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Dynamic relationships of capital flight and macroeconomic fundamentals in Malaysia

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Abstract

Understanding the very factors that influence massive capital outflow from an economy is vitally important as it may assist decision makers in formulating effective strategies which can not only mitigate such capital flight but also slow down the deterioration of the economy and even re-generate it. This paper analyzed the dynamic interaction between macroeconomic fundamentals and capital flight using co-integration and vector auto-regression. The macroeconomic fundamentals considered were exchange rates, consumer price index, gross domestic products and interest rates. The results show that macroeconomic fundamentals and capital flight are associated in the long run. In terms of short-run dynamics and interactions between capital flight and macroeconomic fundamentals, variations in capital flight are predominantly attributed to its own variations and exchange rate variations. Innovations in capital flight explain substantial fractions of the GDP, exchange rate, interest rate and CPI variations.

Keywords: capital flight, CPI variations, exchange rate variations, interest rate, international finance, macroeconomic fundamentals

Introduction

The movement of capital from domestic to foreign economy could be normal or economically good if it is of capital export or foreign direct investment. These flows of capital abroad, which are subjected to regulation and do not endanger national economy, would foster economic growth of a nation. However, the illicit movement of capital away from domestic to foreign economy would worsen the capital scarcity problem especially in emerging economies; thus, contributing to economic contraction as well as collapse of the financial markets. Generally, the illicit movement of capital abroad, which is also called capital flight, escapes government taxation and is motivated by economic and political uncertainties.

Recently, Global Financial Integrity (GFI) (Kar & Freitas, 2012) reported that Malaysia was the third developing country with the highest cumulative illicit capital account over the period from 2001 to 2010, after China and Mexico. Malaysia moved up two ranks from the fifth place with illicit capital of US$30.41 billion in 2009 to the third place with illicit capital of US$64.38 billion in 2010. Indeed, such big amount of dirty money which was closed to MYR200 billion, has put Malaysia second to China, Asian economic powerhouse, in global capital flight for year 2010. It was also the country's highest amount of capital flight in ten years. Due to such dramatic jump of capital flight, there is a crucial need for a policy to effectively reduce capital flight before the market and economy of Malaysia be significantly affected. It is crucial to carefully analyze the case so that the policy on capital flight could be effective. Ineffective policy on capital flight, however, might even obstruct investment, reduce country's debt financing capacity, shrink tax-base and slow down the economic growth. Thus, there is a need to figure out the dynamic relationship between capital flight and other variables, specifically the macroeconomic

fundamentals. Based on previous literature, other than political issues, financial repression and tax treatment, macroeconomic fundamentals could give significant impact on the illicit outflows of capital.

The aims of this study were to explore the size and variations of capital flight in Malaysia and to examine the dynamic relationship of capital flight and macroeconomic fundamentals. In order to make meaningful policies or effective strategies toward minimizing capital flight and its impacts, the dynamic relationship between macroeconomic fundamentals which include exchange rate, gross domestic product (GDP), consumer price index (CPI) and interest rate, and the flows of capital flight were explored.

Literature review

Capital flight definition

Capital flight has been defined as the outflow of resident capital which is driven by economic and political uncertainties (Schneider, 2003). Ajilore (2010) referred capital flight as any illicit movement of capital away from a domestic to a foreign economy. Meanwhile, Ayadi (2008) defined capital flight as the foregone investment in manufacturing plants, infrastructure, and other productive capacity.

Capital flight measurement

A number of past literature had measured capital flight by using World Bank residual method (Kar & Freitas, 2012; Salisu, 2005; Anthony & Hallet, 1992). Ndikumana and Boyce (2010) used residual difference between inflows and outflows of foreign exchange in Balance of Payment corrected for magnitude of external borrowing, trade misinvoicing and unrecorded remittances. Anthony and Hallett (1992) also measured capital flight by using Cuddington (1996) approach and Dooley (1988) approach (as cited in Anthony & Hallet, 1992). Cuddington measures capital flight as the sum of net errors and omissions in Balance of Payment accounts and selected categories of short-term foreign assets of non-bank private sectors. Dooley's on the other hand applies unrecorded stock of domestically owned foreign assets in Balance of Payment accounts as capital flight.

