

Determinants of International Capital Flows: The Case of Malaysia

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This paper examines the determinants of international capital inflows into Malaysia in the forms of pull and push factors. The results from Johansen and Juselius cointegration test confirmed the existence of a long run stable equilibrium among the variables in the model. In addition, the Error Correction Model (ECM) has been utilized to detect the long run divergence from the equilibrium relationship between the explanatory variables and capital inflows in the specified model. The Wald tests from the ECM further support the notion that real GDP, domestic Treasury bill rate, budget balance, current account balance and US production do Granger cause capital inflows into Malaysia in the short run. The empirical findings in this study show that the pull factors especially budget balance and current account are imperative in explaining inflows of capital into Malaysia. Another interesting finding is the role of real factor as denoted by domestic and industrial country's outputs in affecting the capital inflows.

Field: International Economics

1. Introduction

Economic liberalization and globalization have resulted in rapid mobility of resources between nations as to reap the comparative advantage of the respective country. As a small open economy, Malaysia is not an exception to attract capital in pursuing its development agenda. Thus Malaysia has been depending on capital inflows as one of the vital sources of growth for decades since its formation in 1965. This can be seen from the high surge of capital inflows into Malaysia from 1975 to 2004 (see Table 1).

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Table 1: Capital Flows into Malaysia, 1975-2006

Year	Capital Flows (Millions USD)
1975	742.34
1980	1,531.55
1985	1,774.43
1990	1,989.00
1995	6,627.93
2000	1,642.63
2001	-940.84
2002	4,235.00
2003	2,752.63
2004	17,188.95
2005	-1,182.87
2006	4,774.39

Source: International Financial Statistics, various issues.

The capital inflows to Malaysia increase from USD742.34 millions in 1975 to its peak of USD17,188.95 millions in 2004. Malaysia policy towards attracting inflow of capital into the country is considered to be very facilitating and it covers a wide range of strategies (Shazali and Alias 2002). Apart of the policies and strategies, the macro economic performances could provide a strong signal to potential investors to invest. Macro economic indicators such as strong economic fundamentals (pull factors) as well as facilitating policies like new investment incentive packages and liberalization of foreign exchange administration measures are among the crucial determinants of international capital inflows into Malaysia (Ooi 2008). Although there are numerous studies attempt to analyze this phenomenon, this paper examines the determinants of capital inflows in Malaysia in the forms of pull and push factors.

The pull factors refer to domestic variables namely parameters within the control of a particular country itself, while push factors refer to external forces that are beyond the control of a country. Pull factors employed in this study include real Gross Domestic Product (GDP), Treasury bills rates, budget balance and current account balance. Meanwhile, the push factor is represented by US Industrial Production Index (IPI) as a proxy of the industrial country's productivity indicator.

The remaining of this paper is organized as follows: In Section 2, we provide a brief literature review on the determinants of capital flows. The data and methodology will be described in Section 3. Section 4 presents the empirical results and discussions. Finally, we conclude in the last section.

2. Literature Review

There are many factors that determine the inflows of capital into a country ranging from domestic to international settings. The relative significance of the factors varies from one country to another as well as types of factors.

Among literatures in the early 1990s that examine the determinants of capital flows is found in the work of [Calvo et al. \(1993\)](#) who assert that the push factor such as low US interest rates plays a significant role for increasingly inflows of capital to Latin America, hence explaining the accumulation of foreign reserves and appreciating real exchange rates in Latin America.

Instead of concluding push factors as the main drivers for capital inflows, [Hernandez and Rudolf \(1995\)](#) argue that domestic variables (pull factors) as embedded in domestic policies carried out by developing countries are central in explaining the surge of capital flows. Sound macroeconomic policies that promote savings and exports are likely to enhance foreign investment, hence maintaining the sustainability of capital inflows into developing countries in the long run.

