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Openness, Growth, and Development: Evidence from a Panel of East Asian Countries

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Abstract

This paper examines the interaction between openness, growth, and development using a panel of ten developing East Asian countries (China, Japan, Korea, Malaysia, Indonesia, the Philippines, Singapore, Hong Kong, Macao and Vietnam) and five-year averages for the period, 1975-2005. Its primary objective is to determine whether there is a direct link between the level of development and openness, while controlling for the indirect effect of openness through its impact on economic growth. Using a two-equation simultaneous-equations model of development and growth and an alternative measure of openness, our findings suggest that openness has a positive influence on both economic growth and human development. We also find that while economic growth makes a positive contribution to development, the converse is not true in that the more developed a nation the slower its growth rate.

Key words: Trade Openness, Economic Growth, Development, Two equation simultaneous-equations model (2SLS), East Asian Countries.

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1- Introduction

Over the last several decades, the argument that the benefits of increasing per-capita GDP will trickle down to all segments of the community has been proven ineffective. As a result, economic growth is no longer considered universally as a final goal in and of itself, but rather as a means through which the ultimate objective of human development in terms of education, health and the overall standard of living can be reached. However, economic growth might not necessarily translate into human development as countries vary in their ability to convert income into conditions that are conducive to human development. The newest growth strategies focus on export-promotion and outward-orientation. Clark (1997) found that developing countries were more successful when they adopted free outward-oriented trade policies compared with price-distorting import-substitution policies.

Development economists and international economic and development agencies now support openness, rather than isolation or import-substitution, as the method for spawning growth. Recent studies (Bahmani-Oskooee and Niroomand, 1999; Barro, 1991; Harrison, 1996) have found support for the argument that openness exerts a positive impact on growth.

While the openness-growth nexus has received much attention in the literature, little has been done to investigate the effect of openness on human development. This paper attempts to fill his void by investigating the interaction between openness, growth, and development. Its primary objective is to determine whether there is a direct link between the level of development and openness, while controlling for the indirect effect of openness through its impact on growth. For this purpose we have selected ten developing East Asian countries (China, Japan, Korea, Malaysia, Indonesia, The Philippines, Singapore, Hong Kong, Macao and Vietnam) which have vigorously implemented trade liberalization policies and also have grown rapidly over a thirty year period (1975-2005).

Section 2 reviews the literature on the relationships between openness, growth and development with a view towards identifying the major factors that contribute to growth and development. Section 3 builds on the findings of Section 2 and specifies a simultaneous-equations model of growth and

development and describes the data used in this study. Section 4 presents the results followed by Section 5, which summarizes this work.

2- Background

This section reviews the literature with a view towards identifying the channels through which openness affects growth and development. The section ends with a discussion of the relationship between economic growth and development.

a- Openness and Growth

The literature on the empirical evidence of trade and growth is vast and a comprehensive survey is beyond the scope of this article. In this subsection, we simply summarize some of the salient results from recent studies in this literature, in order to set the stage for a discussion of the more specific issue of openness and growth.

The fact that openness to trade is associated with higher growth in post-1950 cross-country data was until recently subject to little disagreement[1].

Whether openness is measured by indicators of trade policy openness (tariffs, non tariff barriers, etc.) or by the volume of trade (the ratio of imports plus exports to GDP), numerous studies document this correlation. For example, Ben-David (1993) demonstrated that a sample of countries with open trade regimes displays absolute convergence in per capita income, while a sample of closed countries did not. Finally, in one of the most cited studies in this literature, Sachs and Warner (1995) classified countries using a simple dichotomous indicator of openness, and argued that "closed" countries experienced annual growth rates a full 2 percentage points below "open" countries in the period 1970-1989. In addition, Sinha and Sinha (1999) argue that openness is linked to economic growth primarily through exports. They summarize the traditional literature on the effect of exports on growth by identifying three channels of influence. First, exports generate domestic income by providing an outlet for excess supply of goods when domestic demand is low (Colombatto, 1990). Second, in the long run,

1- The pre-1990 literature was usefully surveyed in Edwards (1993). We will focus instead on salient papers in this literature since 1990.

exports promote technical progress and saving while improving the country's credit rating making it easier to obtain foreign loans (Krueger, 1978). Finally, policies aimed at promoting exports improve total factor productivity (Balassa, 1978)[1].

