INDIRECT IMPACT OF TRADE ON ECONOMIC GROWTH: EVIDENCE FROM ASIAN-5 ECONOMIES

Tajul Ariffin Masron a, ψ, Zulkornain Yusop b and Ahmad Zubaidi Baharumshah b
and Muzaffar Shah Habibullah b

a Universiti Sains Malaysia, Malaysia
b Universiti Putra Malaysia, Malaysia

Abstract
Past studies indicate that trade and economic growth do not show a parallel co-movement, or in other words, high level of trade does not necessarily lead to high economic growth. By using five selected East Asian economies as case studies, we attempt to investigate the source of this inconsistency. The indirect impact procedure is applied so as to help us to determine through which channel trade will positively affect economic growth, vice versa. We found that in order for ASEAN to emulate the success of South Korea in developing its economy, ASEAN has to ensure that they are moving towards greater competitiveness by enhancing the level of efficiency as well as technological development.

Keywords: Trade; Economic growth; Allocation efficiency; Technology development.

JEL Classification Codes: F 31.

1. Introduction
Rapid growth has become a hallmark of economic performance in Asia during the 1980’s and 1990’s period. This growth pattern has been partly due to the willingness to open up the economy to international trade, or normally termed as shifting towards outward-oriented policy. Many of outward-oriented policy reforms have been designed to improve economic efficiency and speed up the process of technological transfer. The ultimate aim is to accelerate economic growth.

Table 1: Average GDP growth in selected East Asian-5

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>3.4</td>
<td>1.1</td>
<td>3.9</td>
<td>3.67</td>
</tr>
<tr>
<td>United States</td>
<td>3.1</td>
<td>2.0</td>
<td>4.1</td>
<td>4.10</td>
</tr>
<tr>
<td>Europe</td>
<td>3.2</td>
<td>1.9</td>
<td>1.9</td>
<td>3.07</td>
</tr>
<tr>
<td>Latin America</td>
<td>2.3</td>
<td>2.8</td>
<td>4.6</td>
<td>2.08</td>
</tr>
<tr>
<td>Japan</td>
<td>4.5</td>
<td>2.2</td>
<td>2.5</td>
<td>0.36</td>
</tr>
<tr>
<td>Pacific Basin:</td>
<td>7.2</td>
<td>6.7</td>
<td>5.58</td>
<td>2.36</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>7.1</td>
<td>4.7</td>
<td>4.73</td>
<td>2.72</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5.3</td>
<td>6.8</td>
<td>6.17</td>
<td>-2.48</td>
</tr>
<tr>
<td>South Korea</td>
<td>9.8</td>
<td>7.2</td>
<td>5.88</td>
<td>4.51</td>
</tr>
<tr>
<td>Malaysia</td>
<td>4.6</td>
<td>8.6</td>
<td>8.76</td>
<td>2.34</td>
</tr>
<tr>
<td>Philippines</td>
<td>2.5</td>
<td>1.8</td>
<td>5.51</td>
<td>2.28</td>
</tr>
<tr>
<td>Singapore</td>
<td>5.9</td>
<td>8.2</td>
<td>8.09</td>
<td>5.7</td>
</tr>
<tr>
<td>Taiwan</td>
<td>8.7</td>
<td>6.2</td>
<td>2.27</td>
<td>-0.48</td>
</tr>
<tr>
<td>Thailand</td>
<td>9.0</td>
<td>8.6</td>
<td>-0.35</td>
<td>-0.99</td>
</tr>
<tr>
<td>China</td>
<td>9.4</td>
<td>10.0</td>
<td>9.2</td>
<td>7.63</td>
</tr>
</tbody>
</table>

Sources: World Development Indicator (World Bank 2006).

ψ Corresponding author. Tajul Ariffin Masron. School of Management, Universiti Sains Malaysia, 11800 USM Penang, Malaysia. Email: tams@usm.my
During the 1980s and early 1990’s, Asian economies exhibited better performance than any other region in the world although the pace of growth may not be the same for all economies in the region. The western part of Asia grew at lower pace than the eastern part. The most spectacular performance are among the 10 East Asian economies which consist of the Philippines, Malaysia, Thailand, Indonesia, Singapore, China, Hong Kong (Province of China), South Korea, Taiwan Province of China and Japan. Among these economies, only the Philippines grew at the slowest rate of 2 percent per annum while the second tier of newly industrializing economies (NIEs) of Malaysia, Thailand, Indonesia and China achieved growth rate of 4 to 7 percent per annum. Table 1 presents the average growth rates for the five East Asian economies under this study.

Regarding the industrial reforms, in Malaysia, Singapore, and Thailand, the reform process and industrial expansion began in the 1970s and accelerated in the 1970s and 1980s. In the Philippines and South Korea the industrial expansion began even earlier, in the 1960 (Dowling and Ray, 2000).

As part of their industrialization strategy, Asian economies opened their economies to international trade. Hong Kong and Singapore have always been open by their nature as entrepot trading centers. Based on tariff rates, and non-tariff barriers, Sachs and Warner (1995) suggest that Japan, South Korea, and Taiwan lowered trade barriers and opened foreign-exchange markets in the 1960s, as did Malaysia and Thailand, and followed by Indonesia in 1970 and the Philippines in the 1980s. On net, trade liberalization has led to faster long-run growth across the East Asian economies (Dowling and Ray, 2000) as shown in Figure 1.

There is a general consensus that active participation in international trade (or simply greater trade openness) has contributed significantly to the success stories of most East Asian economies. However, there is an unresolved issue relating to the experience of particularly East Asian economies i.e. moving towards greater trade openness does not always lead to higher economic growth. It is also interesting to see that some of these East Asian economies grew more rapidly than others even though all of them have moved towards greater involvement in the international trade.

For example, looking very closely at Korean and Indonesian experiences as shown in the Figure 1, we could see that Korean trade levels are always higher than those of Indonesian. At the same time, Korean economic performance, in terms of GDP growth rate, has always been far better than Indonesian. We tend to conclude that higher growth rate is directly related to trade level. However, if we look at Malaysian versus Korean experiences, Malaysian trade shares of GDP are consistently higher than those of Korea, but
in terms of economic performance (based on GDP growth rate) Korea is different from Malaysia. Clearly, higher trade level does not necessarily lead to higher economic growth since we could observe the opposite case if we compare the trade share between Korea and Thailand, as well as Indonesia. The level of exposure to international trade is more or less the same for these three economies, but their economic performances remain different with Korea relatively outperforming Thailand and Indonesia, in terms of their GDP growth. In the nutshell, having higher trade will not simply lead the country towards higher economic growth. Given the remarkable Korean experience in achieving high economic growth, Indonesia, Malaysia, Philippines and Thailand are now making an effort to replicate the Korean development program in order to industrialize their economies.

