Growth Effects of a Comprehensive Measure of Globalization with Country Specific Time Series Data

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Abstract

Many studies have estimated the growth effects of globalization where globalization was measured with a few economic variables, ignoring its social and political dimensions. Recently Dreher (2006) has developed a comprehensive measure of globalization with several variables from the economic, political and social sectors. He showed, with the panel data methods, that globalization has positive growth effect implying that countries with higher globalization grow faster. We argue that five year average growth rates, used in many panel data studies, are inadequate proxies for the unobservable steady state growth rate (*SSGR*). Using the Dreher indices we extend the Solow (1956) model to derive country specific estimates of *SSGR*s for Singapore, Malaysia, Thailand, India and the Philippines. Our results show that countries with higher levels of globalization have higher *SSGR*s but the growth effects on *SSGR*s are smaller than in many studies.

JEL Classifications: O1, O4, N1, O57
Keywords: Globalization, Solow Model, Country Specific Steady State Growth Rates.

1. Introduction

A large number of papers have estimated the effects of globalization on the long run growth of output. This long run growth rate is conceptually the same as the steady state growth rate (*SSGR*) of the theoretical models. At first, growth equations with large cross section dimensions were estimated. Subsequently, with improved software packages and availability of data for longer periods, panel data methods with higher time series dimensions, became popular.[1] In both types of studies globalization was partially measured with one or two economic variables, ignoring its social and political dimensions. This was so mainly because these proxy variables are often highly trended and it is difficult to estimate their individual growth effects due to high multi-co-linearity. Economic variables frequently used to proxy globalization are the trade ratio, direct foreign investment, capital flows, tariff rates, trade restrictions, monopolization of exports, black market premiums and country specific globalization dummies etc. Generally these measures of globalization are referred to as the openness of the economy. Subsequently a few comprehensive measures of globalization were developed with the weighted average or principal components methods. One such example is the well known Sachs and Warner (1995) binary index of openness based on some of the aforesaid economic variables. When variables from the political and social sectors are used to proxy globalization, it is difficult to disentangle their individual growth effects because measures of political freedom, for example, include a variety of political as well as social indicators. The well known Freedom House discrete index of political freedom is based on a few such variables. These variables are often used, along with a few other crucial economic variables, as the conditioning variables in the growth equations. In practice it is hard to maintain a distinction

[1] Panel data methods are broadly of two kinds viz., those that ignore the stationarity properties of the variables (because they frequently use 5 year averages in the panels) and those that use methods for non-stationary variables. Classical methods of estimation such as the generalized least squares (GLS), seemingly unrelated regressions (SUR) and generalized method of movements (GMM) are popular in the former. The Pedroni (1999, 2004) method is popular in the latter. While many studies on the effects of globalization have used the former type, there are relatively few studies with the Pedroni method. More recently Mark and Sul (2003) and Breitung (2005) have developed alternatives to the Pedroni method. Some widely used software packages, in both approaches, are EViews, STATA, RATS, TSP and GAUSS.

between "openness", measured mainly with economic variables, and "globalization" measured more comprehensively with variables from the economic, political and social sectors. In this paper we shall use these two terms as well as "outward-oriented policies" as synonymous because economic variables play a dominant role in any measure of globalization.

In spite of a large number of studies there is no unanimity on the growth effects of globalization irrespective of how it is measured. There seem to be two main issues in this controversy. Firstly, what is an appropriate or satisfactory measure of globalization, because it has economic, political and social dimensions. Secondly, and more generally, what should be an appropriate specification of the output equation to capture the effects of globalization (or some other variables) on the long run rate of growth of output or the *SSGR*.[2] The latter is a relatively neglected issue and also important for estimating the permanent growth effects of other variables like education, public expenditure on infrastructure, investment ratio, aid, foreign direct investment, financial reforms and learning by doing etc. Commenting on the then state of literature Rodriguez and Rodrik (2001) argued that measures of openness (by implication globalization) in studies that find openness improves growth are flawed and their econometrics is weak. Similarly Easterly, Levin and Roodman (2004) observed that "This literature has the usual limitations of choosing a specification without clear guidance from theory, which often means there are more plausible specifications than there are data points in the sample".[3]

In a recent contribution Dreher (2006) has developed perhaps the most comprehensive measures of globalization which has the potential to reduce the controversy on the measurement issue. His measure uses the principal components method to combine several variables from the economic, political and social sectors. The Dreher globalization index for 123 countries, updated annually, can be downloaded from his

[2] Another important issue is whether or not globalization alleviates poverty; see for example Ddlar and Kraay (2004) and Dreher (2006).