The available empirical literature provides ample evidence concerning the positive effect of openness on economic growth. Barro (1991) first touched on this issue when he examined the effect of market distortions on economic growth. Market distortions are considered a measure of protectionary policies of a country, and the more open an economy, the lower the level of market distortion. Barro found that there was a statistically significant negative relationship between the level of distortions and the growth of output per capita.

Using time-series data for sixteen Latin American countries, Sinha and Sinha (1999) found that for fifteen of the countries in their sample, openness was positively related to economic growth. Bahmani-Oskooee and Niroomand (1999) found a positive long-run relationship between openness and economic growth in nineteen of the twenty-two countries they studied. Dollar (1992) constructed an index of openness based on purchasing power parity and relative prices and found a negative relationship between his index of openness and economic growth for a cross-section of 95 developing countries, implying that the more outward-oriented or open an economy, the higher the growth rate.

Harrison (1996) examined the relationship between openness and economic growth using several measures of openness. She found that the results were sensitive to the choice of the period of study. Only one of the seven openness measures had a positive relationship with growth when pure cross-sectional, period averages were used. Better results were found when the data were averaged over five-year periods. However, the best results were found when annual data were used in that six of the seven openness variables had a positive and statistically significant relationship with economic growth. Berggren and Jordahl (2003) also run cross-country regressions, encompassing 78 countries over the period 1970–2000. Their

1- For a recent and comprehensive review of the empirical literature on export-led growth see Giles and Williams (2000).

results indicate that the area "Freedom to exchange with foreigners" is, indeed, detrimental for growth. In fact, using Least Trimmed Squares to identify outliers and Reweighted Least Squares to perform estimations without the outliers, we get the result that "Freedom to exchange with foreigners" exerts a positive influence on growth.

Wacziarg (2001) addressed issues of endogeneity by estimating a simultaneous equations system where openness affects a series of channel variables which in turn affect growth. Moreover, Rodríguez and Rodrik (2000) argue that one of the problems associated with estimating the impact of trade on growth is that protectionism is highly correlated with other growth-reducing policies, such as policies that perpetuate macroeconomic imbalances. This suggests that trade restrictions are one among a "basket" of growth-reducing policies. Since Rodriguez and Rodrik (2000), the literature on trade and growth has proceeded apace. Using a new measure of the volume of trade, Alcalá and Ciccone (2004) revisit the issue of trade and growth, and argue that "in contrast to the marginally significant and non-robust effects of trade on productivity found previously, our estimates are highly significant and robust even when we include institutional quality and geographic factors in the empirical analysis". The difference stems for these authors' use of a measure of "real openness" defined as a US dollar value of import plus export relative to GDP in PPP US dollars. Commenting on the significance of trade liberalization policies, Santos-Paulino and Thirlwall (2004) noted that since the 1970s world trade has grown five times faster than world output. Chen and Gupta (2006) examine the impact of trade openness on economic growth for The Southern African Development Community (SADC) region in Africa over the period of 1990 to 2003. They find that trade openness have had a strong positive impact on economic growth in this region over this period.

Din (2004) examines the export-led growth hypothesis for the five largest economies of the South Asian region using a multivariate time-series framework. The results indicate bi-directional causality between exports and output growth in Bangladesh, India, and Sri Lanka in the short-run and the study finds long-run equilibrium relationships among exports, imports, and output for Bangladesh and Pakistan. However, for India, Nepal, and Sri

Lanka, no evidence of a long-run relationship among the relevant variables is found.