Thus, this study is concerned with the role of trade on economic growth indirectly or through the above channels in the case of five East Asian economies, namely Indonesia, Korea, Malaysia, Philippines and Thailand. A number of channels through which trade reform might have influenced growth performance have been put forth in the literature. Among the most frequently cited channels are its impact on factor accumulation and employment, diffusion of international information and production technologies, easier access to cost-effective imported capital goods of newer vintage, increased efforts towards labor reducing and research and development (R&D), and a better chance of having a general policy environment conducive to growth (Nam and Kim, 2000).

Therefore, it is the objective of this study is to investigate the indirect impact of trade on economic growth after considering external shock. The organization of the study is as follows. The next section discusses the underlying reason of using indirect approach in measuring the impact of trade on economic growth. The subsequent section highlights the literature review of the impact of trade on economic growth as well as the measurement of indirect impact of trade on economic growth. This is followed by final empirical model, estimation procedure and results of regression output. The last section concludes.

2. Note on modeling strategy
None of the theories touched so far suggested a direct link between trade and growth. The modeling of direct effects of trade cannot be justified on theoretical grounds. Neither the old trade model nor the new trade theory mentions a possible direct channel. The difficulty in finding consistent positive association between trade and growth as discussed above may be due to the assumption made regarding the relationship between trade and growth. Most of the previous studies assumed that the relationship between both variables is direct. Hence, despite substantial studies investigated the correlation between international trade and economic growth, there has been little formal modeling of the mechanisms in this relationship. Izani and MacPhee (2003) given the existing trade theories that suggest indirect relationship between trade and growth. The first attempt to model an explicit link between trade and growth was undertaken by Feder (1982) who focused on one mechanism – higher productivity in the export sector positively affects growth in the non-export sector as well. Structural rigidities in a developing economy presumably allow higher productivity to persist in the export sector and this produces a positive externality on the non-export sector.

Therefore, given the indirect role played by trade on economic growth, the empirical procedure should be stepwise and this paper attempt to examine the indirect effect of trade on economic growth through the channels of allocation efficiency and transmission of technology. Whether or not developing economies are able to substantially raise per capita income depends on policies that address these variables (channels). In fact, the current practice in modeling trade-growth relationship tends to ignore the cost the each country has to bear. Thus, the net impact of trade on economic growth found in the previous studies might be due to benefit of doing trade which outweigh the cost of doing trade. Failing to recognize the magnitude of the cost as well as to reduce the level of the cost might result in lower or even negative impact of trade on economic growth.

1 The old trade theory is relatively similar to the neoclassical growth theory, which put emphasis on the role of capital. The only difference between the two theories is that the former stresses on the role of allocation efficiency, while the latter emphasizes on the accumulation of capital. On the other hand, the new trade theory has a similarity with the new (endogenous) growth theory with both theories highlighting the important role of technological development in order to further accelerating the economic growth.
Lewer and Van den Berg (2003) provided a comprehensive survey of econometric estimates. They discussed four other studies that made an attempt to distinguish the channels through which trade affects growth. Esfahani (1991) modeled an economy in which exports generate foreign exchange, which relieves constraints on imports of intermediate goods and permits output expansion. Edwards (1998) estimated the relationship between openness to trade and average education, a proxy for knowledge embodied as human capital. Frankel and Romer (1999) related growth in per capita income to capital deepening, schooling, and labor productivity and they found that trade positively affected these determinants. Finally, Wacziarg (2001) found that trade affects growth through macroeconomic policy quality, government size, price distortions or black market premium, gross private domestic investment, technology, and foreign direct investment.

3. Empirical model and methodology

Empirical Model

Growth equation specification here is based on the existing trade theories, namely the traditional trade theory and the new trade theory. According to the traditional trade theory, the main source of gains from trade is allocation efficiency or moving towards our comparative advantage, while the new trade theory suggests that technological improvement as the main channel through which we could gain from trade. In this study, we proxy the allocation effect due to openness with private domestic investment and government spending, while for technical effect, we use manufacturing value added (MVA) and foreign direct investment (FDI) as a proxy. The role of PDI and GOV as proxies for allocation effect may not be intuitively clear. The basic concept of allocation efficiency is captured in the idea of incremental capital output ratio (ICOR). Easterly (1997) used a regression analysis to measure the size of ICOR by dividing 1 with the estimated coefficient of domestic investment\(^2\). Nevertheless, without specifically measuring ICOR, the estimated coefficient can be used interchangeably with the reverse ICOR. For example, if high ICOR implies high inefficiency, low estimated coefficient represents high inefficiency as well. Hence, the coefficient of domestic investment (subsequently, government spending) can be considered as an indicator of efficiency. Subsequently, under the same approach to measure level of efficiency due to government activities as governments in ASEAN, in particular Malaysia, tend to interfere when there is sluggishness in the overall economic performance in order to further stimulate the economies. On the proxy for technology or technical effect, manufacturing value added (MVA) is used as a proxy of level of domestic industrialization (Clarke et al., 1999) while FDI is used to proxy the extent of technology development via technology transfer. The use of MVA is believed to be more reflective of the achievement of the industrial sector and is consistent with other previous study such as Clarke et al. (1999). On the other hand, it may reduce the extent of high collinearity that exists between trade and manufacturing export if manufacturing export is used instead. We also incorporate the external shock variable, which is proxied by capital flight. Hence, the final estimating growth model is as follows\(^3\):

\[
\ln GDP_t = \alpha_0 + \alpha_1 \ln PDI_t + \alpha_2 \ln GOV_t + \alpha_3 \ln FDI_t + \alpha_4 \ln MVA_t + \alpha_4 ES_t + \mu_t
\]

where GDP = real GDP per capita, PDI = gross private domestic investment, GOV = total government expenditure, FDI = net foreign direct investment, MVA = manufacturing value added, ES = external shock. In stands for logarithmic form, subscript \(t\) denotes time series and \(\mu\) refers to residual.

For the channel consideration, we have four channels utilized in this study. Our main interest is on the impact of trade on economic growth while putting few additional explanatory variables, which work as control variables. Hence, the channel equations as basically as follows:

\[GR_t = \alpha_0 + \alpha_1 DI_t, \text{ rearranging we get } \frac{DI_t}{GR_t} = \frac{1}{\alpha_1}\]

Of course, Easterly (1997) measured ICOR in order to find out the amount of financing gap required to develop developing economies.

\(^2\) In other words, it can be shown mathematically this way:

\[GR_t = \alpha_0 + \alpha_1 DI_t, \text{ rearranging we get } \frac{DI_t}{GR_t} = \frac{1}{\alpha_1}\]

\(^3\) Of course, there are few more possible channels such as labor, domestic financial sector and so on. But, because of data limitation, we focus only to these few channels as starting point while the rest can be considered in the future study.
\[
\ln PDI_t = f(\ln TRADE_t, CV_t) \tag{2}
\]
\[
\ln GOV_t = f(\ln TRADE_t, CV_t) \tag{3}
\]
\[
\ln MVA_t = f(\ln TRADE_t, CV_t) \tag{4}
\]
\[
\ln FDI_t = f(\ln TRADE_t, CV_t) \tag{5}
\]

where CV is a control variable, which among others consist of GDP growth rate, labor, as well as other growth channel. Detail information is presented in the results and analysis section. We follow the idea of chain rule, which is developed by Wacziarg (2001) as a mean to measure the indirect impact of trade through each channel. For example, if we want to estimate the indirect impact of trade through PDI channel, we have to multiply the impact of trade on PDI with the impact of PDI on economic growth.

