. The results are shown in **Table 1**. **Table 1** shows that CFL are stationary series, EY, $UDI$and R are all non-stationary series. But their first-order difference are stationary series at the significance level of 5%.

Table 1. Variables ADF Test.

Variable	Test	ADF statistic
CFL	(C,0,0)	-6.343***
ΔCFL	(C,0,0)	-12.934***
lnGDP	(C,T,0)	-12.878***
ΔlnGDP	(C,T,0)	-16.478***
EY	(C,T,0)	-0.543
ΔEY	(C,T,0)	-8.315***
UDI	(C,0,0)	-2.525
ΔUDI	(C,0,0)	-12.959***
R	(C,T,0)	-1.125
ΔR	(C,T,0)	-7.003***

Note: The test type (C,T,K), where C and T represent the constant term and the time trend term respectively, and K represents the hysteretic order used in the final determination. The hysteretic order is determined according to the minimum criterion of SIC value. *, **, *** correspond to the significance level of 10%, 5% and 1% respectively.

An important problem in the establishment of VAR model is that the lagged order to be determined. Considering the relatively small degree of freedom of time series, the maximum lag order is selected as 4 in this paper, and the test results are shown in **Table 2**. According to the test results, five test criteria (LR, FPE, AIC, BIC and HQ) show that the optimal lag order of VAR equation is 4, so the lag order selected in this paper is 4. Based on the results of the optimal lag order test in **Table 2**, the five information criteria all support the model with a lag order of 4.

Table 2. VAR Optimal Lagged Term.

Lagged term	LogL	LR	AIC	BIC	FPE	HQ
0	-912.203		37.4368	37.6299	1.2e+10	37.5101
1	-793.014	238.38	33.5924	34.7507	2.70E+08	34.0319
2	-778.599	28.832	34.0244	36.1479	4.30E+08	34.8301
3	-750.271	56.655	33.8886	36.9773	4.10E+08	35.0605
4	-592.511	315.52*	28.4698*	32.5237*	2.1e+06*	30.0079*

In order to test the existence of causality, We construct the Granger causality test using the following regression equation (2).

$$CFI_t = \gamma + \sum_{m=1}^{p} \alpha_m CFI_{t-m} + \sum_{m=1}^{p} \beta_m x_{t-m} + \varepsilon_t \quad (2)$$

Among them, x represents R, lnGDP, EY, or UDI. The test results are shown in **Table 3**. It can be seen from the table that $lnGDP$ is the Granger cause of CFL at the significance level of 1%. EY is the Granger cause of CFL at the significance level of 5%. The four explanatory variables have joint significance at the 1% level. $lnGDP$ is the Granger cause of CFL at the significance level of 1%. EY is the Granger cause of CFI at the significance level of 5%. The four explanatory variables have joint significance at the 1% level.

Table 3. Granger Causality Test.

results	causality	Wald statistic
CFI	R	.00014
CFI	lnGDP	21.971***
CFI	EY	5.0248**
CFI	UDI	1.0443
CFI	All	38.55***

Further, we use the Johansen test for multivariate tests to determine whether there is a long-term cointegration relationship between CFL and explanatory variables. The test results are shown in **Table 4**. It can be seen from the table that the trace statistic of cointegration rank 2 is significant at the 5% level, indicating that there are two linearly independent cointegration vectors. At the same time, the maximum eigenvalue test also significantly rejects the null hypothesis that there are no linearly independent cointegration vectors. It shows that there is a long-term cointegration relationship between variables.

Table 4. Cointegration Test.

H_0	maximum eigenvalue	5% significance	Trace statistic	5% significance
0	70.2228	36.41	125.9546	77.74
At most 1	25.6464	30.33	55.7318	54.64
At most 2	16.1291	23.78	30.0854*	34.55
At most 3	12.5586	16.87	13.9564	18.17
At most 4	1.3978	3.74	1.3978	3.74

Further analysis of the impulse response function shows that, as shown in **Figure 2**, when the change in EY has a positive shock of one standard deviation, it leads to a negative change in the CFL in the next period. As shown in **Figure 3**, when there is a positive shock of one standard deviation in the change of lnGDP, thereis a significant positive change in C FL in the third period.