Bhaskara and Rup (2007) used the Solow growth model with an endogenous growth framework to estimate the effects of trade openness on the steady state growth rate (*SSGR*). They estimated the augmented production functions to compute the *SSGR*s for Singapore, Malaysia, Hong Kong, India and Thailand. Their empirical results to capture the permanent growth effects of trade liberalization policies have been impressive and they also found that good policy environment has increased the permanent growth effects of trade liberalization in these countries.

b. Openness and Development

Unlike the relationship between openness and growth, little work is available on the effect of openness on development. On an intuitive level it may be argued that, whereas openness affects economic growth primarily through exports, it influences development through imports. If used efficiently, imports of capital, both physical and human, as well as technology and new ideas could enhance a country's development capacity. For example, better medical equipment and better-trained medical staff can improve the general health of the population and thus contribute to human development. Another contributing factor is efficient water treatment facilities and sewer systems. Similarly, imports of modern agriculture equipment, technical services, and farming methods can expand a nation's capacity to produce food. Openness to the exchange of scholars and students can improve the quality of education. It should be noted that some if not all of these factors also enhance the growth capacity of the economy as they represent investment in the country's social and economic infrastructure.

As far as empirical analysis of the effect of openness on development is concerned, to our knowledge the only study is by Eusufzai (1996) who found a positive correlation between these two variables. He considered several human development variables including infant mortality rate, the proportion of population with access to safe water, the United Nations' Human Development Index (HDI), and the UN's income-distribution-adjusted HDI. Eusufzai reconstructed Dollar's openness index and used it to calculate Pearson's correlation coefficients between the openness index and each

development variable. He found that most of the development variables were statistically significantly correlated with the openness index in the expected direction While Eusufzai's work is a step in the right direction; it is open to criticism as it relies on correlation analysis, which does not control for other influences. Moreover, he did not consider the possible interaction between growth and development and thus was unable to determine the channel through which openness affects human development. Perhaps in recognition of these facts Eusufzai(1996) suggests that more rigorous econometric approach would provide a more solid footing for the evidence. This is what motivates our study, as we use a simultaneous-equations model to examine the effect of openness on growth and development while allowing for the possible interaction between economic growth and human development.

c. The Relationship between Growth and Development

With the emergence of development economics following World War II, an emphasis was placed upon the role of economic growth. The idea was that increased production would broaden the material base of the economy leading to improvements in the standard of living. Although it was realized that wealthy members of society would probably gain the most from increases in output per capita, at least in the early stages of development, it was thought that these benefits would eventually trickle down to the less fortunate so that in the end everyone would be better off. However, lack of evidence of such a trickle-down effect casts doubt on the growth-led development proposition.

In the 1970's a distinction was made between growth and development. Economic growth remained concerned with the increase in production per capita, whereas economic development came to encompass the overall welfare of the population in terms of education, health, nutrition, etc. As this distinction emerged, so did a debate about the relationship between the two notions. Four strands of thought have been advanced in this regard. Some contend that economic growth and economic development are unrelated, in the sense that each can exist without the other. Others argue that growth and development are highly interdependent as policies that foster growth, also enhance development.Yet others posit that economic development is the force driving economic growth. Finally, the dominant

view appears to be that economic development is a direct result of economic growth, while recognizing that growth is a necessary, but not a sufficient condition for development (Mazumdar, 1996).

3- Model Specification and Measurement

Our aim is to investigate the effect of openness on economic growth and development while controlling for the interaction between the latter two. We specify a simultaneous-equations model in which human development and economic growth are endogenous, while openness and a number of other economic, demographic, and policy variables are exogenous[1].

a. Development and its Key Determinants

As it became apparent in the late sixties and early seventies that GDP (or GNP) was an inadequate measure of development, several new indices of development that combined income with a number of development indicators were constructed. This campaign to find a measure that adequately described development, or the standard of living, became known as the "social indicator movement" (Tilak, 1992). In 1970, the UN published its Social Development Index, which was an attempt to measure structural changes in a country. It was based on seven indicators, including enrollment in vocational education, circulation of newspapers, consumption of energy, and foreign trade.