**Methodology**

This study utilizes autoregressive distributed lag (ARDL) approach (Pesaran and Shin, 1995; Pesaran et al. 2001, among others)\(^4\). More recent studies have indicated that the ARDL approach to cointegration is preferable to other conventional cointegration approaches such as Engle and Granger (1987), Johansen and Juselius (1990) and Gregory and Hansen (1996). The procedure is adopted for at least two reasons. Firstly, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots unlike other techniques such as the Johansen approach. It is applicable irrespective of whether the regressors in the model are purely I(0), purely I(1) or mutually cointegrated. However, it is important to keep in mind that in the presence of I(2) variables, the computed F-statistics provided by Pesaran et al. (2001) are not valid. Secondly, the test is relatively more efficient in small or finite sample data sizes as is the case in this study as compared to Johansen and Juselius (1990). ARDL approach involves two steps. The first step is to confirm the existence of cointegration among the variables in the system or equation.

In testing the cointegration following Pesaran et al. (2001), in the first step, we need to specify the long-run equation (3) as a vector autoregressive (VAR) model of order \(p\). Putting additional assumption that all of them are cointegrated and thus there is an adjustment process of short-run disequilibrium to long-run equilibrium, we set the conditional vector error correction model as follows:

\[
\Delta Z_t = \alpha_0 + \Pi Z_{t-1} + \sum_{i=1}^{\rho} \Phi_i \Delta Z_{t-i} + \varepsilon_t \tag{4}
\]

where \(\alpha\) representing a \((k+1)\)-vector of intercepts (drift) and \(\varepsilon\) are white noise errors. \(Z_t\) is the vector of variables \(Y_t\) and \(X_t\), respectively. By referring to equation (1), \(Y_t\) is an I(1) dependent variable defined as \(\ln GDP_t\) and \(X_t = [\ln PDI_t, \ln GOV_t, \ln FDI_t, \ln MVA_t, ES_t]\) is a vector matrix of I(0) and I(1) regressors. Subsequently, we can also express the above conditional VECM, under which sometimes termed as ‘unrestricted’ error correction model (UECM), as follows:

\[
\Delta Y_t = \alpha_0 + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + \sum_{i=1}^{\rho_1} \phi_i \Delta Y_{t-i} + \sum_{i=0}^{\rho_2} \gamma_i \Delta X_{t-i} + \varepsilon_t \tag{5}
\]

or, if we replace \(Y_t\) and \(X_t\) with their respective substitutes, we get our estimating equation:

\[
\Delta \ln GDP_t = \alpha_0 + \delta_1 \ln GDP_{t-1} + \delta_2 \ln PDI_{t-1} + \delta_21 \ln PDI_{t-1} + \delta_22 \ln GOV_{t-1} + \delta_23 \ln FDI_{t-1}
\]

\(^4\) At this point, it is important to note regarding the choice between this single-equation approach and system-based approach (i.e. SURE). There two issues surrounding this option, namely stationarity issue and endogeneity issue. Although system-based approach can be considered as capable to handle endogeneity issue, but at the moment, it is not clear whether it can also overcome the issue of stationarity. On the other hand, ARDL approach which is developed purposely for handling stationarity issue, it is also designed in such a way that it capable to minimize the extent of endogeneity issue. For this reason, we decided to proceed with ARDL, rather than system-based approach.
In order to test for the existence of a long-run relationship among the variables by conducting an F-test for
the joint significance of the coefficients of the lagged levels of the variables, null hypothesis (H0: \( \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0 \)) against the alternative (HA: \( \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0 \)). This will be
denoted by \( F_{GDP} \left( GDP \right| PDI, GOV, FDI, MVA, ES ) \). The computed F-statistic will then be compared
with the critical values provided in Pesaran et al. (2001). If the computed F-statistic exceeds the upper
bound to Pesaran et al. (2001), the null hypothesis of no long-run relationship can be rejected. Having
established the cointegration analysis, we can then investigate the conditional long-run equation and
subsequently the existence of adjustment process can be detected via the significant error correction term in
the error correction model which can be expressed as follows:

\[
\Delta \ln GDP_i = \alpha_0 + \alpha_1 ECT_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta \ln GDP_{t-i} + \sum_{i=0}^{q} \gamma_i \Delta \ln PDI_{t-i} + \sum_{i=0}^{r} \gamma_i \Delta \ln GOV_{t-i} + \sum_{i=0}^{s} \gamma_i \Delta \ln FDI_{t-i} + \sum_{i=0}^{v} \gamma_i \Delta \ln MVA_{t-i} + \sum_{i=0}^{w} \gamma_i \Delta \ln ES_{t-i} + \epsilon_i \quad (7)
\]

From the above specification, we obtain the short-run dynamic parameters by estimating an error correction
model associated with the long-run estimates (\( \alpha_1 \)). \( \alpha_1 \) also represents the speed of adjustment from
disequilibrium to equilibrium level. Another important aspect that needs to be taken into consideration is
about the choice of appropriate lag length (p) for the VAR model before we could test for the existence any
cointegrating relationship. In this study, we adopt the Schwarz information criterion (SIC) to tracks the
optimal lag length.

This paper will focuses on the five East Asian economies most adversely affected by the crises of 1997.
These include three second-tier South-East Asian newly industrializing economies (NIEs), namely
Indonesia, Malaysia and Thailand, as well as South Korea – the most adversely affected first-generation
newly industrialized economy. The data cover from 1970 to 2006 and mainly taken from World
Development Indicator (World Bank, 2008) and International Financial Statistics (IMF).

4. Results
Although ARDL procedure does not require pre-testing of unit root problem, the test is still conducted by
using PP test. The results are not presented here (available upon request), but we found that although all
dependent variables are not stationary at level, all explanatory variables are stationary at level. In the next
step, we analyze the existence of cointegration by utilizing bound cointegration approach as well as the
significant error correction model. As this step is merely an intermediate step and in order to conserve
space, we only present the results for the first equation or growth equation, as shown in Table 2 and Table
3.

