Financial development and the FDI–growth nexus: The Malaysian experience

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This article examines the FDI-growth nexus in the small open economy of Malaysia by controlling for the level of financial development. Financial development is proxied by a composite index, which is a summary measure of four financial development indicators. Using time-series data from 1965 to 2004, the results show that FDI and financial development are positively related to output in the long-run. The impact of FDI on output is enhanced through financial development. To supplement these findings, we assess the causal relationships between the variables using the recent causality tests available in the literature. The results indicate that economic growth causes FDI growth in the long-run, but no feedback relationship is observed.

I. Introduction

Malaysia is one of the most successful developing countries in attracting a large amount of foreign direct investment (henceforth FDI). The inward FDI potential index (a measure of the attractiveness of the host economy to foreign investors) published by UNCTAD (2004) shows that Malaysia was the most popular destination, among the developing countries in Asia, for FDI in 2003. Policy reforms, including the introduction of the Investment Incentives Act 1968, the establishment of free trade zones in the early 1970s, and the provision of export incentives alongside the acceleration of open policy in the late 1980s, led to a surge of FDI before the Asian financial crisis hit Malaysia in 1997. Apart from these policy factors, it is generally believed that sound macro-economic management, sustained growth in the real sector, relatively low set-up costs, political stability, a sufficiently trained labour force and a well-functioning financial system made Malaysia an attractive prospect for FDI. The importance of FDI to the domestic economic development is undeniable. In fact, Athukorala and Menon (1995) argue that FDI is one of the most important contributing factors to Malaysia’s growth-led industrialization.

The issue of how inflows of FDI impact on economic growth has been the subject of intense study in the recent literature. FDI can exert a positive influence on economic growth through the transfer of new technology and spillover efficiency. Such a positive impact does not occur automatically, but rather, depends on the absorptive capacity of the recipient country. Several studies that discuss the importance of absorptive capacity and the success of FDI focus only on human capital and trade regime (e.g. Balasubramanyam et al., 1996; Borensztein et al., 1998; Kohpaiboon, 2003). Only in recent years, some attention has been given to study the role of finance on the relationship between FDI and economic growth using a cross-country framework. These studies argue that the impact of FDI on
economic growth depends on the extent of financial development of the host country (Hermes and Lensink, 2003; Alfaro et al., 2004).

There are several ways in which a higher level of financial development allows the host country to exploit FDI more efficiently. First, the provision of more credit facilities allows firms to purchase new machines, adopt new technology and hire better-skilled managers and labours. Second, the presence of an efficient financial system facilitates FDI to create backward linkages, which are beneficial to the local suppliers in the form of improved production efficiency. Therefore, financial development plays a crucial role in allowing the host country to absorb the spillovers associated with FDI. In other words, the level of financial development in the host country affects its ability to absorb the benefits of FDI. In this way, finance enters into the growth equation through the interaction with FDI.

The results of these cross-country studies suggest that countries with better-developed financial systems tend to benefit more from FDI. Although the findings of these studies provide a useful guide about how the variables are related, the results cannot be generalized since such a causal link is largely determined by the nature of the institutions, and the policies pursued in each country. Hence, it is important to carry out country specific studies in order to relate the findings to policy designs within specific cases.

This article examines the relationship between FDI and growth as well as financial development and growth in Malaysia for the period 1965 to 2004 by taking into account the complementarity between FDI and financial development in the process of economic development. Malaysia is an interesting case study for this subject because it has a rich history of financial sector reforms.1 However, there is little empirical evidence providing policy makers the necessary information about whether these policy reforms have any impact on the real sector. This article is an attempt to fill the gap. The main contribution of this article is that for the first time an attempt is made to examine the dynamic relationship between economic growth, foreign direct investment and financial development for Malaysia.

The remainder of the article is organized as follows. Section II discusses the model, data and measurement of financial development. Section III describes the methodology used in this study. The results are discussed and presented in Section IV. Section V discusses policy implications of the results and concludes.

1 See Ang and McKibbin (2007) and Ang (2007) for more discussion on financial sector reforms in Malaysia.

II. Model, Data and Measurement

Model and data

Based on the theoretical arguments presented above, the relationship between output, financial development and FDI can be specified as follows:

\[ G = f(F, I, I \times F) \] (1)

where \( G \) is logarithmic per capita real GDP, \( F \) is a composite measure of financial development expressed in logarithmic form, \( I \) refers to logarithmic ratio of FDI to nominal GDP, and \( I \times F \) refers to the interaction between \( I \) and \( F \). To ensure that this interaction term does not proxy for \( F \) per se, \( F \) is also included in the specification. The sign expected for the coefficient on \( I \) is ambiguous. However, the coefficients of \( F \) and \( I \times F \) are expected to be positive. We include five dummy variables in the estimation to account for the oil crises in 1973 and 1979, the global economic recession in 1985, the Asian financial crisis in 1997–98, and the world trade recession in 2001.

