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Panel data analysis of “Export-led” Growth Hypothesis in BIMP-EAGA Countries

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Abstract

This paper uses panel data analysis to test the validity of the “export-led hypothesis” in three BIMP-EAGA countries (i.e. Indonesia, Malaysia, and the Philippines) by using panel data analysis. One-way random effects model leads to a conclusion that, there is no significant relationship between the size of national income and the amount of export for these countries. On the other hand, panel unit root tests imply that there is strong evidence of stationary process for both GDP and EX at the first differences. However, the panel co-integration test indicates there is no co-integrating relationship between export and development for these countries. As a conclusion, the export could be not seen as the “engine” of growth in these BIMP-EAGA. In other word, the empirical findings did not provide sufficient evident to support the “export-led hypothesis” in the area.

Keywords

Export-led Growth hypothesis, BIMP-EAGA

1. Introduction

With conspicuous imbalance in the distribution of wealth between the “have” and “have-not” nations in the global community, one of the most critical questions for development economists remain as: how could these developing countries cut the chain of “vicious circle” by overcoming the poverty? In the other word, what could be the “engine” of growth to boost their much-needed economic growth?

Traditionally, development economists assume that the main root cause of poverty in developing countries is a lack of investment. This assumption is based on the well-known “Harrod-Domar” model of economic development (Harrod, 1939; Domar, 1946). The basic “Harrod-Domar” model can be expressed as:

$$\Delta Y = (1/\gamma)\Delta K = A\Delta K \quad (1)$$

where Y is output, K is stock of capital, γ is capital-output ratio, A is $1/\gamma$, and Δ signifies “the change in”. The equation implies that the change in output is proportional to the change in the stock of capital or investment.¹ Based on this equation, many development economists wanted to see foreign aid as a promised “engine” for the economic development. Accompanying by donor countries’ senses of guilty to their former colonies, many developed countries have plunged vast amounts of foreign aid to the developing countries in order to “overcome” the shortage of investment in those countries. However, some researchers have openly criticised the efficacy of foreign aid. They argue that foreign aid fail to play a role of the “engine” to ensure sustainable economic growths in the recipient countries. For instance, Robert Cassen and his co-authors in their influential book entitled “*Does Foreign Aid Work?*” argue that foreign aid has failed to produce the expect results and conclude that the significant portion of aid does not work (Cassen and Associates, 1994).

Due to the perceived ineffectiveness of foreign aid to stimulate economic growth in developing countries aid donor countries are apparently loosing their enthusiasm for the provision of foreign aid. As Van den Berg (2001, p.360) put it, “The main reason for the decline in real inflow of foreign aid is the simple fact that such aid has not always worked very well in bringing economic growth to the developing countries”.²

The diminishing inflows of foreign aid and its ineffectiveness have prompted many developing countries to overcome their aid-dependency and to search for alternative development strategy to stimulate their economies. One of the most promising and viable development strategies seems to find own niches in global market place and to tap into the demands of the world economy without relying on foreign countries’ helps.

¹ According to the Harrod-Domar model, the change in stock of capital is equal to investment. In other words, the existing stock of capital will not suffer any depreciation. This assumption could be a major weakness of this development model.

² Although other donor countries suffered from the “aid-fatigue” after the end of the Cold War, Japan became the top donor country which has provided more than US\$ 10 billion worth of foreign aid annually in order to stimulate the economic development in developing countries (Furuoka, 2002).

To reflect the changes in their perceptions, aid donor and recipient countries have introduced a slogan "Trade Not Aid". This slogan supports the idea that the best way to stimulate economic growth in the developing countries is not giving them foreign aid but encouraging international trade. The idea has become a dominant discourse in economic development literature. This is known as the "export-led growth" hypothesis.

In other word, export is firmly reconfirmed as the "engine" of growth in the global society. Recently, the validity of this hypothesis is reinforced by China's miraculous economic performance. China had suffered from economic stagnation and serious poverty when they had closed their door to foreigners. The country has enjoyed break-neck speed of economic development only after its leaders choose to open up its economy.