[3] Although these observations were made in the context of the aid-growth relationships, they are equally applicable to other specifications.

homepage. [4] He has also shown, with conventional techniques and panels of 5 year averages that the growth affects of his measures of globalization are significant, implying that countries with higher globalization grow faster. However, Dreher's panel data estimates have the same weaknesses of the earlier works because annual or even 5 year average growth rates are poor proxies for *SSGR*s. Further, we also take a methodological view that country specific time series studies, instead of panel data studies, are more useful for growth policies.[5] With country specific studies it is possible to estimate country specific *SSGR*s and therefore the permanent growth effects of globalization or any other variable. Conceptually *SSGR* is similar to the non-inflationary unemployment rate or the natural rate of unemployment. Both are unobservable and need to be derived from the estimates of dynamic equations with observable variables. In practice their estimates are derived by imposing equilibrium or the steady state conditions on the estimated non-steady state equations.

The purpose of this paper is to illustrate the advantages of our methodology and not to underestimate the significance of panel data or cross section studies. In fact both the country specific time series and panel data methods should be seen as complementary and the power and relevance of panel data estimates can be improved with our specifications and methodology. The outline of this paper is as follows. Section 2 briefly reviews some key studies on the growth effects of globalization. Section 3 discusses our methodological concerns on the specification and estimation. Estimates with our specifications and country specific time series data are in Section 4. To illustrate the merits of our approach we have selected Singapore, Malaysia, Thailand, Korea, India and the Philippines. These countries are selected partly because of their rapid growth rates and globalization process.[6] Section 5 concludes.

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[4] These indices can be downloaded from http://globalization.kof.ethz.ch/

[5] For some methodological views on the relative merits of country specific time series estimates of growth models see Greiner, Semler and Gong (2005).

[6] We should have liked to include a few more Asian countries in this study. However, that needs a separate paper because estimating the stock of capital, employment and with the non-linear two-stage least squares instrumental variables method are all time consuming tasks.

2. Globalization and Growth

Most economists agree that international trade and globalization are important factors in building an economic system. Throughout recent history, policy-makers have attempted to produce efficient trade policies that can boost economic growth. However, there is not a consensus among economists regarding the effect of openness in trade on economic growth. As stated in the previous section some of them believe that economic policies oriented towards openness are beneficial for many countries but others reject this hypothesis.

According to Baldwin (2003), there are several reasons for this disagreement. The first and most important reason is the difference in the way economists define and treat the question that is being investigated. Some researchers are concerned about the impact of outward-oriented policies on economic growth. Others are looking at the causal relationship between the increase in trade and the increase in growth. On the other hand, the interpretation and definition of openness differ among authors. Another reason for the disagreement among economists regarding the effect of openness in trade on economic growth is reflected by the nature of the data and the econometric approach that researchers use to test their models. In addition to the concerns noted in the previous section, Pritchett (1996) also brought to the forefront doubts that researchers were adequately measuring openness. Pritchett (1999) examined the correlations between a number of measures of openness to see if they were capturing some common aspect of trade policy or openness. He found that the examination of the link between various empirical indicators are pair-wise uncorrelated. This finding raises obvious questions about their reliability in capturing some common aspect of trade policy and the interpretation of the empirical evidence on economic performance. Hence, and in an important way, his findings cast a doubt on the interpretation of the empirical evidence on openness and economic growth.

In what follows, a survey of different views regarding openness and growth will be presented. The survey will pursue a historical pattern from 1992.[7] An extended survey is also provided in Table 1.

A vast number of research manuscripts have recognized a positive relationship between openness and growth. In this framework, Dollar (1992) found out that outward oriented economies as well as high exports and the sustainability of imported goods and machinery accelerate growth.[8] Barro and Sala-i-Martin (1995), Sachs and Warner (1995), Edwards (1998), Greenaway, Morgan, and Wright (1998), and Vamvakidis (1998) show, with cross-country regressions, that trade protection reduces growth rates. Ben-David (1993), and Sachs and Warner (1995) show that only open economies experience unconditional convergence. Quinn (1997) proposed an openness indicator based upon a coding of the domestic and international laws of 64 nations, most of whose legislation is available from 1950 to 1994. The results suggest that capital account deregulation may contribute to economic growth and investment and initial level of income should be also added as the determinants of long-run economic growth. Frankel and Romer (1999) provide instrumental variables estimates and confirm a significant and robust positive impact of trade on growth, using cross-country geographic indicators. Brunner (2003) extended Frankel and Romer's (1999) cross-sectional approach to panel estimation and found a significant positive impact of trade on income.