Annual data covering the period 1965 to 2004 were used in the study. All data were obtained from the World Bank’s World Development Indicators, the IMF’s International Financial Statistics, and the various issues of Bank Negara Malaysia’s Quarterly Economic Bulletin. The data were converted into natural logarithms so that they can be interpreted in growth terms after taking the first-difference. All variables were quoted in local currency.

Measuring financial development

The selection of key variables to represent the level of financial services produced in an economy and how to measure the extent and efficiency of financial intermediation are the major problems in an empirical study of this nature. In this study, we use the ratio of number of commercial bank offices per 1000 people (\( B \)), the ratio of M3—M1 to nominal GDP (\( M \)), the ratio of commercial bank assets to the sum of central bank assets and commercial bank assets (\( A \)) and the ratio of bank claims on private sector to nominal GDP (\( P \)) as the proxies for financial development.

The number of bank branches per capita, or banking density, gives an idea about to what extent people can access to banking services (see, e.g. Demetriades and Luinient, 1996). We subtract narrow money from broad money to focus on the intermediation activities provided by the banking system (see, e.g. Rousseau and Wachtel, 2002).
The relative importance of commercial banks is used as a proxy for financial development on the basis that commercial banks are more likely to identify profitable investment opportunities, and therefore, can make more efficient use of funds than central banks (see, e.g. King and Levine, 1993). Bank credit to private sector is often argued to be a satisfactory measure of financial development, since the private sector is able to utilize funds in a more efficient and productive manner as compared to the public sector. We do not consider any stock market variables in this study. The stock market in Malaysia has been subject to much fluctuation over the last three decades. It is therefore not indicative about the depth of the Malaysian financial system.

The variations of the dependent variable better than any other linear combination of explanatory variables, is the best measure of financial development in this case. Hence, we extract only one principal component, and the information related to this principal component is reported at the bottom panel of Table 1. The factor scores are used as the weights to construct the financial development index, denoted as $F$.

### III. Methodology

The testing procedure involves three steps. We begin by testing the existence of unit roots by using Augmented Dickey–Fuller (ADF) test and Phillips–Perron (PP) test. The second step is to test for cointegration using the Johansen approach for the VARs in levels. Our causality tests are preceded by cointegration testing, since the presence of cointegrated relationship has implications for the way in which causality testing is carried out. If cointegration is detected, the third step is to formulate a vector error correction model (VECM) to test for causality by employing the appropriate types of causality tests available in the recent literature.

Engle and Granger (1987) argue that cointegrated variables must have an error correction representation in which an error correction term (ECT) must be incorporated into the model. Accordingly, a VECM is formulated to re-introduce the information lost in the differencing process, thereby allowing for long-run equilibrium as well as short-run dynamics. For the four-variable case with one cointegrated relationship, the VECM can be expressed as follows:

$$
\Delta G_t = \mu_t + \alpha_{1t} ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{ij} \Delta G_{t-j} + \sum_{j=1}^{p-1} \theta_{ij} \Delta F_{t-j} + \psi_{1t} \Delta I_{t-1} + \omega_{1t} \Delta (I \times F)_{t-1} + \varepsilon_{1t}
$$

### Table 1. Principal component analysis

<table>
<thead>
<tr>
<th>Principal component</th>
<th>Eigenvalues</th>
<th>Percentage of variance</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.499</td>
<td>0.875</td>
<td>0.875</td>
</tr>
<tr>
<td>2</td>
<td>0.430</td>
<td>0.107</td>
<td>0.982</td>
</tr>
<tr>
<td>3</td>
<td>0.065</td>
<td>0.016</td>
<td>0.998</td>
</tr>
<tr>
<td>4</td>
<td>0.006</td>
<td>0.002</td>
<td>1.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor loadings</th>
<th>Communalities</th>
<th>Factor scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M$</td>
<td>0.521</td>
<td>0.271</td>
<td>0.278</td>
</tr>
<tr>
<td>$A$</td>
<td>0.464</td>
<td>0.215</td>
<td>0.248</td>
</tr>
<tr>
<td>$P$</td>
<td>0.527</td>
<td>0.277</td>
<td>0.282</td>
</tr>
<tr>
<td>$B$</td>
<td>0.487</td>
<td>0.237</td>
<td>0.260</td>
</tr>
</tbody>
</table>