The importance of pull factors in driving capital flows to developing countries also assert by [Montiel and Reinhart \(1999\)](#) which conclude that the domestic macroeconomic policy (Pull factor)- the sterilization policy has significantly attracted short term capital inflows to Asia than to Latin America. In contrast, the finding from the push perspective confirms: (i) International interest rates stimulate more inflows of capital to Latin American countries than Asian countries; (ii) interest rate effects are intra-regional in pattern; and (iii) contagion effect brought by the Mexican crisis is more regional in pattern.

Next eminent study on the significance of pull factors in attracting private capital flows is found in the study by [Dasgupta and Ratha \(2000\)](#). The researchers discover that the net portfolio flows are related negatively with the current account balance, but positively with both country's per capita income and growth performance. In addition, the study also highlighted a significant positive relationship between FDI flows and portfolio flows to developing countries.

[Hernandez et al. \(2001\)](#) stress that the effects of pull factors are stronger than the push factors in influencing capital flows to emerging markets in the 1990s. The results confirm that the net private capital flows to emerging countries seems to support the expected outcome, when it relates positively with the inflows of capital into emerging markets. In terms of pull factors, foreign debt service and gross domestic investment play significant roles in attracting private capital flows to the countries studied. Both variables link inversely with capital flows. However the importance of public sector balance in attracting inflows of capital into a country does not hold in this study.

Another literature that supports the eminent of pull factors in attracting capital inflows to emerging markets is as reported in a study carried out by ([Mody et al. 2001](#)). The study concludes that pull factors such as (consumer price index, domestic credit, industrial production index, domestic interest rate, credit rating, reserve-import ratio and domestic stock market index) have significantly attracting capital flows into all the economic regions in the sample studied. Nevertheless, the effect of push factors like the shocks in US high-yield spread, swap rate and US interest rates on capital flows are more in short term basis as they will adjust to an equilibrium state in the long run.

Adopting the Structural VAR model (SVAR), [Culha \(2006\)](#) generalizes that the pull factors namely the real interest rates, budget balance and current account balance appear to be the more pertinent factors in explaining the inflows of capital into Turkey. Despite the significant finding on the dominance of the pull factors in determining capital inflows into Turkey, the author also discovers a new trend in his latest set of data that external forces such as foreign interest rates is likely to change the amount of capital flows into a country.

[De Vita and Kyaw \(2008\)](#) find a mixed result when both pull and push factors in terms of real factors (domestic output and industrial country's output) are important in explaining capital inflows to developing countries. They also noticed that among all the push and pull variables employed, real variables appear to be significant in supporting inflows of capital to developing countries in the medium and long run.

3. Data and Methodology

Data Description

This study uses quarterly data which span from 1985Q1 to 2006Q4 that can be obtained from various issues of the International Financial Statistic (IFS) published by International Monetary Fund (IMF) and the Central Bank of Malaysia's Monthly Statistical Bulletin.

The dependent variable in this study is the capital inflow (CAPF) which obtained by summing up the foreign direct investment, portfolio investment liabilities and other investment liabilities. The rationale to form aggregated data from these three flows is because they are the major components of capital flows in the financial account of a country. These components of total capital flows distinguish the present study from other studies in the same area.

The independent variables used in this study include both pull and push factors that affecting the capital inflows into a country. For the pull factors, we employ real GDP (RGDP), 3-month Treasury bills rate (TBR), budget balance (BB) and current account balance (CAB). RGDP represents the domestic performance of an economy and it is widely cited in many literatures on determinant of capital inflows into a country. On the other hand, BB which obtained by deducting total federal government expenditures from total receipts denotes fiscal fragility of a country ([Hernandez et al., 2001](#) and [Culha, 2006](#)). The CAB reflects external vulnerability while the country's TBR is used as the proxy of domestic interest rate to represent the returns on domestic securities ([Culha 2006](#)). The push factor examined in this study is the US Industrial Production Index (USIPI), which is used as the proxy for industrial country's productivity performance.