However, it soon became evident that the index needed to look at indicators of general welfare as well. This led to the construction of the Physical Quality of Life Index by the UN's Overseas Development Council. The result was a composite index of life expectancy of infants, infant mortality, and literacy rates. Although this index was popular, it was considered too simplistic to adequately represent the level of development in a country.

[1] . Frankel and Romer (1997) and Cyrus et al. (1997) study the relationship between growth openness using a simultaneous-equation model that treats openness as endogenous. However, neither study incorporates a separate equation for development

From these attempts, and several others, the two most recognized development measures have emerged. The first is the Human Suffering Index (HSI), constructed by Camp and Speide in 1987. This index is based on ten indicators including GNP per capita, inflation rate, growth of labor force, growth of urban population, infant mortality rate, daily per capita calorie supply, percentage of the population with access to safe water, per capita energy consumption, literacy rate, and an index of personal freedom.

The HSI has been subjected to several criticisms the most notable of which has to do with the inclusion of the growth of urban population stemming from two competing views as to how it affects development. An increase in urban population indicates a shift away from agriculture towards more skilled labor and services, which suggests a positive relationship between urbanization and development (Fryer, 1965; Hamilton and Mills, 1984; Tilak, 1992). On the other hand, rapid growth of urban population can hinder development, as cities in less developed countries do not have adequate sanitation, employment opportunities, food supply and housing. Furthermore, the HSI merely ranks countries according to their level of human suffering relative to other countries. This ranking can be performed as easily by using each of the ten indicators separately with little difference in the results. Overall, the HSI may be considered a useful summary measure, but it is of little use for empirical research on development.

Another index is the Human Development Index (HDI) constructed by the UN Development Program, which is the most widely accepted statistical indicator of development. The HDI is constructed from three basic indicators: longevity (life expectancy at birth), standard of living (per capita real GDP), and educational attainment (adult literacy and combined primary, secondary, and tertiary enrollment rates). Although the HDI has received criticism for not being comprehensive enough, it is the most accepted measure currently available, and thus it is the measure used in this study to proxy development.

Given this choice, we must exercise care when choosing determinants of development to avoid variables that are already incorporated into the HDI so as to reduce the likelihood of spurious correlation. With this in mind, we consider the following as some of the major determinants of human development.

Openness: As mentioned earlier, there is no conclusive measure of openness. In this paper we alternatively use the most popular measure of openness which is the ratio of trade to GDP, denoted OPEN (e.g., Bahmani-Oskooee and Niroomand, 1999). This is the sum of exports and imports divided by GDP. Based on the discussion in the previous section, we expect this to be positively related to development.

Economic Growth: Recall that there are several competing hypotheses concerning the relationship between growth and development, ranging from the two being unrelated to being interrelated with each being a necessary condition for the other. In our empirical analysis, we measure growth in terms of the growth rate of real GDP, which we denote GGDP.

Urbanization: Fryer (1965) suggests several development criteria that are based on the demographic characteristics of the population such as the urban/rural mix. Agrarian economies are typically less developed where a large portion of the population is concerned mainly with basic survival. The ability of the population to move to non-agrarian employment creates a push towards development. However, there is the possibility of a bi-directional causality between the two variables— as the labor force moves toward non-agrarian employment, the economy becomes more developed. At the same time, as the economy develops, it creates greater opportunities for employment in industries and services in urban areas. The uncertainty of the relationship between urbanization and development suggests that the effect of this variable is a priori indeterminate. In our subsequent empirical analysis, we measure this variable in terms of urban population growth rate and denote it UPOPG.

Education: Much of the literature assigns an active role to the government for establishing the foundation of development through physical and social infrastructure (Bottorf and Savitt, 1995; Stiglitz, 1997). Stiglitz lists six roles for governments with respect to economic development: educational, technological, physical, environmental, financial, and social infrastructure. The UN also discusses the role of public expenditure ratio and social allocation ratio in economic development. The social allocation ratio is the percentage of GDP that is used for social programs such as education and basic health services. An increase in this ratio is expected to increase the level of development. We do not include a measure of public expenditures

in our development equation; rather we include it in our growth equation based on the fact that there is significant evidence suggesting that government capital expenditures, especially infrastructure investment, are a primary determinant of growth. We do, however, include a measure of social allocation in our development equation. Our measure, denoted ED, is the ratio of government expenditures on education to GDP.