Note: Number of principal component (or factor) extracted = 1.
\[
\Delta F_t = \mu_2 + \alpha_2 ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{2j} \Delta G_{t-j} + \sum_{j=1}^{p-1} \theta_{2j} \Delta F_{t-j} + \sum_{j=1}^{p-1} \psi_{2j} \Delta I_{t-j} + \varepsilon_{2t}
\]

\[
\Delta I_t = \mu_3 + \alpha_3 ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{3j} \Delta G_{t-j} + \sum_{j=1}^{p-1} \theta_{3j} \Delta F_{t-j} + \sum_{j=1}^{p-1} \psi_{3j} \Delta I_{t-j} + \varepsilon_{3t}
\]

\[
\Delta(I \times F)_t = \mu_4 + \alpha_4 ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{4j} \Delta G_{t-j} + \sum_{j=1}^{p-1} \theta_{4j} \Delta F_{t-j} + \sum_{j=1}^{p-1} \psi_{4j} \Delta I_{t-j} + \varepsilon_{4t}
\]

where

\[
ECT_{t-1} = G_{t-1} + \left(\beta_{21}/\beta_{11}\right) F_{t-1} + \left(\beta_{31}/\beta_{11}\right) I_{t-1} + \left(\beta_{41}/\beta_{11}\right)(I \times F)_{t-1}
\]

is the normalized cointegrated equation. The ECT describes the long-run equilibrium relationship while the lagged difference terms indicate short-run dynamics. There are two sources of causation, i.e., through the ECT, if \( \alpha \neq 0 \), or through the lagged dynamic terms.

In Equation 3, to test the hypothesis that \( \Delta F_t \) does not Granger-cause \( \Delta G_t \) in the short-run, we examine the significance of the lagged dynamic terms by testing the null \( H_0 \); all \( \theta_{ij} = 0 \). Nonrejection of the null implies finance does not Granger-cause growth in the short-run. The test of weak exogeneity, which is a notion of long-run noncausality, requires satisfying the null \( H_0; \alpha_{11} = 0 \). We can also perform the test of strong exogeneity, which imposes stronger restrictions by testing the joint significance of both the lagged dynamic terms and ECT (Engle et al., 1983). In particular, \( \Delta F_t \) does not cause \( \Delta G_t \) if the null \( H_0; \) all \( \theta_{ij} = \alpha_{11} = 0 \) is not rejected. The test of strong exogeneity does not distinguish between the short- and long-run causality, but it is a more restrictive test that indicates the overall causality in the system.

### IV. Empirical Results

Both ADF and PP tests yield remarkably similar results (Table 2), i.e., all variables are nonstationary in their levels but become stationary after taking the first difference. Hence, we conclude that all series are \( I(1) \) at the 1% level of significance. Given that these variables share common integration properties, we can now proceed to test for the presence of a common trend, or equivalently, a long-run cointegrating relationship between the variables.

Since the Johansen approach is sensitive to the lag length used, we conduct a series of nested likelihood ratio tests on the first-differenced VARs to determine the optimal lag length prior to performing cointegration tests. Given the sample size, we have considered a maximum lag length of four. The optimal lag length is found to be one. We follow this lag structure for the rest of the estimations. Using likelihood ratio tests, the five dummy variables used to account for various macroeconomic shocks are found to be

<table>
<thead>
<tr>
<th>Table 2. Unit root tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF</td>
</tr>
<tr>
<td>Level</td>
</tr>
<tr>
<td>( G )</td>
</tr>
<tr>
<td>( F )</td>
</tr>
<tr>
<td>( I )</td>
</tr>
<tr>
<td>( I \times F )</td>
</tr>
<tr>
<td>( P )</td>
</tr>
<tr>
<td>( I \times F )</td>
</tr>
</tbody>
</table>

Notes: ** indicates 1% level of significance. For ADF, AIC was used to select the lag length. The maximum number of lags was set to be four. For PP, Barlett–Kernel was used as the spectral estimation method. The optimal bandwidth was chosen using Newey–West method.
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statistically significant. Cointegration tests are performed for the VARs at levels. In Table 3, the results of both trace and maximum eigenvalue tests unanimously point to the same conclusion that there is one cointegrated relationship at the 1% level of significance in each model.

Table 4 presents the cointegrating vector, speed of adjustment coefficient and some diagnostic statistics. In both models, the Lagrange Multiplier (LM) tests indicate no evidence of serial correlation in the residuals. We obtain the same conclusion by allowing for up to four lags. The multivariate normality tests show that the residuals are Gaussian in each model. For the VARs at levels. In Table 3, the results of both trace and maximum eigenvalue tests unanimously point to the same conclusion that there is one cointegrated relationship at the 1% level of significance in each model.