Determinants of capital flight

Generally, previous studies had identified some of the determinants of capital flight; but they mainly gave greater attention on the roles of external debts (Ljungwall & Wang, 2008; Beja, 2007; Boyce, 1992), foreign direct investment (Perez, Brada & Drabek, 2012; Basu & Chau, 2007) and financial liberalization (Ahmed, 2013; Yalta & Yalta, 2012; Adekunle, 2011; Brada, Kutan & Vuksic, 2011) on capital flights. There are few studies done on macroeconomic factors, such as income level (Ding & Jinjarak, 2012; Ljungwall & Wang, 2008), supply and demand shock (Kim, 2000), exchange rate (Han, Gan, Hu & Li, 2012; Adekunle, 2011) and financial crisis (Aizenman & Pasricha, 2012; Giannetti & Laeven, 2011). According to Ajayi (2005), causes of capital flight include varying risk perception, exchange rate misalignment, financial sector constraints and repression, fiscal deficits, weak institutions, macroeconomic policy distortions, corruption and extraordinary access to government funds, among others.

External debt is found to have significant positive relationship with capital flight (Schneider, 2003; Harrigan, Mavrotas & Yuso, 2002; Claessens & Naude, 1993). Studies have found that capital flight is positively related to external indebtedness in Nigeria (Ajilore, 2010) and Sub-Saharan African countries (Ndikumana & Boyce, 2010). However, Chipalkatti and Rishi (2001) claimed that capital flight is negatively related to external debt in Asia Pacific economy. External debt is not applied as one of the macroeconomic fundamentals in this paper since its changes is part of the formula used in measuring capital flight.

Exchange rate is another important macroeconomic fundamental that could determine whether a capital flight is of high or low condition. Currency depreciation is claimed to have a significant positive impact on capital flight (Harrigan et al., 2002; Claessens & Noude, 1993; Collier, Hoeffler & Pattillo, 2001).

In terms of economic productivity, gross domestic product (GDP) has been found to have no significant relationship with capital flight (Schneider, 2003; Ajilore, 2010; Harrigan et al., (2002). This finding is surprisingly contradictory to the belief that economic uncertainty would contribute to an increase in capital flight. Capital flight, however, has been claimed to be negatively affected by economic growth and FDI activities in the long run. Claessens and Naude (1993) and Collier, et al. (2001) somehow managed to find significant negative relationship between GDP and capital flight in their studies.

In a study of the relationship between inflation and capital flight, Harrigan et al. (2002) stated that inflation yields a positive effect on capital flight. However, Han, Gan, Hu and Li (2012), in their study, concluded that inflation rate does not significantly affect Hong Kong's capital flight. Indeed, they also found that interest rate is not significantly related to capital flight.

Methodology

This paper focused on the yearly effects of macroeconomic variables on capital flights in Malaysia from year 1992 to 2012. Capital flight is defined as illicit outflows of capital from Malaysia in Malaysian ringgit, based on World Bank Residual method with adjustment as applied by GFI (Kar & Freitas, 2012). GFI measures capital flight as negative sum of current account balance, net equity flows, change in reserves of the central bank and change in external debt as in:

$$\text{Model 1:} \qquad CF = -(CAB + NEF + \Delta Res + \Delta ED) \qquad \text{(Eq. 1)}$$

where CF = capital flight; CAB= current account balance; NEF = net equity flows (including net foreign direct investment and portfolio investment); ΔRes = change in reserves; ΔED = change in external debt.

The data on those capital flight variables are available in the country's balance of payment obtained from Department of Statistic Malaysia. The macroeconomic variables include exchange rate, gross domestic product (GDP), consumer price index (CPI) and interest rate which were gathered from World Bank and Department of Statistics Malaysia websites. The exchange rate applied is the ringgit Malaysia vis-à-vis US dollar. To measure the country's economic productivity, nominal GDP was applied. Country's overall price level was represented by CPI with 2005 as the based year index. The interest rate applied in this paper is the three-month interbank offer rate.