Therefore, it is no doubt that there has been an ever-growing consensus about importance of promoting export and participating in global market among the development economists, policy makers and political leaders. For a recent example, when enacting the "Africa Growth and Opportunity Act (AGOA)" in 2001, US President George W. Bush stressed the importance of opening a country's economy to world market and tapping "the power of markets to improve the lives of our citizens".³

Although many countries adopted export-driven development strategies, systematic empirical research analysing the relationship between export and economic development is still lacking. To address this issue, the present paper chooses three BIMP-EAGA countries (i.e. Indonesia, Malaysia and the Philippines) as case study to analyse the relationship between them.

In this context, these BIMP-EAGA countries, except the Philippines, seem to found successfully their own niches in the global market. Despite all these export-driven economies have effectively make use of power of globalisation for their economic development, there has been differences in term of main export commodities.

For example, Malaysia exports both primary commodities and manufactured goods to the world economy. The country also exports electronic components, petroleum, Liquefied Natural Gas (LNG) and palm oil. By contrast, the Philippines is the less impressive example among the BIMP-EAGA countries which still heavily rely on the remittances that Filipinos working in other countries send their money to their home countries. In 2005, immigrants from the Philippines sent more than US\$ 10 billion back home, which account for 13.5 percent of its Gross Domestic Product (GDP).⁴

This main objective of this paper is to examine the relationship between export and development in the three BIMP-EAGA countries by employing panel data analysis. The paper consists of five sections. Following Introduction, Section 2 offers a brief literature review of the relationship between economic growth and international trade. In Section

³ Africa Growth and Opportunity Act's (AGOA) homepage [accessed on October 4, 2004], http://www.agoa.gov/agoa_forum/agoa_forum.html.

⁴ "Emerging-market indicators", *The Economist*, November 26, 2005, p.108.

3, research methodology adopted in this study is discussed. Section 4 reports findings of the research. Section 5 concludes.

2. Economic Development and International Trade

The starting point of the debate over the intricate relationship between a country's economic performance and export can be traced back to the founding fathers of modern economic thought. As such, the role of international trade in the economic development has been a hot topic for more than two hundred years.

Classical economists Adam Smith and David Ricardo emphasised the importance of international trade for a country's economic development. They argued that a country could benefit considerably if it specialised in a certain commodity or product and then exported it to the foreign countries that lacked this commodity.

In his seminal book "*The Wealth of Nations*" (1776), Adam Smith proposed that a country should specialise in and export those commodities in which it had an "absolute advantage". At the same time, Adam Smith reasoned, the country should import those commodities in which the trading partner had an "absolute advantage". The concept of "absolute advantage" could be explained by using input coefficients. The input coefficient is the amount of labour required to produce one unit of output. Country A has an absolute advantage if:

$$a_{LX} < b_{LX} \quad (2)$$

where a_{LX} is the input coefficient of product X in the country A, and b_{LX} is the input coefficient of product X in the country B (Yarbrough and Yarbrough, 2002, p.26).

David Ricardo further elaborated on the concept of absolute advantage. In his book, "*The Principles of Political Economy*" (1817), Ricardo introduced a more generalised concept of a "comparative advantage". He argued that a nation gained from trade by exporting the goods or services in which it had the best "comparative advantage" in productivity while importing those in which it had the least "comparative advantage". Country A has a comparative advantage if:

$$a_{LX} / a_{LY} < b_{LX} / b_{LY} \quad (3)$$

where a_{LY} is the input coefficient of product Y in the country A, and b_{LY} is the input coefficient of product Y in the country B (Yarbrough and Yarbrough, 2002, p.27).

However, with the development of economic thought, several shortcomings of the classical theory of international trade became evident. First of all, it does not incorporate a perspective on the consequences of the deteriorating terms of trade, which became a central trade issue between the developed and developing nations. As Cypher and Dietz (1998, p.305) observe critically, "Especially for poor, less-developed nations, we show that the generalised argument in favour of free trade policy derived from (classical) trade theory cannot be sustained once one takes the long-term historical trend of the terms of trade into consideration".