Table 2: Bound cointegration test – growth equation

<table>
<thead>
<tr>
<th></th>
<th>Indonesia</th>
<th>South Korea</th>
<th>Malaysia</th>
<th>Philippines</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistics</td>
<td>6.26***</td>
<td>9.26***</td>
<td>10.91***</td>
<td>6.07***</td>
<td>10.55***</td>
</tr>
<tr>
<td>Critical value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 %</td>
<td></td>
<td>3.41</td>
<td></td>
<td>4.68</td>
<td></td>
</tr>
<tr>
<td>5 %</td>
<td></td>
<td>2.60</td>
<td></td>
<td>3.79</td>
<td></td>
</tr>
<tr>
<td>10 %</td>
<td></td>
<td>2.26</td>
<td></td>
<td>3.35</td>
<td></td>
</tr>
</tbody>
</table>

Note: Asterisk *** stands for significant at 1%. * We follow the Case III of Pesaran et al. (2001) that is,
unrestricted intercepts and no trends.
In Table 2, the results of bound cointegration test obviously demonstrated that the null hypothesis of no cointegration against its alternative (of cointegration) is rejected at 0.01 significant level. The computed F-statistic (Wald test) is greater than the upper critical bound value in each equation for all four economies. Therefore, we conclude that all variables in all five East Asian economies are cointegrated and there is long run equilibrium.

Table 3: Error correction model (ECM) for growth equation

Panel I: Regression results

**Indonesia:**
\[
\Delta GDP = 38.6770^{**} - 0.5634ECT(-1)^{**} + 0.5118\Delta PDI^{**} - 0.1473\Delta MVA + 1.9391\Delta FDI^{***} - 0.1144\Delta CF^{**} + 1.1436\Delta MVA(-1)^{**} - 0.0145\Delta CF(-1)^{*} + 1.6549\Delta GDP(-3)^{*} + 1.7676\Delta PDI(-2)^{***} + 2.3837\Delta GOV(-2)^{*} - 1.1100\Delta MVA(-2)^{***}
\]

Adjusted $R^2 = 0.5037$

**South Korea:**
\[
\Delta GDP = 14.0807^{*} + 0.4461ECT(-1)^{**} - 4.9050\Delta GOV^{***} + 1.8830\Delta MVA^{***} + 6.2306\Delta CF^{***} - 0.2808\Delta GDP(-2)^{**} - 0.5335\Delta PDI(-1)^{*} + 2.8226\Delta GOV(-1)^{**} - 2.2698\Delta MVA(-1)^{**} + 5.1518\Delta FDI(-1)^{**} - 0.3961\Delta CF(-1)^{***} + 0.4986\Delta GDP(-3)^{**} + 1.6503\Delta MVA(-2)^{*} - 11.598\Delta FDI(-2)^{***}
\]

Adjusted $R^2 = 0.4183$

**Malaysia:**
\[
\Delta GDP = -54.1383^{**} + 0.6001ECT(-1)^{*} + 0.3674\Delta PDI^{*} + 0.6504\Delta GOV^{*} - 3.4370\Delta MVA^{***} + 0.6202\Delta PDI(-1)^{*} + 2.2079\Delta MVA(-1)^{**} - 1.4618\Delta FDI(-1)^{**} - 0.1514\Delta GDP(-3)^{***} + 0.7699\Delta PDI(-2)^{**} + 1.4069\Delta GOV(-2)^{*} - 1.0294\Delta FDI(-2)^{*}
\]

Adjusted $R^2 = 0.5020$

**The Philippines:**
\[
\Delta GDP = 29.6877^{**} - 0.4699ECT(-1)^{***} + 0.1743\Delta GDP(-1) + 2.5538\Delta PDI^{***} + 4.6876\Delta MVA^{***} + 3.7033\Delta FDI^{*} - 0.6210\Delta PDI(-1)^{*} + 2.6433\Delta GOV(-1)^{**} + 1.1058\Delta MVA(-1)^{**} - 0.0029\Delta CF(-1)^{***} - 0.2095\Delta GDP(-3)^{**} + 1.9180\Delta GOV(-2)^{**} + 4.4772\Delta MVA(-2)^{**} + 0.0024\Delta CF(-2)^{***}
\]

Adjusted $R^2 = 0.4960$

**Thailand:**
\[
\Delta GDP = 56.6991^{**} - 0.4368ECT(-1)^{***} + 1.6752\Delta GDP(-1)^{**} - 0.1810\Delta CF^{**} + 1.4964\Delta GDP(-2)^{**} + 5.9838\Delta GOV(-1)^{**} - 5.5773\Delta FDI(-1)^{**} + 0.3715\Delta CF(-1)^{***} + 0.3051\Delta GDP(-3)^{***} - 0.8268\Delta PDI(-2)^{**} - 1.7963\Delta GOV(-2) + 2.4010\Delta FDI(-2)^{**} + 0.2899\Delta CF(-2)^{***}
\]

Adjusted $R^2 = 0.6116$

Panel II: Diagnostic checking

<table>
<thead>
<tr>
<th></th>
<th>Indonesia</th>
<th>South Korea</th>
<th>Malaysia</th>
<th>Philippines</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Corr.</td>
<td>3.69[0.12]</td>
<td>1.76[0.28]</td>
<td>2.14[0.21]</td>
<td>0.24[0.79]</td>
<td>0.79[0.49]</td>
</tr>
<tr>
<td>Stability</td>
<td>1.92[0.19]</td>
<td>1.55[0.19]</td>
<td>0.73[0.35]</td>
<td>1.20[0.33]</td>
<td>1.33[0.14]</td>
</tr>
</tbody>
</table>

Note: Asterisks *, ** and *** stand for significant at 10%, 5% and 1%, respectively. a Serial Correlation LM Test is the test for autoregressive and Ramsey's RESET test is test for functional form. Figure in [ ] denotes p-value, while figure in ( ) stands for no of lag.

The superiority as well as the validity of the estimated equations have been justify by several model criteria (i.e. adjusted $R^2$) and diagnostic tests (i.e. serial correlation and stability). In general, we find all the final
estimated models passed all the diagnostic tests. This suggests that the reported results are valid and reliable (see Table 3). In addition, the existence of cointegration among the variables under study in each country is further confirmed with the significant error correction model, in particular its error correction term (ECT). In other words, the long run equation has been integrated into the short run system so as to capture the adjustment from short-run disequilibrium to long-run equilibrium. Having established all the necessary conditions, we now proceed with the estimated long-run equation, based on ARDL model. The results are presented at Table 4.

Table 4: Estimated long-run equation – growth equation

<table>
<thead>
<tr>
<th>Country</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnGDP(_{Ind})</td>
<td>0.3600lnPDI* - 2.4902lnGOV* + 0.0129lnFDI* + 1.5636lnMVA* - 0.7431ES*</td>
</tr>
<tr>
<td>lnGDP(_{Kor})</td>
<td>0.6034lnPDI* - 1.9572lnGOV* + 1.4856lnFDI* + 6.7471lnMVA* - 1.2659ES*</td>
</tr>
<tr>
<td>lnGDP(_{Mal})</td>
<td>0.3438lnPDI* - 1.3459lnGOV* + 0.8657lnFDI* + 1.7073lnMVA* - 0.0788ES*</td>
</tr>
<tr>
<td>lnGDP(_{Phil})</td>
<td>0.3250lnPDI* - 0.7335lnGOV* + 0.0809lnFDI* + 1.3983lnMVA* - 0.0520ES*</td>
</tr>
<tr>
<td>lnGDP(_{Thai})</td>
<td>0.3250lnPDI* - 0.7335lnGOV* + 0.0809lnFDI* + 1.3983lnMVA* - 0.4590ES*</td>
</tr>
</tbody>
</table>

Note: All variable are significant at least at 10 percent critical level.