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It is evident that both financial development and FDI are positively related to real output. Financial development exerts a relatively larger positive effect on the real sector, regardless of the financial development indicator used. The results that financial sector development plays a catalyst role in output expansion are, by and large, in line with the literature (see, e.g. Levine, 1997; Ang and McKibbin, 2007; Chang and Caudill, 2005; Shan, 2005; Thiessen, 2005). The interaction term is statistically significant and consistent with the theoretically expected sign (positive). Therefore, it can be inferred that the impact of FDI on the Malaysian economy is strengthened by the level of sophistication of the financial system. This is obvious when we obtain the derivative of $G_t$ with respect to $I_t$. Hence, both the direct and indirect effects of FDI on real output are positive in the long-run.

On the whole, our results are consistent with the findings of Hermes and Lensink (2003) and Alfaro et al. (2004). The loading factor, which measures the speed of adjustment back to the long-run equilibrium value, is correctly signed (negative). This implies that the long-run equilibrium deviation has a significant impact on economic growth. The economy adjusts at the rate of 3% each year to achieve long-run equilibrium when there is a deviation from equilibrium.

Given that the results are not sensitive to the choice of financial development indicator, causality tests are performed based on Model A, which uses the index ($F$) as the measure of financial development. The results reported in Table 5 show that output growth causes FDI growth in the long-run but no feedback relationship is observed, corroborating the results of Chakraborty and Basu (2002) for the Indian experience and Shan (2002) for the Chinese

Table 3. Johansen cointegration tests

<table>
<thead>
<tr>
<th>Model</th>
<th>Trace statistic ($\lambda_{trace}$)</th>
<th>Maximum eigenvalue statistic ($\lambda_{max}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r = 0$</td>
<td>$r \leq 1$</td>
</tr>
<tr>
<td>Model A: ($G, F, I, I \times F$)</td>
<td>69.749**</td>
<td>28.545</td>
</tr>
<tr>
<td>Model B: ($G, P, I, I \times P$)</td>
<td>68.262**</td>
<td>27.887</td>
</tr>
</tbody>
</table>

Notes: ** indicate 1% level of significance, respectively. The critical values follow MacKinnon et al. (1999).

Table 4. Cointegrating vector

<table>
<thead>
<tr>
<th>Model</th>
<th>Cointegrated equation</th>
<th>$\alpha_{11}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$G_t = 12.222 + 2.710F_t + 0.764I_t + 0.498(I \times F)_t$</td>
<td>$-0.031$</td>
</tr>
<tr>
<td></td>
<td>$(7.584^{**})$</td>
<td>$(6.941^{**})$</td>
</tr>
<tr>
<td></td>
<td>$LM(1) = 15.281, JB = 12.083$</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>$G_t = 9.745 + 1.303P_t + 0.290I_t + 0.208(I \times P)_t$</td>
<td>$0.030$</td>
</tr>
<tr>
<td></td>
<td>$(7.124^{**})$</td>
<td>$(6.832^{**})$</td>
</tr>
<tr>
<td></td>
<td>$LM(1) = 16.826; JB = 7.207$</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The number of observations used in the estimation is 40; the optimal lag length chosen is one. ** indicate 1% level of significance, respectively; and figures in the parentheses indicate t-statistics. $LM$ is the Lagrange Multiplier test for no first-order serial correlation. $JB$ is the joint Jarque-Bera test for normally distributed residuals.
experience. These findings are further supported by the results from strong exogeneity tests.

However, there is no short-run causal relationship observed between output growth and FDI growth on the basis of Granger noncausality tests. Hence, our findings suggest that economic growth exerts a unidirectional causal effect on FDI growth in the long-run. While examining the causality from other variables to economic growth, the results seem to suggest that FDI and financial development do not exert any direct causal impact on output growth, both in the short-run and long-run. However, we find some support for causality running from the interaction between these two variables to output growth based on the results of strong exogeneity tests.

### V. Conclusions

In this article, we examine the FDI-growth nexus in the small open economy of Malaysia by controlling for the level of financial development. We attempt to address the difficult problem of measuring the depth of financial development by using principal component analysis to create an index that represents the overall development in the financial sector. Using the recently developed cointegration and causality techniques and by properly controlling for the various macro-economic shocks experienced by Malaysia, our results show that FDI and output are positively related in the long-run. Similarly, financial development exerts a positive influence on output. The causality results suggest that even though FDI has increased over the years, the policy changes do not appear to have led to higher economic growth. Instead, a reverse causality from output growth to FDI growth is observed.

The results highlight that FDI has no direct causal effect on growth. However, FDI stimulates economic growth through financial sector development. Therefore, an important implication of the findings in this article is that the extent and efficiency of the financial system of the host country is a crucial prerequisite in order to realize the positive effects of FDI. A more developed financial system facilitates the transfer of new technology associated with FDI into the host country.

Although the findings of our analysis may be unique to Malaysia due to its specific institutional and structural characteristics, the econometric techniques employed in this study can be readily extended to include other countries. However, it is important to note that given the small sample nature of this analysis, the results must be interpreted with due caution.

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### References