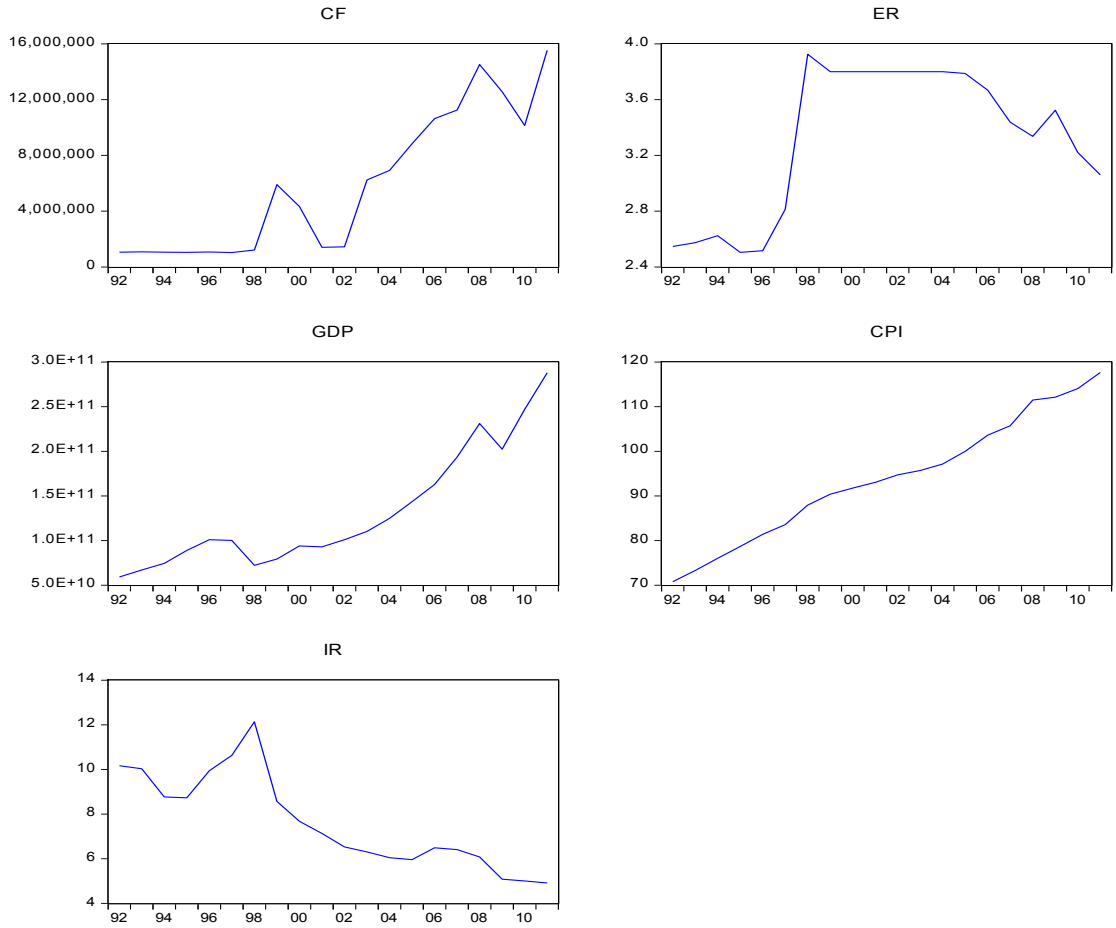
The performances of all the five variables were displayed in time series graph and descriptive statistics. The series were then converted to natural logarithm before testing for unit roots by using Augmented Dickey-Fuller (ADF) test. The series had also gone through Chow breakpoint test to check for the structural break. The long-run and short-run relationships between capital flights and macroeconomic fundamentals were analyzed by long-run Johansen cointegration test and short-run vector error correction model, specifically on variance decomposition.

Findings

Descriptive statistics

The time series graph of Malaysian capital flight and macroeconomic fundamentals from 1992 to 2012 are shown in Figure 1. Capital flight, which comprised of the negative sum of current account balance, net equity flows, change in reserves and change in external debts, has significantly being boosted up since mid 2002. From 1992, the capital flight remained low and stagnant before it increased in 1998 and 1999.

In 2001 and 2002 it was back to almost the same level as before 1998. Table 1 shows the mean, maximum, minimum and standard deviation of the capital flight as well as the macroeconomic fundamentals. Due to such a great increase in capital flight since 2003, there is a need to curtail it before the country's capital and economy are affected. Too much transfer of assets abroad would give a significant social cost and lead to loss of investment in a country. Therefore, further studies on capital flight as well as its determinants, relationship and effects are important.



Note: CF = Capital flight, ER = Exchange rate, GDP = Gross domestic product, CPI = Consumer price index, IR = interest rate

Figure 1. *Malaysia's capital flight and macroeconomic fundamentals yearly performance (1992 – 2012)*

A sharp depreciation of Ringgit Malaysia (MYR) vis-à-vis US dollar (US$) in late 1997 and early 1998 had caused a financial and economic crisis in the country. In September 1998, Malaysian government had pegged Ringgit at MYR3.8 equivalent to US$1 and it remained at that rate until July 2005. After de-pegging of ringgit, the value starts appreciating but yet to reach the level of that early 1997. The GDP and CPI have shown increasing performance throughout the period. Except in 1998 and 2009, Malaysia had gone through economic recession due to financial crisis and US subprime mortgage crisis, respectively. Interest rate showed a declining trend throughout the period except from 1995 to early 1998, the period of economic growth and economic recession, whereby the rate increased to more than ten percent.