Secondly, it is not possible to spot in advance a country's own niche or its comparative advantage. As a result, many developing countries are experiencing serious difficulties in

finding their own niche in the global market. The fact was noticed by Hausmann and Rodrick (2002). They commented that for developing nations economic development could become a trial and error process of discovering their own strengths in the global competition.

Empirical researches, however, support the notion that there exists a positive relationship between international trade and economic development. In other words, empirical findings provide some evidence to support the "export-led hypothesis". According to Van den Berg (2001, p.326), "The empirical evidence on the source of economic growth overwhelmingly suggests that there is a positive relationship between international trade and economic growth".

The World Bank has conducted a research on the impact of international trade on the economic development. It classified the countries into four groups, i.e., 1) strongly outward-oriented, 2) moderately outward-oriented, 3) moderately inward-oriented, 4) strongly inward-oriented. In the course of research it transpired that strongly outward-oriented countries had achieved the highest economic growth among the four groups. By contrast, strongly inward-oriented countries suffered from serious economic recessions over the observation period from 1973 to 1985 (World Bank, 1987).

Prominent economists Jeffrey Sachs and Andrew Warner (1995) analysed the relationship between globalisation and economic performance. The findings of their research are in favour of international trade for a country's economic development. Sachs and Warner concur that there is a strong association between the openness of an economy and its growth rate, both within the group of developing and the group of developed countries. According to Sachs and Warner (1995, pp.35-36),

Within the group of developing countries, the open economies grew at 4.49 percent per year, and the closed economies grew at 0.69 percent per year. Within the group of developed countries, the open economies grew at 2.29 percent per year, and the closed economies grew at 0.74 percent per year.

Having established the importance of international trade for ensuring economic growth, this paper proceeds to analyse whether exports have been producing a significant impact on the economic development in the three BIMF-EAGA countries. The following section will introduce econometric methods used in this research.

There are several empirical researches to test the importance of exports in the process of economic development. For example, Furuoka (2007) examined the relationship between exports and economic development in Malaysia. According to him, the results of the empirical analysis do not support the "export-led growth" hypothesis. Rather, they lead to a conclusion that there exists a "virtuous cycle" or mutually reinforcing relationship between Malaysia's exports and GDP in the long run. He also argued that the findings detected unidirectional short run causality from GDP to exports, but not vice versa. This means that the increase in Malaysia's export tends to be an effect, and not the cause, of the country's output expansion.

3. Research Methodology

A panel data analysis is used to examine the relationship between amount of national income and size of export in the three BIMP-EAGA countries (i.e. Malaysia, Indonesia, and the Philippines) for period 1985-2002.⁵ It is hypothesised that size of Gross Domestic Product (*GDP*) is influenced by the amount of export (*EX*).

Three separate methods are used to analyse the model, i.e., 1) pooled Ordinary Least Squares (OLS), 2) one-way fixed effects, and 3) two-way fixed effects. Fixed-effects approach is better suited for the cases where there exist unobservable country-effects and unobservable time-effects.

First of all, in order to examine the determinants of size of national income without taking into account country- and time-effects, a pooled OLS regression model is could be:

$$GDP_{it} = \alpha + \beta_1 EX_{it} + \varepsilon_{it}, \quad (4)$$

where GDP_{it} is size of Gross Domestic Product in country i in year t , EX_{it} is the amount of export in country i in year t , α is the intercept, β_1 , β_2 , and β_3 , are slope parameters and ε_{it} is the error term. To incorporate country-effects, one-way fixed effects model could take a form:

$$GDP_{it} = \alpha_i + \beta_1 EX_{it} + \varepsilon_{it}, \quad (5)$$

where α_i is recipient-effects. Finally, to incorporate both country- and time-effects, two-way fixed effects model could take a form:

$$GDP_{it} = \alpha_0 + \alpha_i + \theta t + \beta_1 EX_{it} + \varepsilon_{it}, \quad (6)$$

where α_0 is the intercept, α_i is recipient-effects, θt is time-effects.