First of all, all variables in each country’s growth equation enter significantly. Out of five explanatory variables, three of them, namely PDI, FDI and MVA consistently show a positive sign, while the remaining two variables, namely GOV and ES, show a negative impact on economic growth in all five equations. Based on the above findings of level relationship on economic growth as shown in Table 4, there are few important points to note. Firstly, the significant role of external shocks (which is proxied by capital flight) allow us to consider all growth equations as reflective to open economies, the nature of all five East Asian economies which are moving towards greater participation in the international platform. Without having to consider the role of trade in particular, which we will consider and discuss later, we try to shed more light regarding the relative role of allocation effect and technical effect on economic growth due to openness as well as current level of international economic participation. Meanwhile, as the long-run impacts of FDI and MVA on economic growth are positive, there are significant positive effects of technical improvement on economic growth in all five East Asian economies. FDI plays a significant and biggest role in technology development and contributed the largest positive effect on economic growth, even in the case of the most reluctant country (at least among the five East Asian economies in this study) for FDI such as South Korea. The finding is an additional point which is not based on the initial aim of this study. Therefore, the above brief discussion is considered as sufficient at this point.

For the purpose of establishing indirect impact of trade on economic growth, without specifically showing the estimated error correction models for each growth channel (PDI, GOV, FDI and MVA) equations, we present the estimated long-run relationships for each equation, which are extracted from the error correction models\(^6\). In this study, we classified growth channel, through which trade is expected to affect economic growth, into two categories – allocation effect channel as well as technical effect channel. We demonstrate the results of allocation effect channel in the Table 5. Although it is not the main motivation of this study, we discuss few important points that can be extracted from the results presented in Table 5. From Table 5,

\(^5\) Of course our main focus would be on the impact of trade on economic growth via various growth channels. However, another important reason of why no consistent trade-growth relationship is due to the problem of proxy. None of the suggested openness proxies in the literature can be considered as perfect. Since trade also has been frequently used in literature as a proxy for openness although trade is at best imperfect proxy for openness (Rose, 2004), it may not able to capture the full effect of openness. Therefore, the discussion here can be thought of as an additional attempt to quantify the effect of allocation efficiency and technological improvement on economic growth. By putting them into global environment framework, we may simply assume that the output is somehow affected by its level of openness.

\(^6\) The results of ECMs are available upon request.
it is clear that the impact of FDI on PDI is positive throughout the five East Asian economies with relative high and significant positive impact in the case of Malaysia, South Korea and Thailand as in the study of Harrison et al. (2001). However, the findings here are in contrast to the studies by Boreztein et al. (1994), Dayal-Gulati and Hussain (2000) and Zhang (2001) who found the negative impact of FDI on PDI and argued that the net negative impact of FDI is not necessarily that FDI does not produce positive effect, but it is due to the negative competition effect that dominates the positive technology effect. Nevertheless, since PDI is classified under the allocation effect, in the opposite direction, the allocation efficiency in ASEAN has become better due to stiff competition with the inflow FDI. On the effects of government spending on private investment the sign can be either positive or negative or insignificant (Seruvatu and Jayaraman, 2001; Laopodis, 2001). In accordance to our results, we found that in the case of South Korea and Malaysia, the impact of GOV is significant and positive and consistent with the findings in Odedokun (1996) and Rossisiter (2002) who concluded that the crowding-in hypothesis seems to hold and dominant in their studies. This can be explained by the fact that large portion of the government spending goes to provide infrastructure, improving human capital by increased spending on education, health and so on so forth. In contrast, in the case of Indonesia and Thailand, the impact is significant but negative (-5.6021 and -9.8057, respectively) and is supportive to the findings in Monadjemi (1993), Argimon et al (1997), and Voss (2000) who argued that the crowding-out hypothesis is suits well in explaining the impact of GOV on PDI in their studies. According to another view, an increase in public spending, due to higher government borrowing requirements, displaces private investment which, in turn, negatively affects economic growth. The third explanatory variable used is M3 which is a proxy for level of financial development. The impact of M3 on PDI is positive for all East Asian economies, except Indonesia and this positive impact is in accordance to the findings of several studies such as (Levine, 1997; Aysan et al., 2005) as developed financial systems mobilize and allocate resources for the firms to undertake investment projects and will provide more opportunities and incentives for the firms to invest. As expected, South Korean M3 recorded the highest positive impact on PDI (1.0226) given its level of financial development which has exceeded the ASEAN economies. The final determinant of PDI is lagged GDP which represents investors’ anticipations. The investors envision the future economic environment as the GDP growth observed in the past. On the other hands, GDP can also be used as an indicator of profitability and since private investment behavior is primarily influenced by the profit motive, we can expect a positive association between GDP and PDI. In short, there is an indication that the domestic business environment is so conducive that the profitability from doing business has led the private sector to increase their level of investment. From the results, we found that, except for the Philippines, all four East Asian economies has a positive impact of GDP on PDI with a relatively large effect, namely 3.4264 (for South Korea), 6.0113 (for Thailand), 5.3814 (for Indonesia) and 5.1446 (for Malaysia).

The second proxy for allocation effect channel is government spending (GOV). Looking at the role of private domestic investment, public investment seems to follow private investment over time. Most of the time, as private domestic investment increases, it is expected that government spending (GOV) will also increase in order to give support to private sector to be eventually competitive (internationally). From Panel B of Table 5, with an exception for Indonesia, the remaining four East Asian economies recorded as expected a positive impact of PDI on GOV, which also reflect its good strategy towards market oriented policy or letting the private sector to run by them. Regarding the role of level of development, which is captured in GDP, the results illustrate that only in the case of South Korea, the demand for government investment or government participation is increasing at diminishing trend, given the impact of GDP on GOV is below one (0.9884). This situation is well explained by Wagner’s Law, which stated that as income increases, the demand for public goods, such as infrastructure is expected to increase, although possibly at a diminishing rate. Nevertheless, all economies recorded a positive impact of past development on GOV. The possible explanation is as the level of development increases, the structure of the economy is expected to change in ways that increase the productivity of infrastructure investment. For example, industrialization accompanies development and infrastructure may well be more productive to industry than agriculture (Lybeck, 1988; Sturm, 2001). On the impact of FDI on GOV, four of five East Asian economies show positive sign, with an exception for Malaysia, in which negative association prevails. The largest positive impact of FDI is in South Korea (1.9963). This can be explained by two possibilities. Given an increasingly

7 Another reason of why we include GDP in the lagged period is also to avoid simultaneity problems in estimating the investment equation.
important role of FDI in development program, South Korean government is intensifying its effort in attracting FDI inflow into South Korea. The second explanation might be in the case of developing countries, very often multinational corporations enter into joint ventures with state-owned enterprises, which mean that FDI may also flow into the public sector. Quite strange, but the impact of FDI on GOV in the case of Malaysia is negative (-0.2372). Thus, there is a possibility that FDI in Malaysia tends to substitute the government role in developing country’s infrastructure. This may due either lack of skills or lack of capital. Finally, we move on to the discussion on the impact of dependency ratio (DR) as a proxy for country’s welfare. The results show that only in the case of South Korea we found a positive sign of DR on GOV and consistent with the study done by Abizadeh and Yousefi (1996), who argued that once the economic development reached to certain desired level, instead of emphasizing basic infrastructure, the spending priority is placed on social safety net programs. For ASEAN economies, DRs have a negative or insignificant impact on GOV, reflecting ASEAN focus more on higher economic growth and less on income distribution especially to those who are poor.