Table 1. Descriptive statistics of capital flight and macroeconomic fundamentals (1992 – 2012)

	CF	ER	GDP (bil)	CPI	IR
Mean	5,865,344	3.3169	132	93.9418	7.6279
Median	5,123,289	3.4810	101	93.8899	6.8275
Maximum	15,528,870	3.9244	288	117.6483	12.1342
Minimum	1,033,897	2.5044	59	70.7794	4.9150
Std. Dev.	5,105,065	0.5344	67	14.0005	2.1114
Skewness	0.5180	-0.4723	0.9939	0.0319	0.5202
Kurtosis	1.8400	1.5831	2.7856	1.9863	2.1543

Note: CF = Capital flight, ER = Exchange rate, GDP = Gross domestic product, CPI = Consumer price index, IR = interest rate

Long-run cointegration

The Augmented Dickey-Fuller (ADF) test was applied as a pre-requisite in establishing the presence of a long-run relationship among the capital flight and macroeconomic fundamentals in order to evaluate the integration properties of those variables. The results of the ADF test in Table 2 reports that those variables in levels cannot reject the null hypothesis of non-stationarity. However, all the five variables are found to be stationary when expressed in first differences. Therefore, those capital flight and macroeconomic fundamentals are integrated at order 1, or I(1). The test suggests the possibility of a long-run relationship among variables.

Table 2. ADF Unit Root Test

	Level		1st Diff	
	t-Statistic	Prob.*	t-Statistic	Prob.*
CF	-0.4513	0.8787	-5.3899	0.0005
CPI	-2.1681	0.4788	-3.8988	0.0345
ER	-0.8227	0.9449	-4.5784	0.0143
GDP	-1.4738	0.8024	-3.4048	0.0839
IR	-3.2605	0.1063	-3.6433	0.0544

Note: CF = Capital flight, ER = Exchange rate, GDP = Gross domestic product, CPI = Consumer price index, IR = interest rate

Table 3. Johansen Cointegration Tests

Hypothesized	Trace		Max-Eigen	
No. of CE(s)	Statistic	*Prob.***	Statistic	*Prob.***
None *	119.986	*0.000*	54.381	*0.000*
At most 1 *	65.605	*0.001*	34.588	*0.005*
At most 2 *	31.017	*0.036*	22.084	*0.037*
At most 3	8.933	*0.372*	8.634	*0.318*
At most 4	0.300	*0.584*	0.300	*0.584*

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Johansen cointegration test was applied to analyze long-run integration among the capital flight and macroeconomic fundamentals. The trace and max-eigen tests in Table 3 indicate the presence of three cointegrating vectors. The strong power of the cointegration tests concluded that there are three cointegrating vectors governing the long-run relationship among the variables. Thus, the capital flight and macroeconomic fundamentals have long-term tendency to converge with each other.

Variance decomposition

This paper continued to examine the short-run dynamic interactions among the capital flight and the four macroeconomic fundamentals after realizing that there is long-run co-movement among those variables by applying vector error correction model (VECM). The VECM was performed based on the order of capital flight, exchange rate, GDP, CPI and interest rate. To further examine how the capital flight responds to shocks or innovations in macroeconomic fundamentals, variance decompositions were carried out on those five variables. For short-run dynamic interactions among the five variables, variance decompositions' results in Table 4 document the presence of interactions among capital flight and macroeconomic fundamentals.

Variations in capital flight are predominantly attributed to its own variations, which account more than 52 percent. The exchange rate variations turn up to be the second significant contributor, which are up to 28 percent to variations of capital flight. The contribution of CPI, interest rate and GDP are less than 10 percent, in which GDP innovations explain 2.9 percent, the least of capital flight variations. From these variance decompositions for capital flight, it can be concluded that movements in Malaysian capital flight are driven by its own shocks and it responds more to exchange rate shocks than the other macroeconomic fundamentals shocks.