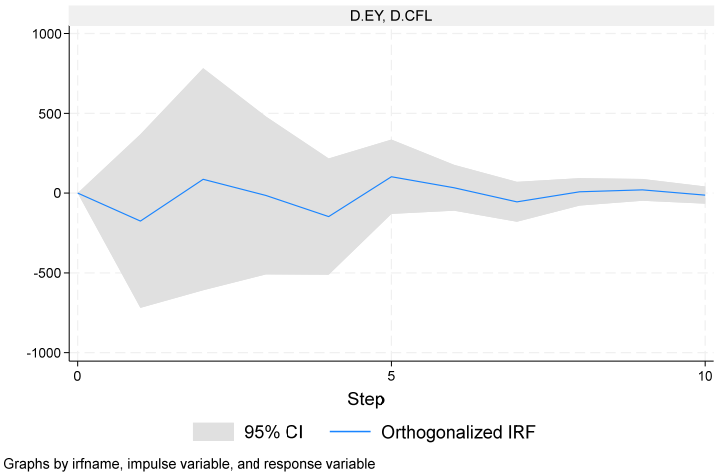

Fig. 2. This figure shows the response of D.CFL to D.EY shocks. The abscissa represents the 10 periods after the impact. When D.EY has a positive shock of one standard deviation, D.CFL has a negative response in the next period. Over time, this reaction fades away. Convergence of the impulse response function.

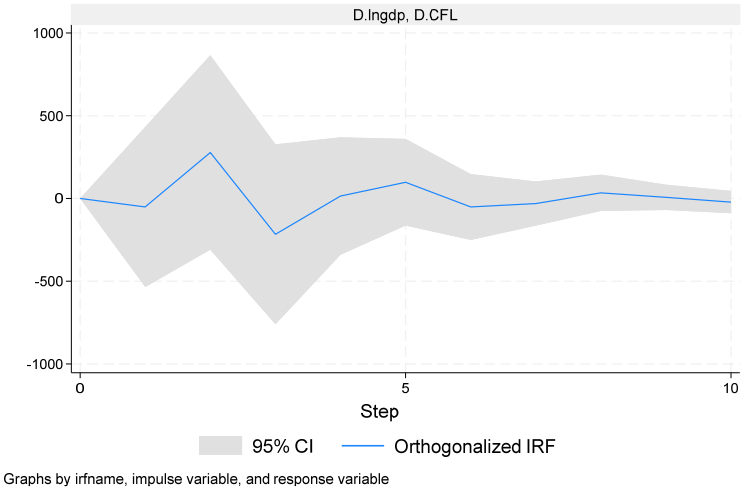

Fig. 3. This figure shows the response of D.CFL to D.lnGDP shocks. The abscissa represents the 10 periods after the impact. When D.EY has a positive shock of one standard deviation, D.CFL has a negative response in the next period. Over time, this reaction fades away. Convergence of the impulse response function.

The stability test of the above VAR model is shown in **Figure 4**. The test results show that all the eigenvalues lie inside the unit circle.

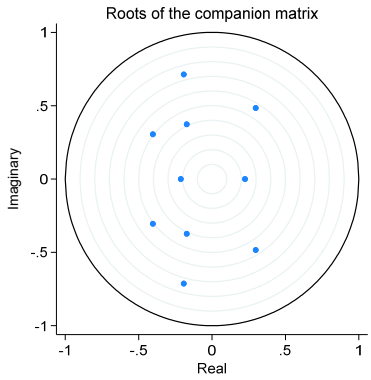

Fig. 4. This figure depicts the stability of the VAR model, and it shows that all the points are inside the unit circle. The model is stable.

5 Conclusion

First of all, China's capital flight and exchange rate changes, the difference in the yield of long-term financial instruments in the capital market at home and abroad, domestic economic growth changes are interdependent. The regression relationship shows that the variables form a long-term equilibrium, and their economic interaction is not a short-term interaction, but a long-term stable relationship.

The depreciation of the local currency exchange rate will intensify the positive impact on capital flight. Once the currency depreciates sharply, huge capital flight may be caused, resulting in a large outflow of funds. The change of GDP growth rate also has the opposite effect on capital flight. Once the domestic economic growth rate is reduced, it will certainly bring about the intensification of capital flight.

Due to the limitation of research objectives, this paper has not made a detailed study of the mechanism and method of preventing capital flight. Therefore, further research in this paper can study the strategy and mechanism of preventing capital flight. Such as to strengthen the supervision of capital flight to prevent the risks of the financial system caused by large-scale capital flight. to take measures to prevent capital flight in a timely manner and maintain domestic financial security etc.

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