Table 5: Estimated long-run equation – allocation effect channel

Panel A: PDI equation

<table>
<thead>
<tr>
<th>Country</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ind</td>
<td>lnPDIInd = – 1.1024 + 0.7961lnFDI – 4.5523lnGOV – 1.5020lnM3 + 6.8108lnGDP(-1) – 0.0542lnTRADE</td>
</tr>
<tr>
<td>Kor</td>
<td>lnPDIKor = 2.1989 + 4.9692lnFDI + 0.9245lnGOV – 1.0226lnM3 + 3.4264lnGDP(-1) + 0.8365lnTRADE</td>
</tr>
<tr>
<td>Mal</td>
<td>lnPDIMal = – 3.6603 + 2.7876lnFDI + 8.3456lnGOV – 0.329lnM3 + 6.1885lnGDP(-1) + 0.4015lnTRADE</td>
</tr>
<tr>
<td>Phil</td>
<td>lnPDIPhil = 5.9320 + 0.5089lnFDI – 1.334lnGOV – 0.7116lnM3 – 2.5436lnGDP(-1) – 0.3412lnTRADE</td>
</tr>
<tr>
<td>Thai</td>
<td>lnPDIThai = – 1.4832 + 1.9442lnFDI – 1.4371lnGOV – 0.8614lnM3 + 7.1717lnGDP(-1) + 0.2420lnTRADE</td>
</tr>
</tbody>
</table>

Panel B: GOV equation

<table>
<thead>
<tr>
<th>Country</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ind</td>
<td>lnGOVInd = – 5.0188 + 0.1550lnPDI* + 0.3917lnFDI* + 6.2142lnGDP(-1)* – 10.7807DR* + 0.1257lnTRADE*</td>
</tr>
<tr>
<td>Kor</td>
<td>lnGOVKor = 2.7485 + 0.1192lnPDI* + 1.9963lnFDI* + 0.9884lnGDP(-1)* + 7.2062DR + 0.0575lnTRADE*</td>
</tr>
<tr>
<td>Mal</td>
<td>lnGOVMal = 3.3691* + 0.3741lnPDI* – 0.2372lnFDI* + 1.1483lnGDP(-1)* – 3.5083DR + 0.0793lnTRADE*</td>
</tr>
<tr>
<td>Phil</td>
<td>lnGOVPhil = 2.2748 + 0.1272lnPDI* + 0.4143lnFDI* + 1.8597lnGDP(-1)* – 1.9859DR + 0.1259lnTRADE*</td>
</tr>
<tr>
<td>Thai</td>
<td>lnGOVThai = – 8.4008* + 0.2983lnPDI* + 0.2512lnFDI* + 5.3238lnGDP(-1) + 2.7322DR + 0.1369lnTRADE*</td>
</tr>
</tbody>
</table>

Note: Asterisk * denotes significant at least at 10 percent critical level.

Moving on to the second channel of growth, we will start by discussing the determinant of FDI, one of the technical-effect channels. From Panel A of Table 6, the impact of WAGE on FDI is mixed. Only in the case of ASEAN economies where the impact of WAGE on FDI is negative, while for South Korea, the impact is positive. It implies that FDI inflow into South Korea is relatively skilled-labor-seeking or high-technology-oriented FDI, while in ASEAN, the nature of FDI inflow is remained highly low-cost oriented FDI. However, given low coefficient in the case of Malaysia (-0.0112) and Thailand (-0.6464), this may indicate that there is a shift in the motivation of FDI inflow into these two economies from low-cost seeking to skilled-labor orientation. On the other hand, the lagged GDP in all five East Asian economies found to be positively associated with FDI, which are consistent with the studies such as Jaspersen et al. (2000) and Asiedu and Lien (2002). The argument here is that higher domestic income and higher growth rates imply a greater demand for goods and services and therefore make the host country more attractive for FDI. In contrast, in South Korea, the impact of GDP on FDI is relatively lower with the coefficient of 0.1140, and the impact is actually insignificant. This may due to the fact that South Korea is less reliant on FDI in its development program as well as large scale production and local market penetration are not the main targets of FDI inflow into South Korea (Lankes and Venables, 1996; Fernández-Arias and Hausmann, 2000).

---

8 Although Fernández-Arias and Hausmann (2000) in testing the proposition that capital inflows tend to take the form of FDI in countries that are safer, more promising and with better institutions and policies, suggest that capital flows, in general, tend to go to developed countries that are more open, less volatile, with better institutions and with developed financial markets. However, these same forces reduce the share of capital flows that take the form of FDI, therefore, implying that FDI flows to poorer, more volatile and less open economies whose financial system and institutions are weak. Hence, in less developed economies, capital flows take the form of FDI due to the fact that foreign firms prefer to have control rather than rely on locals market.
Table 6: Estimated long-run equation – technical effect channel