Since the quarterly data for BB and CAPF from 1985 to 1998 are unavailable, the annual figures of these data were split into quarterly figures using the interpolation technique based on Gandolfo (1981). Variables such as CAPF,

BB and CAB are all in ratios to GDP, while RGDP, TBR and USIPI are in natural logarithm form.

Model Specification

In this study, the capital flows into Malaysia can be modeled as follows:

$$\text{CAPF} = f \{ \text{RGDP}, \text{TBR}, \text{RBB}, \text{RCAB}, \text{USIPI} \} \quad (1)$$

Following the empirical studies by [Kim \(2000\)](#), [Hernandez et al. \(2001\)](#), [Mody et al. \(2001\)](#) and [Culha \(2006\)](#), to name some, we regarded RGDP and TBR to have positive relation with CAPF. This is because an economically well doing country can attract more inflows of capital than the reverse, and also, the higher the domestic interest rate, the more attractive the country is in terms of attraction to foreign capital.

In contrast, both domestic BB and CAB are anticipated to have either positive or negative relationship with CAPF depending on how we perceive the variables. If we look at the variables as fiscal and external fragilities to a country respectively, these two variables might have negative relationship with capital inflows. This is because large budget and current account deficits denote unfavorable domestic economy condition, thus making a country less attractive to capital inflows from abroad ([Hernandez et al. 2001](#)). However, if we consider the variables from a direct angle, they might have positive nexus with capital inflows as widening deficits in current account and budget balance imply a substantial demand for capital inflows from other countries to finance the deficits.

The strength of the industrial countries' economy is proxied by USIPI may have two implications on capital flows to emerging economies. On the one hand, an improvement in US industrial production index shows the ability of industrial countries in accumulating capital to fund economic activities in developing countries. On the other hand it leads to inflationary pressure in the US hence raises its interest rates. Higher interest rates in the US attract inflows of capital into the US hence, reducing the amount of capital flows to emerging economies.

4. Empirical Results

Stationarity Properties of the Data

In this study, the Augmented Dickey-Fuller (ADF) unit root test is utilized to examine the stationarity properties of the data used in the model. The optimal lag length is selected based on Schwarz Information Criterion (SIC). Results from Table 2 clearly show that all the variables examined are non-stationary at level. In contrast, they are stationary after first differencing, hence they are said to be integrated of order one.

Table 2: ADF Unit Root Tests Results

Variables	Levels	First Differences
	Trend	Without Trend
CAPF	-2.85(2)	-9.74(1)***
LRGDP	-1.99(5)	-4.77(4)***
LTBR	-1.82(0)	-8.11(0)***
BB	-1.93(1)	-3.94(4)***
CAB	-1.96(9)	-3.47(8)***
LUSIPI	-1.94(1)	-4.44(0)***
Critical values:		
	1%	-4.07
	5%	-3.46
		-3.51
		-2.89

Notes: CAPF refers to ratio of capital flows to GDP; LRGDP reflects natural logarithm of real GDP; LTBR denotes natural logarithm of 3-month Treasury bill rate; BB signifies ratio of budget balance to GDP; CAB implies ratio of current account balance to GDP, and LUSIPI denotes natural logarithm of US Industrial Production Index. Asterisks (***) denote significant at the 1% level.

Cointegration Test Result

Upon confirming the stationarity characteristics of the data being examined, we then proceed with the Johansen and Juselius (1990) cointegration test to justify the long run equilibrium relationship among the variables. The empirical finding of the cointegration test is presented in Table 3. The null hypothesis of $r=0$ is rejected at 5% level, implying that there exists a long run equilibrium relationship amongst the variables in the specified model.