Table 4. Variance decompositions

Period	E.	CF	ER	GDP	CPI	IR
Variance Decomposition of CF:						
1	.405	100.000	0.000	0.000	0.000	0.000
2	.575	75.002	23.149	0.182	0.256	1.411
5	.903	53.156	28.596	1.469	9.731	7.048
10	.984	52.797	28.704	2.887	8.742	6.870
Variance Decomposition of DER:						
1	.109	49.170	50.830	0.000	0.000	0.000
2	.129	36.196	39.187	12.991	11.436	0.190
5	.150	35.656	29.176	15.891	10.095	9.182
10	.155	34.290	28.957	16.793	10.684	9.276
Variance Decomposition of GDP:						
1	.173	57.273	39.268	3.459	0.000	0.000
2	.182	51.855	36.849	8.844	1.750	0.702
5	.211	47.564	28.861	10.221	5.174	8.181
10	.216	46.374	28.511	10.679	5.746	8.690

Period	E.	CF	ER	GDP	CPI	IR
Variance Decomposition of CPI:						
1	.012	3.678	17.427	0.290	78.605	0.000
2	.016	2.532	11.590	16.553	60.661	8.665
5	.021	20.801	7.826	16.536	36.340	18.497
10	.022	20.555	9.241	17.566	34.576	18.063
Variance Decomposition of IR:						
1	.096	0.192	9.227	9.065	9.463	72.053
2	.153	23.353	5.600	16.266	22.794	31.987
5	.179	25.906	11.388	12.309	21.248	29.148
10	.185	25.437	12.576	12.558	20.750	28.679

Cholesky Ordering: CF ER GDP CPI IR

Capital flight shocks also contribute significantly to variations in the macroeconomic fundamentals. Among the five variables, innovations in capital flight turned up to be the first contributor to variations in GDP and exchange rate. Innovations in capital flight explained more than 46 percent of the GDP forecast error variance and more than 34 percent of the exchange rate forecast error variance. Only more than 28 percent of those two forecast error variances are explained by their own innovations. The movements in CPI and interest rate are predominantly driven by their own shocks, which are more than 34 and 29 percent, respectively. Innovations in capital flight, however, still play significant role to variations in interest rate and CPI. About 25 percent of interest rate variance and 20 percent of CPI variance are attributed to capital flight shocks.

These results suggest that the capital flight incorporates its own information and the information of exchange rate. Indeed the impact of GDP on capital flight seems to be getting greater and the impact of its own innovation is lesser. The results also show the significant influence of capital flight on the movements of future macroeconomic fundamentals such as GDP, exchange rate, interest rate and CPI. The significant impact of capital flight on GDP and exchange rate may also suggest that the growth or recession of economy and appreciation or depreciation of exchange rate could be due to their reactions to changes in capital flight. Capital flight also contributes quite a significant impact on the movements of interest rate and CPI. Surprisingly, GDP, interest rate and CPI do not significantly influence the movements of capital flight.

Conclusion

The paper analyzes the dynamic relationship between capital flight and macroeconomic fundamentals: exchange rate, GDP, CPI and interest rate. The findings of the paper show that there is a presence of long-run and short-run associations. The capital flight and macroeconomic fundamentals are integrated at least for some variables. The dynamic analysis indicates that the movements of capital flight in Malaysia are driven mainly by its own factor and exchange rate. Further analysis need to be done in determining other factors which could contribute to the movements of capital flight since its variations are predominantly attributed to its own variations, even though the impact seems deteriorating. The appreciation and depreciation of exchange rate also play significant roles in determining the movement of capital flight. The depreciating currency would lead to greater outflow of capital, showing the lack of confidence in holding local money and capital. This scenario would negatively impact the economy. The exchange rate would keep declining as more capital, legally and illegally, leaving the country; which would then affect the stock market. Having less returns or loss in investment would directly and indirectly impact both

companies and households negatively. Thus, action must be taken in controlling the outflows of capital, legal and illegal, especially during the depreciating currency period. The capital flight seems to remain high when the exchange rate is experiencing depreciation and low confidence level. Thus, action must be taken to control the movement of exchange rate so that the outflow of capital can be controlled.

The movement of capital flight would also impact economic growth, stability of the exchange rate movement, interest rate and inflation rate. The significant effect of capital flight on macroeconomic fundamentals further proves the importance of controlling the illicit movement of capital away from domestic to foreign economy. The greater the amount of capital flight, the lower the value of currency and the interest rates and the higher the inflation rates; thus, affecting the economy as a whole. At least if the outflow of capital is legally performed, the outcome of transactions related to the capital could be reflected in the GDP. The worries are the negative impacts due to illicit movements of the capital which would affect the economy worse than expected; thus affecting local companies and households with higher unemployment rate and lower household consumption at higher cost of living. In order to remain sustainable, the authorities have to take action to control the increasing capital flight.

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