Infant Mortality: Eusufzai (1996), among others, found a negative correlation between infant mortality rate and development. The measure used in this paper is infant deaths per thousand births and it is denoted MORT.

Based on the above discussion, we specify the following development equation,

$$HDI_{it} = \alpha_0 + \alpha_1 GGDP_{it} + \alpha_2 OPEN_{it} + \alpha_4 MORT_{it} + \alpha_5 ED_{it} + \alpha_6 UPOPG_{t} + u_{it} \quad (1)$$

Here HDI is the human development index; GGDP is the growth rate of real GDP; OPEN is set alternatively equal to trade (imports plus exports) as a share of GDP; MORT is the infant mortality rate (deaths per thousand births); ED is the ratio of government expenditures on education to GDP; UPOPG is the urban population growth rate; u is a random error term; i = 1, 2,.. , n is the ith country; and t = 1, 2,…,T is the time index.

b. Growth and its Key Determinants

Historically, the literature has combined the determinants of economic growth with those of development. Given that we are interested in the interaction between growth and development, we include in our growth equation some of the primary determinants of growth that do not enter the development equation, in addition to the level of development, and the degree of openness.

Investment: All theories of growth suggest that investment is an important determinant of growth (Dollar, 1992; Solow, 1957). This includes not only investment by the private sector but also public infrastructure capital. In our growth equation, we include total investment, private plus public, as a percent of GDP and call it INV.

Military Expenditures: Some have found that a large share of military expenditures in the government's budget has a negative impact on growth. Between 1960 and 1987, military expenditures in developing countries rose three times as fast as those in industrial nations (Bottorf and Savitt, 1995; Barro, 1991). The internal turmoil and external conflict that are usually associated with military buildups decrease the productive capacity of the economy by destroying part of its capital stock, labor force, and the infrastructure base of the nation. The most damaging, however, is the opportunity cost of these resources in terms of forgone social and physical infrastructure projects that could have been developed. To control for this possible effect, we incorporate a variable, denoted DEF, which measures the ratio of government expenditures on defense to GDP.

Population Growth: Another well-known factor that can hamper growth in developing nations is rapid population growth, which we denote POPG in our model of growth[1]. We incorporate the above variables are incorporated in the following growth equation,

$$GGDP_{it} = \beta_0 + \beta_1 HDI_{it} + \beta_2 OPEN_{it} + \beta_3 INV_{it} + \beta_4 DEF_{it} + \beta_5 POPG_{it} + v_{it} \qquad (2)$$

Where INV is the ratio of real investment, public and private, to real GDP; DEF is the ratio of government defense expenditures to GDP; POPG is the growth rate of population; and all other variables and notations are as defined previously.

4- Results

We estimate the model in Equations 1 and 2 using panel data for ten East Asian countries (China, Japan, Korea, Malaysia, Indonesia, The Philippines, Singapore, Hong Kong, Macao, Vietnam) over a thirty year period (1975-2005) using five-year averages. The data are from the World Bank Social Indicators of Development database and the World Bank

1- This negative relation between population growth and economic growth is implied by the neoclassical growth theory. The new endogenous growth theory, on the other hand, predicts that population growth can be positively related to economic growth in advanced economies.

Economic Indicators. We estimate Equations 1 and 2 using two-stage least squares and the results obtained by using Eviews5. The results for the human development model (Equation 1) are reported in Table 1 and those for the growth model (Equation 2) are in Table 2.

We begin with the results in Table 1 and note that the estimated coefficient on the variable representing infant mortality rate (MORT) have the expected sign and is statistically significant at the 1% level. Estimate of the coefficient on growth of urban population (UPOPG) are negative and statistically significant at the 5% level suggesting that increased urbanization hampers human development. The result concerning the effect of public expenditures on education (ED) is statistically insignificant. This may be due to the fact that public spending on education is not a good proxy for what Stiglitz (1997) calls "social allocation ratio." Turning to the effect of growth on development, the results in Table 1 provide qualified support for the general consensus that economic growth leads to development.