Table 3: Johansen and Juselius Cointegration Test Results

H_0	H_1	λ_{\max}	CV _(max, 5%)
Variables: CAPF, LRGDP, LTBR, BB, CAB, LUSIPI			
$r = 0$	$r = 1$	48.38**	40.08
$r \leq 1$	$r = 2$	28.09	33.88
$r \leq 2$	$r = 3$	17.54	27.58
$r \leq 3$	$r = 4$	8.99	21.13
$r \leq 4$	$r = 5$	7.69	14.26
$r \leq 5$	$r = 6$	0.04	3.84

Notes: r is the number of cointegrating vector. Asterisks (**) indicate significant at the 5% level. The reported maximum eigenvalue statistics have been adjusted for small sample size correction using Reinsel and Ahn (1988)'s formula: $(t-nk)/t^*lr$, where t = actual sample size used in the estimation, n = number of variables in the system, k = number of lags used and lr = log likelihood ratio.

Normalized Cointegrating Vector

The result from vector error correction estimates can be written as follows:

$$\text{CAPF} = -1.14 + 0.73\text{LRGDP} + 0.11\text{LTBR} - 6.85\text{BB} - 1.82\text{CAB} - 0.88\text{LUSIPI}$$

(4.28) (2.21) (-6.98) (-5.45) (-2.27)

Figures in the parentheses are the t -statistics. All the estimated coefficients are statistically significant at 5% level. From the normalized equation, it tells the existence of the long run elasticity or responsiveness in the variables examined. The values of the coefficients imply that CAPF is more responsive with respect to BB and CAB as compared to RGDP, TBR and USIPI.

All the signs shown in the above equation are in line with past literatures on determinants of capital inflows into a country. An increase in real output ([De Vita and Kyaw, 2008](#)) and domestic interest rate has the potential to raise the inflows of capital. The later seems to positively affecting the inflows of capital possibly due to moderate history of interest rate risk premium in Malaysia from the 1970s to present. However, rises in federal government budget balance, current account balance and industrial country's productivity will reduce the inflows of capital.

There are evidences that budget balance and current account balance are likely to have opposite relationship with capital flows ([Kim 2000](#); [Dasgupta and Ratha 2000](#)). The notion that USIPI has a negative relationship with capital flows into Malaysia is in line with a study done by [Kim \(2000\)](#).

Estimation of Error Correction Model (ECM)

In the ECM, we incorporate explanations on important statistical indicators particularly the values of error correction term (ECT) and the diagnostic tests. The estimation of ECM seems adequate based on the results presented in Table 4. The residuals from the ECM have constant variances and they are serial uncorrelated. Moreover, the estimated model is well specified and stable across the sample period.

The sign of the ECT is statistically significance with negative value, indicating the correct sign as expected. This reconfirm that the variables under study are cointegrated in the long run. The ECT value of -0.72 implies that about 72% of the short run deviations in the capital inflows would be adjusted in quarterly basis in order to reach the long run equilibrium state. In other word, there is a

relatively fast adjustment to correct disequilibrium among the factors affecting capital inflows into Malaysia.

Table 4: Estimation of ECM for Capital Inflows in Malaysia

Variables	Coefficients	Std. Errors	<i>t</i> -statistics	<i>p</i> -values
Constant	0.009	0.006	1.448	0.152
ECT(-1)	-0.722	0.091	-7.894	0.000
Δ RCAPF _{t-3}	0.259	0.077	3.342	0.001
Δ LRGDP _{t-5}	-0.200	0.115	-1.737	0.087
Δ LTBR _t	-0.074	0.037	-2.007	0.049
Δ RBB _t	-1.643	0.835	-1.967	0.053
Δ RBB _{t-4}	1.501	0.710	2.115	0.038
Δ RCAB _{t-3}	-0.634	0.190	-3.343	0.001
Δ RCAB _{t-4}	0.740	0.199	3.714	0.000
Δ LUSIP _{t-3}	-0.967	0.545	-1.774	0.080

Diagnostic Tests:

AR[4]	0.469 [0.76]
ARCH[1]	0.051 [0.82]
RESET[1]	0.274 [0.60]
CUSUM	Stable
CUSUM ²	Stable

Notes: AR, ARCH and RESET are the Lagrange Multiplier tests of serial correlation, ARCH effects and Ramsey RESET specification test, respectively. CUSUM and CUSUM² refer to the CUSUM stability and CUSUM of square stability tests, respectively. Figures in [.] refer to *p*-values of the diagnostic tests.

