Foreign Direct Investment, Exports, and Economic Growth in Selected Emerging Countries: Multivariate VAR Analysis

By
Adil Khan Miankhel
Crawford School of Economics and Government
Australian National University

Shandre Mugan Thangavelu
Department of Economics
National University of Singapore

Kaliappa Kalirajan
Crawford School of Economics and Government
Australian National University

Preliminary Draft

Please send comments to adil.miankhel@anu.edu.au

May 2009
Abstract

The paper adopts a time series framework of the Vector Error Correction Models (VECM) to study the dynamic relationship between export, FDI and GDP for six emerging countries of Chile, India, Mexico, Malaysia, Pakistan and Thailand. Stationarity of the series with structural breaks is also examined in the model. Given that these countries are at different stages of growth, we will be able to identify the impact of FDI and export on economic growth at different stages of growth. The results suggest that in South Asia, there is evidence of an export led growth hypothesis. However, in the long run, we identify GDP growth as the common factor that drives growth in other variables such as exports in the case of Pakistan and FDI in the case of India. The Latin American countries of Mexico and Chile show a different relationship in the short run but in the long run, exports affect the growth of FDI and output. In the case of East Asian countries, we find bi-directional long run relationship among exports, FDI and GDP in Malaysia, while we find a long run uni-directional relationship from GDP to export in case of Thailand.
1 Introduction

Since the 1997 East Asian financial crisis, the relationship between Foreign Direct investment (FDI), exports and economic growth has gained importance and attention among policy makers and researchers. Due to volatility experienced in the short term capital flows, developing and less developed countries shifted their focus from attracting short term capital flows to FDI, due to its long term effects. However, the understanding of the long term impacts and benefits of FDI is not clear as FDI is not attracted uniformly to each country, which makes it difficult to identify the impact of FDI on economic growth.

It is also more important for policy to understand the long and short-term impact of FDI on economy growth. Thus, not understanding with certainty how FDI is attracted to a country and its effects in the short term and long term, the task becomes more difficult when one is not sure about the mechanism through which FDI is going to bring about change in the economy. Duttaray, Dutt and Mukhopadyay (2008) examine this issue and the problems in understanding the effects of FDI on economic growth using cross country regression equations. They highlight that FDI measured as a ratio of FDI flow to output has a positive effect on growth by having a positive coefficient in the regression equation (De Mello, 1997; Dutt, 1998). However, when an extra variable such as exports is included in the regression equation, the FDI coefficient can either become negative or positive (Balasubramanyam et al. 1996, 1999; Borensztein et al. 1998; Stocker 1999). Further, they highlight that the positive coefficients in the equation conceal the mechanism through which FDI affects growth. Given the endogeniety biasness, the positive coefficient does not provide robust evidence of the uni-directional causality from FDI to output growth, as the causality can run both ways.

It is also important to highlight that the interaction between these variables is complex and each variable (GDP, exports and FDI) has a plausible theoretical foundation to affect the other variables. Without knowing the direction and pattern of mechanisms among these variables can hamper effective policy to promote economic growth. Therefore it is important to investigate the relationship between these variables to correctly formulate policies in respective countries.
This study makes several contributions to the literature. The paper focuses on the emerging countries of India, Pakistan, Malaysia, Thailand, Chile and Mexico. Given that these countries are at different stages of growth, we will be able to identify the impact of FDI and export on economic growth at different stages of growth. For example, since India and Pakistan are just liberalizing their economies, we should expect the impact on these countries to be different from those of more matured emerging countries of Malaysia and Thailand. In order to uncover the effect of FDI on economic growth, so far, most studies have adopted the bi-variate Granger causality testing methodologies. This paper carefully studies the dynamic relationship between export, FDI and output growth in a time-series framework from 1970 to 2005. The long time series will enable us to explore the long-run and short-run dynamic relationship between the variables. In particular, this study adopts a time series three-step procedure to reveal the direction of causality and the mechanisms through which one variable affects another. The three step approach includes checking the stationarity of the variables, then estimating the Vector Auto Regression (VAR)/Vector Error Correction Models (VECM) by employing cointegration and Granger causality techniques. Stationarity of the series with structural breaks is also examined during the estimation process.