4. Empirical Results

Results of the regression analyses of pooled OLS model are presented in Table 1. The multiple coefficient of determination (R^2) is only 0.02. Controlling for country-effects causes R^2 to increase considerably to 0.45. Conditioning on both country- and time-effects leads to a slightly improvement of R^2 to 0.70.

The findings also show the results of the one-way fixed effects model. To compare the one-way fixed effects model with the random effects model, Lagrange Multiplier (LM) test and Hausman test indicate that random-effects model is a better choice for the analysis. Furthermore, to compare the pooled OLS model with the one-way fixed effects model, the null hypothesis that α_i (recipient-effects) equals zero is rejected at the 0.01 level of significance. This implies the presence of country-effects in the model.

The same method could be applied to examine the significance of time-effects. Table 1 shows the results of the two-way fixed effects model. The Lagrange Multiplier (LM) test

⁵ The data is obtained from the Asian Development Bank (2005).

and Hausman test show that the two-way fixed-effects regression is better than random-effects model. To compare the one-way fixed effects model with the two-way fixed effects model, the null hypothesis that θt (time-effects) equals zero could not be rejected.

Table 1: Panel Data Analysis (Pooled OLS, One-Way Fixed Effects and Two-Way Fixed Effects): Dependent Variable: GDP

	Pooled OLS	One-Way Fixed Effects	One-Way Random Effects	Two-Way Fixed Effects
<i>EX</i>	0.554 (1.05)	1.279 (2.25)*	-0.24 (-0.39)	-1.277 (-1.77)
Overall Significance(F test)	1.11	13.98**		3.61**
R ²	0.02	0.45	0.02	0.70
Adjusted R ²	0.02	0.43		0.50
Lagrange Multiplier Test (One-way) (Random-effects/ Fixed-effects vs. Classical Regression Model)				70.79**
Lagrange Multiplier Test (Two-way) (Random-effects/ Fixed-effects vs. Classical Regression Model)				72.60**
Hausman Specification Test (One-way) (Fixed-effects vs. Random-effects)				0.17
Hausman Specification Test (Two-way) (Fixed-effects vs. Random-effects)				7.88**
F Test for Model Specification (One-Way Fixed Effects vs. Pooled OLS)				20.01**
F Test for Model Specification (Two-Way Fixed Effects vs. Pooled OLS)				3.79**
F Test for Model Specification (Two-Way Fixed Effects vs. One-Way Fixed Effects)				1.61

Numbers in parentheses in fixed effects are t-statistics

Number in parentheses in random effects is derived from coefficient divided by standard errors.

* indicates significance at the 0.05 level

** indicates significance at the 0.01 level

These results imply that only the one-way random effect analysis is the best model. In other words, size of income in the three BIMP-EAGA countries is influenced by only country-specific random effects. As the one-way random effects model shows, independent and dependent variables have not significant relationship in these countries. This implies that *GDP* does not seem to increase as the *EX* increase in these three BIMP-EAGA countries.

5. Conclusion

BIMP-EAGA countries are dynamic developing countries which have experienced rapid economic development. International trade is playing an important role in propelling the country towards the status of developed economy. Thus, this paper made an attempt to analyse empirically the relationship between export and development for three BIMP-EAGA countries (i.e. Indonesia, Malaysia and the Philippines).

The one-way random effects model leads to a conclusion that, there is no significant positive relationship between the size of national income and the amount of export for these five countries. In other word, the present study provides empirical evidence that BIMP-EAGA countries are not export-driven economies. In other word, the export could not seen as the "engine" of growth in these countries. In short, the empirical findings did not provide sufficient evident to support the "export-led hypothesis" in BIMP-EAGA countries.

Findings of this paper encourage a closer look at other factors that may influence the size of income in BIMP-EAGA countries (e.g., domestic consumption, government expenditure, etc.). Future studies on this topic may want to incorporate other than the present study's variables in their research in order to capture a complex nature of development process.

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