<table>
<thead>
<tr>
<th>Panel A: FDI equation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\ln{\text{FDI}_{\text{Ind}}} = -1.1219 + 0.1502\ln{\text{PDI}} + 0.6058\ln{\text{GOV}} + 6.7575\ln{\text{GDP}(-1)} - 5.6475\text{WAGE} + 0.0279\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{FDI}_{\text{Kor}}} = 1.2645 + 0.0497\ln{\text{PDI}} - 0.9831\ln{\text{GOV}} + 0.1140\ln{\text{GDP}(-1)} + 1.8732\text{WAGE} + 0.0679\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{FDI}_{\text{Mal}}} = 1.8107 + 0.3913\ln{\text{PDI}} + 0.7256\ln{\text{GOV}} + 4.0738\ln{\text{GDP}(-1)} - 0.0112\text{WAGE} + 0.0279\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{FDI}_{\text{Phil}}} = 3.3934 + 0.0594\ln{\text{PDI}} + 0.3621\ln{\text{GOV}} + 0.6211\ln{\text{GDP}(-1)} - 1.1737\text{WAGE} + 0.0092\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{FDI}_{\text{Thai}}} = 1.3427 + 0.1951\ln{\text{PDI}} + 1.6840\ln{\text{GOV}} + 8.2291\ln{\text{GDP}(-1)} - 0.6464\text{WAGE} + 0.0523\ln{\text{TRADE}}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: MVA equation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\ln{\text{MVA}_{\text{Ind}}} = 8.9905 + 0.0121\ln{\text{PDI}} + 0.1541\ln{\text{FDI}} - 0.2400\ln{\text{GOV}} + 3.8912\text{WAGE} + 0.0441\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{MVA}_{\text{Kor}}} = -2.5863 + 1.4178\ln{\text{PDI}} + 0.2552\ln{\text{FDI}} - 0.0186\ln{\text{GOV}} + 1.0345\text{WAGE} + 0.1585\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{MVA}_{\text{Mal}}} = 1.3435 + 0.0962\ln{\text{PDI}} + 0.6879\ln{\text{FDI}} - 0.4973\ln{\text{GOV}} - 0.0202\text{WAGE} + 0.1192\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{MVA}_{\text{Phil}}} = 1.2278 + 0.0288\ln{\text{PDI}} + 0.1221\ln{\text{FDI}} - 1.4168\ln{\text{GOV}} - 0.1559\text{WAGE} + 0.1456\ln{\text{TRADE}}$</td>
<td></td>
</tr>
<tr>
<td>$\ln{\text{MVA}_{\text{Thai}}} = 2.0741 + 0.0543\ln{\text{PDI}} + 0.6151\ln{\text{FDI}} - 0.2807\ln{\text{GOV}} - 3.6136\text{WAGE} + 0.1129\ln{\text{TRADE}}$</td>
<td></td>
</tr>
</tbody>
</table>

Note: Asterisk * denotes significant at least at 10 percent critical level.

There is no doubt that industrialization, in which manufacturing is the key, remains one of the most powerful engines for economic growth. It acts as a catalyst to transform the economic structure of the countries, from simple, slow-growing and low-value activities to more productive activities that enjoy greater margins, driven by technology, and have higher growth prospects. Manufacturing has become, nowadays, the main means for developing countries to benefit from globalization and bridge the income gap with the industrialized world (Albaladejo, 2003) and therefore treated as one of the channels through which trade may influence economic growth indirectly. Panel B of Table 6 demonstrates the results of long run MVA equation. The impact of WAGE on MVA is negative in the case of ASEAN economies although the impact is insignificant in the case of Malaysia and Philippines. These results simply mean that ASEAN economies are still giving emphasis and exploiting low cost of labor as a source of industrialization and therefore if WAGE is continuing to rise, it may retard further industrialization process. On the other hand, in the case of South Korea, WAGE has a positive impact, possibly due to its huge efforts towards promoting human capital development in the past. Therefore, higher wage is actually reflection of higher skill of South Korean labor that prevails today which is then led to gearing up the speed of industrialization.

MVA, which is used as a proxy for level of industrialization or industrial productivity, is also related to the externalities due to the growth rate of other sector(s) such as government activities and foreign capital. For example, if the government and FDI roles in the East Asian economies are efficient, then it is expected that with the growth of the government spending as well as FDI will create positive externalities to industrialization process or industrial productivity. In accord with the findings in the Table 6 (Panel B), the results indicate that GOV has tendency to exert negative effect on industrialization process in the long-run, while FDI seems to provide positive externalities (or more appropriately, technology transfer) to the process of industrialization in the East Asian economies. The result of long run impact of private sector (PDI) on industrialization process (MVA) also supports to the fact that ASEAN economies is still very much reliant on low-skill labor as a source of industrialization as the impact of PDI on MVA is too minimal (and even insignificant in the case of Philippines) for all four ASEAN economies. In South Korea, PDI has a significant as well as relatively large impact of private activities (0.5100) on industrialization.

Finally, we can now calculate the indirect impact of trade on economic growth via all four growth channels as well as the total indirect impact (TTI) of trade on economic growth. As mentioned earlier, the indirect impact is measured by multiplying the coefficient of trade in growth channel equation with the coefficient of growth channel in growth equation. The results are presented at Table 7.

First of all, we look at the impact on local firms of increased exposure to foreign competition (trade). Column PDI of Table 7 demonstrates the results. We could see that in general, private domestic investment has a significant positive impact on economic growth. It indicates that there is tendency for East Asian economies to move onto market-oriented approach of economic development (Jomo, 2001). However, it does not necessarily mean that domestic private sector is efficient enough to compete internationally in all five East Asian economies. If we refer to the impact of trade on private domestic investment, only in the case of South Korea, Malaysia and Thailand that the effect is positive. This finding is consistent with studies by Frankel and Romer (1999), Nam and Kim (2000), Wacziarg (2001), Greenaway et al. (2004),
who among others argue that trade reforms toward greater participation constitute another factor that can stimulate private investment as well as increases competitiveness and provides access to enlarged markets (Balassa, 1978; Feder, 1982). Trade openness can be at the origin of economies of scale gains. However, another concern that emerged is the loss of scale economies could serve to reduce a firm’s incentive to invest in new technology and thus lead to negative performance of PDI in the open economy as in the case of Indonesia and the Philippines, in which the indirect impact of trade on economic growth is negatively recorded with the coefficients of -0.0542 and -0.3412, respectively. These findings may also be supported by the evidence that many other authors also found that greater openness to trade lead to lower private domestic investment (Levinsohn 1993; Hoekman et al., 2001). In short, increasing international competition, even among ASEAN members, should force private sector to become more competitive in order to survive in the long run, or conversely, the situation in Indonesia and Philippines may fit to the argument made in Batra and Slotje (1993) and Mercinger (2003) who argued that freer trade is the primary source of economic downturns.

### Table 7: Allocation effect, technical effect and total indirect impact

<table>
<thead>
<tr>
<th>Country</th>
<th>PDI</th>
<th>GOV</th>
<th>AE</th>
<th>MVA</th>
<th>FDI</th>
<th>TE</th>
<th>Total Indirect Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>-0.0195</td>
<td>-0.3130</td>
<td>-0.3325</td>
<td>0.0006</td>
<td>0.0436</td>
<td>0.0442</td>
<td>-0.2883</td>
</tr>
<tr>
<td>South Korea</td>
<td>0.5047</td>
<td>-0.1125</td>
<td>0.3922</td>
<td>0.2355</td>
<td>0.4581</td>
<td>0.6936</td>
<td>1.0858</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.1380</td>
<td>-0.1300</td>
<td>0.0080</td>
<td>0.1032</td>
<td>0.0804</td>
<td>0.1836</td>
<td>0.1916</td>
</tr>
<tr>
<td>The Philippines</td>
<td>-0.1109</td>
<td>-0.0926</td>
<td>-0.2035</td>
<td>0.0118</td>
<td>0.0129</td>
<td>0.0247</td>
<td>-0.1788</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.0637</td>
<td>-0.2425</td>
<td>-0.1788</td>
<td>0.0955</td>
<td>0.0821</td>
<td>0.1795</td>
<td>0.0007</td>
</tr>
</tbody>
</table>

Note: AE = Allocation Effect = PDI + GOV. TE = Technical Effect = MVA + FDI. Total Indirect Impact = AE + TE.