Finally, consider the effect of openness on development. Recall from the discussion in the previous section that if increased openness is to foster human development, we should find HDI to be positively correlated with the share of trade in GDP. The results in Table 1 indicate that the estimated coefficient associated this measure of openness has the expected sign and is statistically significant at the 10% level. This result leads us to conclude that openness to international trade does foster development.

Having discussed our findings concerning human development, we now turn to the estimated growth equations presented in Table 2. In equation (2), the estimate of the effect of military expenditures (DEF) is not statistically significant. The estimated effect of the share of private and public investment in output (INV) is positive and highly statistically significant, a finding that is consistent with the neoclassical growth theory. The estimated coefficient on population growth (POPG) is negative and statistically significant at the 5% level. This, too, is consistent with the prediction of the neoclassical growth theory and the general consensus that rapid population growth has a negative impact on economic growth.

Now consider the results concerning the growth effects of the two variables of interest to us: human development and openness. As far as the former is concerned, we find that the estimated effect is negative and

statistically significance at the 5% level. The negative sign implies that as an economy develops, it experiences a reduction in its rate of economic growth. Indeed, this has been the experience of many highly developed economies, but whether one should expect the same phenomenon in early stages of development is not clear. Finally, the estimated parameter associated with openness has the expected sign and is statistically significant at the 5% level. This is consistent with the recent findings by Bahmani-Oskooee and Niroomand (1999), Barro (1991), Dollar (1992), and Harrison (1996), and Sinha and Sinha (1999), among others that open trade policies have a positive impact on economic growth.

5- Summary

The empirical study presented in this paper is based on a synthesis of three different strands of research found in the literature. One is concerned with the interaction between development and growth, another deal with the effect of openness on economic growth, and the third looks at the impact of openness on development. In this paper, we used a two-equation simultaneous-equations model of human development and economic growth with each equation containing a measure of openness as a regressor, in addition to other conditioning factors.

We found evidence suggesting that openness has a positive impact on both human development and economic growth. Both of these findings are consistent with our general understanding of the process of growth and development. We also found that while economic growth makes a positive contribution to development, the converse is not true. In fact, according to our results, it appears that development slows growth. Our investigation can be extended in a number of ways. One would be to treat openness as an endogenous variable. As a first step, one might wish to employ the specification used by Frankel and Romer (1997) and Cyrus et al (1997) to endogenize openness.

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Table 1: Dependent Variable: Human Development Index, HDI

Variables	Coefficients	value of t-ratios
Constant	0.939986	11.22249
MORT	-0.003779***	-16.46497
ED	0.000173	0.229157
UPOPG	-0.000754**	-2.130766
GGDP	0.000157*	1.604345
OPEN	0.000100**	2.154660
R^2	0.999707	

Table 2: Dependent Variable: Growth Rate of Real GDP, GGDP

Variables	Coefficients	value of t-ratios
Constant	13.30316	3.043934
DEF	-0.106035	-0.642077
INV	0.135507***	6.042302
POPG	-0.725917**	-2.738125
HDI	-18.62545**	-3.223209
OPEN	0.019105**	2.549120
R^2	0.789020	

Note: The system in tables 1 & 2 is estimated by Two-stage Least Squares (2SLS) for Five-year Averages for 10 Developing Nations (1975, 1980, 1985, 1990, 1995, 2000, 2005).

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

GLOSSARY:

GGDP = growth rate of real GDP.

MORT= infant mortality rate (deaths per thousand births).

ED= ratio of government expenditures on education to GDP.

UPOPG = urban population growth rate.

HDI = Human Development Index.

OPEN = export plus imports as a percentage of GDP.

DEF = ratio of total government expenditures on defense to GDP.

INV = public and private investment share of GDP.

POPG = growth rate of population.