Test for Short Run Granger Causality Relationship

This test is carried out based on the result from the ECM to detect the short run causal relationship among the variables when the variables examined are cointegrated. It utilizes the *F*-test in the Wald test context to show the short run causal link between the explanatory variables and the dependent variable. The empirical results of short run Granger causality test are reported in Table 5. We found that the null hypothesis of no causal effect has been rejected in all the cases at least 10% significant level. This clearly shows that all the past values of explanatory variables and capital inflows do have the ability to Granger cause the inflows of capital into Malaysia in the short run.

Table 5: Results of Short Run Granger Causality Test

Null Hypothesis	F-statistic of Wald Test (p -value)
	$\Delta RCAPF_t$
$\sum_{i=1}^5 \Delta RCAPF_{t-i}$	11.17 (0.00)***
$\sum_{i=1}^5 \Delta RGDP_{t-i}$	3.02 (0.09)*
$\sum_{i=1}^5 \Delta LTBR_{t-i}$	4.03 (0.05)**
$\sum_{i=1}^5 \Delta RBB_{t-i}$	4.80 (0.01)***
$\sum_{i=1}^5 \Delta RCAB_{t-i}$	11.29 (0.00)***
$\sum_{i=1}^5 \Delta LUSIPI_{t-i}$	3.15 (0.08)*

Note: Asterisks (*), (**) and (***) indicate significant at 10%, 5% and 1% levels, respectively.

5. Conclusion and Policy Implications

The objective of this paper is to examine the determinants of capital inflows into Malaysia in the context of pull and push factors. The pull factors are represented by the country-specific factors while the push factor is denoted by the output performance of the industrial country (in this case we use US Industrial Production Index).

Empirical results show that all the variables under study are integrated of order one and they are cointegrated in the long run. The normalized equation further implies that the inflows of capital into Malaysia is more responsive with changes in Federal government budget balance and domestic current account balance as compared to real output, Treasury bill rates and industrial country's productivity level. All the variables sign are consistent with our prior expectation, thus implying the importance of the model in explaining the determinants of capital inflows into Malaysia.

The use of ECM re-confirmed the existence of the long run stable equilibrium relationship among the variables in the model. The findings from the Granger causality test support the importance of the past performance of capital inflows, real GDP, Treasury bill rates, budget balance, current account

balance and US productivity level in affecting the short run movement of the inflows of capital into Malaysia.

The empirical findings in this study imply that the pull factors are imperative in explaining the inflows of capital into Malaysia. In that sense, budget balance and current account balance appear to be the most influential variables in affecting the inflows of capital into Malaysia as indicated by the high sensitivity of capital inflows toward the changes in these variables. This finding is consistent with the studies by [Hernandez and Rudolf \(1994\)](#); [Hernandez and Rudolf \(1995\)](#); [Dasgupta and Ratha \(2000\)](#) and [Hernandez \(2001\)](#). Another interesting discovery is the crucial role of real factor as denoted by domestic and industrial country's output in determining capital inflows into a country. The same findings were highlighted by [Mody et al. \(2001\)](#), [Dasgupta and Ratha \(2000\)](#), [Culha \(2006\)](#) and [De Vita and Kyaw \(2008\)](#) in supporting the importance of real output as important factors in attracting capital inflows.

As a small open economy, it is vital for Malaysia to keep the domestic macroeconomic variables in the right order if she wishes to attract more foreign capitals. The government as an important policymaker needs to play a more active role in maintaining the attractiveness of Malaysian exports in order to catch the attention of foreign capitals to invest in our country. Besides that, keeping a good fiscal management may ensure the attractiveness and competitiveness of Malaysia as one of the centers for foreign investment destination among the many potential and giant economies in the world.

Endnotes:

1. One can refer to <http://www.asean.org/6480.htm> and <http://www.asean.org/21940.htm> for the details of AIA and ACIA.

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