Moving on to the indirect impact via government spending (GOV), this channel apparently becomes the main source of negative relationship between trade and economic growth as the indirect impact of trade on growth via this channel is negative in all economies with the second lowest coefficient in the case of South Korea (-0.1125). Indonesia and Thailand have the highest indirect impact with the coefficient of -0.3130 and -0.2425, respectively. The result is quite parallel with what has been suggested in the literature (i.e. Glavan, 2004) that the main source of inefficiency is government – the sole immobile factor that governs the market process. In other words, higher involvement in international trade will lead to higher level of participation of local government for various purposes, in which some activities are purposely provided for supporting local industries or companies to be international competitive either to those competing for world market or local market. In that sense, government activities tend to exceed government optimal level of activities.

The third forth column of Table 7 depicts the indirect impact of trade on economic growth via industrialization process, which is proxied by manufacturing value added. Interestingly, despite relatively similar size of impact of trade on MVA in all five economies (i.e. ranging only from 0.0441 in the case of Indonesia to 0.1585 in the case of South Korea), South Korea is relatively successful in developing its own indigenous technology. This permit South Korea to move above any ASEAN economy based on what had been demonstrated by Romer (1990) and Grossman and Helpman (1991) of how increasing returns to scale can be a source of continued higher growth. Through innovation, it allows any firm to capture monopoly rents and thus become a driver for firms to undertake R&D expenditures. These expenditures on R&D raise productivity for all firms and thus lead to higher overall growth. Therefore, the large contribution of MVA on economic growth may be due to large investment in indigenous technology-development program and let trade only minimal role to play. The low impact of trade in ASEAN may also well fit to the fact that most of ASEAN economies remained reliant to labor as a source of manufacturing growth (Clark et al., 1999) as well as FDI for technological development (Jomo, 2001). Since factor proportions differ among industries, trade, especially exporting, permits a more rapid growth of value added and employment in

---

9 Although export may also good proxy for industrialization progress, but in this study we use manufacturing value added instead of export in order to avoid the overestimated the impact of trade via this channel since high collinearity between trade and export.
unskilled labor intensive manufacturing operations for any given rate of human and physical capital formation. However, an erosion of this advantage over time as well as unclear indication of technology transfer from foreign multinational companies (Athukorala and Menon, 1996) has retarded or slowed down the process of economic growth. The low indirect impact of trade on growth via this channel as well as on the industrialization progress may well be said that the role of product innovation and imitation through the imported goods has play minimal role in these economies\textsuperscript{10}.

Trade variables consider the relation of host economies with the rest of the world. The empirical literature has ascertained that open economies attract more flows than heavily protected economies. Much of the expansion in manufactured exports of developing countries has concentrated in East Asia. This expansion has taken place primarily as a result of growing participation of these countries in labour-intensive processes organized by trans-national corporations (TNCs) seeking low-cost producers for export to world markets. As a result, with the exception of a few East Asian first-tier NIEs, mainly South Korea, which have already reached high income levels, the exports of developing, mainly ASEAN economies are still concentrated on products derived essentially from the exploitation of natural resources and the use of unskilled or semi-skilled labour which have limited prospects for productivity growth and lack dynamism in world markets. This phenomenon may explain the low impact of FDI on economic growth in ASEAN economies relative to the impact in the case of South Korea (6.7471). In other words, focusing more on technology-oriented FDI inflow in the case of South Korea allowed them to benefit from higher economic growth.

While there is little systematic evidence of the importance of FDI as a source of positive spillovers, Saggi (1999) has shown that absorptive capacity in the host country is crucial for obtaining significant benefit from FDI. Taken together, the evidence suggests that among the major developing countries, only a few first-tier NIEs have succeeded in simultaneously upgrading their production and export structures by moving into technology-intensive sectors and closing the productivity gap with the industrial leaders (Akyuz et al., 2004). Many developing countries, particularly East Asian economies, are relying on FDI and MNCs for expansion of industrial production and exports appear to be far behind in upgrading their production structures, but the evidence in this study demonstrates that South Korea is more successful than commodity-dependent ASEAN economies in moving to higher-end manufacturing sector.

In summary, three important findings can be extracted from the analysis in accordance to the objectives of this study. Firstly, regarding the severity of the impact of capital flight (proxy for external shock) on economic growth of five East Asian economies, which is anticipated as negative, it is justified in this study\textsuperscript{11}. Secondly, after taking into consideration the indirect impact of trade as well as the role of external shock, it was found that trade does not necessarily induce positive effect through all growth channels. There are also channel (i.e. PDI and GOV or in broad classification, Allocation Effect) through which trade may affect economic growth negatively and thus, either reducing positive net effect of trade on growth (as in the case of South Korea, Malaysia and Thailand) or in extreme cases, exerting negative net effect of trade on growth (as in the case of Indonesia and the Philippines). Please refer to the total indirect impact of trade on economic growth as presented in Table 8. Finally, there are several significant differences between the South Korean experience and ASEAN’s experience mainly regarding the division between the state role versus private sector as well as the contribution of FDI. In short, the findings show the benefit of using indirect approach as it provides us with the disaggregate impact of trade on economic growth through various channels, by which we could investigate not only the benefit which is accrued via certain channel, but more importantly, the cost of doing trade as well.

5. Conclusion
The study investigates the impact of capital flight (proxy for external shock) on economic growth as well as the indirect impact on the allocation efficiency and technological improvement in the case of East Asian 5 economies for the period from 1970 to 2006.

\textsuperscript{10} One of the prominent examples of country that rely heavily on product imitation is Japan and economists argue that Japan’s achievement is largely based on borrowed-technology.

\textsuperscript{11} We do not show the result in this study as the impact of external shock is only used as a control variable. Available upon request.
The mixed results of impact of (indirect impact of) trade on economic growth in five East Asian economies are really interesting. The main source of inconsistent trade-growth relationship can be said as due to inefficient resource allocation as well as low technological development in East Asian, especially ASEAN economies. The challenge posed by technological development illustrates the importance of social commitment, cooperation and institution building for development strategies. Technological acquisition and learning, which out of necessity involves long-term cooperation between firms and institutions, tends to take place more effectively if sustained by selective industrial policies promoted by the federal government and states (Lall, 2000; Jomo, 2001; Arbix and Laplane, 2003). Especially, when heavy industrialization predominated, industrial policies will only be effective if they are supported by local and regional systems oriented toward innovation and learning, capable of diffusing new technologies and simultaneously promoting productive specialization. Regional initiatives geared towards facilitating exchange between companies and institutions, both public and private, will only be effective if integrated with research centers and universities by means of selective policies stimulated by the central government.

References

720