The results suggest that in South Asia, there is evidence of an export led growth hypothesis. However, in the long run, we identify GDP growth as the common factor that drives growth in other variables such as exports in the case of Pakistan and FDI in the case of India. The Latin American countries of Mexico and Chile show a different of relationship in the short run but in the long run, exports affect the growth of FDI and output. In the short run, GDP is more important in the case of Mexico, while FDI is more important in the case of Chile In the case of East Asian countries; we find bi-directional long run relationship among exports, FDI and GDP in Malaysia, while we find a long run uni-directional relationship from GDP to export for Thailand.

The paper is structured as follows. The next section provides the literature review. In section 3, we discussed the data and methodology. In section 4, the results of the unit-root and cointegration test are presented. Section 5 provides the results of the vector-autoregressive model. The concluding policy discussions are given in section 6.

2 Literature Review
The FDI-growth nexus is clearly identified by the neoclassical growth models. The neoclassical growth model considers technological progress and labour force as exogenous, and thus argues that FDI increases level of income only while it has no long run growth effect if it does not augment technology. Long run growth can only be increased through technological and population growth and if FDI positively influences technology, then it will be growth advancing (Solow 1956). Somwaru and Makki (2004) point out that according to recent endogenous growth theory, FDI can be growth advancing if it results in increasing returns in production through spillover and technological transfers via diffusion processes. In addition, Easterly et al. (1995) argue that technology transfer depends on the diffusion process and that can take place through four modes: transfer of new technologies and ideas; high technology imports; foreign technology adoption; and level of human capital.

Yangru Wu (1999) emphasizes the role of the learning process through FDI in the growth of a country. Findlay (1978) presents the contagion effect of managerial practices and advanced technology introduced by foreign firms on the host country’s technology. In contrast, Charkovic and Levine (2005) claim that FDI creates the crowding out effect on domestic capital and hence the effect of FDI on growth is either insignificant or negative. In addition, other studies reason that causality can be the other way and market seeking FDI tends to serve the growing economies. Similarly, multinational corporations are attracted towards growing and productive economies. Therefore, this bi-directional behaviour between FDI and GDP can create simultaneity bias between the two variables.

Further, there is the similar two-way causality discussion between exports and GDP. The first is the export led growth hypothesis, while the other equally appealing hypothesis is that output growth causes export growth. Regarding the export led growth hypothesis, Makki and Somwaru (2004) argue that export growth increases factor productivity due to gains obtained from increasing returns to scale, by catering to the larger foreign market. In addition, export growth relaxes the foreign exchange constraints that result in an increase in the import of capital/technology-intensive intermediate inputs. Due to the increased exports, efficiency is enhanced because exporters are able to compete in foreign markets which results in technological advances and grooming of local entrepreneurs. Grossman and Helpman (1991) advocate that open trade regimes helps in importation of better technologies and also result in an improved investment climate.
Likewise, Jing and Marshal (1983) present the second hypothesis that in a growing economy, a process of technological change and learning takes place which is not related to any specific government export promotion measures. This can be the result of human capital accumulation, cumulative productive process, transfer of technology via direct investment or physical capital accumulation. This increased growth may take place despite any government specific export promotion measures. Due to the increased growth, the domestic market may not cater to the increased production of goods, and exporters have to look outward to sell their products. The implied hypothesis here is that increased growth leads to export growth. This causal relationship may not necessarily be positive; it may be negative as increased output growth may result in a decrease in export growth. This may happen when there is an increased domestic consumer demand in the exportable and non-tradable sector that may ultimately result in low export growth due to increased consumption in the domestic economy.

Similarly Rodrik (1995) argues that it is difficult to identify the impact of trade on growth and there is evidence that countries with higher income for reasons other than trade, tend to trade more. Another criticism regarding the link between trade and growth comes from Rodriguez and Rodrik (1999) who argue that failing to take into account institutional factors results in an upwardly biased estimate of trade coefficients and the other variables. Furthermore, they claim that the relationship between average tariff rates and economic growth is only slightly negative and nowhere statistically significant.

Finally, there is a same bi-directional argument in the case of FDI and the export nexus. Petri and Plummer (1998) argue that it is not clear whether FDI causes exports or exports cause FDI. Then there are other concerns such as specified by Gray (1998) regarding market seeking (substitute) FDI or efficiency seeking (complement) FDI. Furthermore, Kjima (1973) analyze whether FDI is trade oriented or anti trade oriented. Vernon (1966) explores whether FDI is at the early product life cycle stage (substitute) or at the mature stage (complement). Hsiao and Hsiao (2006) assert that exports increase FDI by paving the way for FDI by gathering information of the host country that helps to reduce investors’ transaction costs. Also FDI may reduce exports by serving foreign markets through establishment of production facilities there.
Similarly to analyze the debate on the FDI’s role as a complement or substitute to international trade, Wei, Wang and Liu (2001) expound that according to Heckscher-Ohlin-Samuelson models, trade can substitute for international movement of factors of production including FDI. For example, by exporting capital intensive commodities in exchange for labour intensive commodities, the perfectly immobile factors move through exports and imports. Helpman (1984) and Helpman and Krugman (1985) argue that if countries are asymmetric, the capital abundant country provides the headquarter services in a labor intensive country through FDI in exchange for finished varieties of differentiated goods. So FDI generates complementary trade flows from labour intensive countries. However, if the countries are symmetric, there is a substitution effect and capital intensive goods are exchanged for labour intensive goods.

To illustrate the causal relationship, several studies (Johanson and Widershen 1993; Nicholas 1982; UNCTAD 1996) suggest that manufacturing firms first service the foreign markets by trading because trade is easier and less risky than FDI. Then gaining knowledge about foreign countries economies, political and social conditions, the home country firms establish subsidiaries in foreign markets and then subsidiary exports. Thus, the FDI-export nexus is as complicated as the other bi-variate causal discussion.

In this study we adopt a multivariate causal study by introducing three variables. The addition of a third variable in the bivariate pattern of relationships helps to expose the channeling effect that takes place through one of these variables to establish short run or long run bivariate causal effects. For example, if we consider the export-GDP and GDP-FDI relationship, export and FDI may be related through GDP. Export growth precedes GDP growth, and then GDP growth precedes FDI growth. This implies that it is exports that are driving FDI through the channeling effect of GDP. In addition to unearthing the channeling effect, there is also the question about whether the established causality is effective in the short run or long run.

3 Data and Methodology

The data for the study is collected from World Development Indicators, the World Bank, International Financial Statistics, the IMF and UNCTAD. All the variables are defined in real values by deflating it to 2000 prices using GDP deflators. The data covers a period of 1970 to
All variables are expressed in logs. We believe that the 36 observations are sufficient time series for this study to detect both the short- and long-run relationships of the FDI, export and GDP growth. Regarding the frequency and length of the span of the data, Hakkio and Rush(1991) and Campbell and Perron(1991) point out that the results will not improve much by increasing the number of observations by using a high frequency data as compared to one that has the same frequency with lesser observations for the same length of time. Hakkio and Rush (1991) further state that the cointegration test power to detect the long run relationship is enhanced if the sample length is increased rather than by simply increasing the number of observations.

3.1 Methodology

This paper explores the causal relationship between FDI, Exports(X) and GDP in both the short run and long run. In this study, we choose six emerging countries of India, Pakistan, Malaysia, Thailand, Chile and Mexico. To capture the different stages of growth, we selected India and Pakistan from South Asia that have recently liberalized its economy. For the comparative analysis, we select two countries from East Asia that have higher per capita income than Pakistan and India. Therefore, Malaysia and Thailand have been chosen from East Asia because these countries have been successful in attracting FDI, being among the top ten FDI recipient countries. Similarly, we choose Mexico and Chile from Latin America that have been successful in attracting FDI and include them in the comparative analysis with the remaining chosen countries. By having different policy regimes and growth patterns in the selected countries, a comparative analysis is helpful in formulating policies.

First, examination of the time series properties of the data (unit root and cointegration) is necessary. Granger (1988) states that long run equilibrium exists when two or more non stationary time series (integrated of order 1 or I (1)) are integrated of order (0). Furthermore, because of testing procedures, long run dynamics of the time series properties are identified that counter the short run deviations generated by the short run forces, thus reducing the risk of spurious regression. For valid inferences, the tests should be undertaken on the I(0) variables. Granger (1988) shows that there will be at least one direction of causality in the presence of cointegration.
Following the established three step procedure of Engle and Granger to test the direction of causality, the first step is to check for the order of integration through unit root tests and if the unit root is present, then stationarity is achieved by the first differencing of the data. Then by applying the VAR approach of Johansen-Juselius (1990), we test for cointegration and if cointegration is present, we test for Granger causality by applying the standard Granger test modified with an error correction term. If there is no cointegration, we estimate the usual VAR model.