On the contrary, Rodriguez and Rodrik (2000) challenge the robustness of the openness-growth correlations found by Dollar (1992), Ben-David (1993), Sachs and Warner (1995), and Edwards (1998). They argue that some of these studies do not control for other important growth indicators and that important drawbacks are their usage of the openness measures. Nevertheless, Warner (2002) refutes the argument of Rodriguez and Rodrik (2000). His results re-establish the positive growth-openness link. In fact, Warner (2002) argues that Rodriguez and Rodrik (2000) base their claims on empirical specifications with low statistical power for testing the impact of trade

[7] Edwards (1993) provides an excellent survey of empirical studies prior to 1992.

[8] Recently, Subasat (2003) demonstrates that the index developed by Dollar (1992) has fundamental flaws and therefore has no relevance to the debate on trade orientation and should be abandoned.

restrictions on growth and development. Warner also presented additional tests of the growth-openness relation based on specifications similar to Sachs and Warner (1995). The weight of the evidence argues that protection is harmful to growth.

At the same time, Vamvakidis (2002) and Clemens and Williamson (2004) examine longer-period historical data. They find that the existing correlation between openness and growth becomes significant only in recent decades. Rodrik (2007) argued that trade and financial openness by itself are implausible to lead to economic growth, and may occasionally even backfire, in the absence of a wide range of complementary institutional and governance reforms. Here, it is worth noting that even such outstanding defenders of globalization like Blinder (2006), Summers (2006) or Krugman (2007) have acknowledged that globalization has also some adverse effects and increases inequality and insecurity.

Finally it is important to highlight that Baldwin and Sbergami (2000) and Edison et al. (2004) demonstrated that enriching the specification between globalization and growth by allowing for nonlinearities helps explain why different studies that ignore the nonlinear character of the relationship find mixed results. Specifically, Baldwin and Sbergami (2000) provide a formal dynamic model with imperfect competition that gives rise to a U-shaped relationship between *ad valorem* tariffs and growth while a bell-shaped relationship between specific tariffs and growth. They conclude that allowing for non-linearity does have a big empirical impact. Greiner et al. (2004) discuss in some detail how such non-linear models can be estimated but within the framework of the endogenous growth models. Therefore, we also consider the nonlinear nature of the relationship between growth and globalization in our empirical specifications although we conjecture that the results also depend on how openness or globalisation is measured and what kind of growth model is selected.

Table 1

Author(s)	Contribution	Method*	Key Variable(s)	C[a]	S[b]
Dollar (1992)	The author analyses the relationship between outward orientation and economic growth. His finding is that outward orientation is conducive to economic growth.	CS	Produced an index of outward orientation. He adjusted national price levels with factor endowments, and used the difference between actual and predicted price levels as a measure of real exchange rate distortion.	95	+
Levine and Renelt (1992)	Employing extreme bound analysis (EBA) proposed by Leamer (1983) they authors consider a relationship between growth and a variable of interest to be robust if it remains statistically significant and maintains a sign predicted by theory even after the conditioning set of variables in the regression has been changed. Among their findings, they conclude that a positive robust relationship exists between average share of capital formation in the GDP and the average share of trade in the GDP. Similarly, they confirm the existence of a positive robust relationship between average growth rates and the share of capital formation in the GDP. Finally, they point out that an overwhelming majority of economic and political indicators, such as fiscal-expenditure, monetary-policy and political stability indicators are indeed not robustly correlated with growth or the capital formation share of the GDP.	CS	They used a variety of variables related to Trade (See Levine and Renelt, 1992 data appendix) for their exact definition.	119	±
Easterly et al. (1993)	Find out evidences that terms of trade explain growth variation in the 1970s and 1980s. While the investment rate changes little over time for most countries in the world, the growth rate is highly volatile. Then, if investment rates do not changed much across decades whereas growth rates do, it is plausible to think that the investment could not be an important determinant of growth.	CS	The black market exchange rate premium, and the ratio of imports and exports to GDP, both of which they find to be negatively related to growth, although the coefficient on trade share is insignificant.	160	-
Asesina et al. (1994)	They found that capital controls had positive but insignificant effects on economic growth within OECD countries. Their employed annual data so the implications of the article are for a short term.	CS	*Share*[c]	20	-
Grilli and Milesi-Ferreti (1995)	They study the effect of capital controls on GDP growth and inflation. The results show level of capital controls do contribute to inflation.	CS	*Share*	61	-

Table 1: (continued)

Sachs, J. D. and Warner, A. (1995)	They constructed their own openness indicator and found positive relationship between the latter and economic growth.	CS	The Sachs-Warner dummy is a variable that classifies an economy as closed if it is closed according to any one of the following five criteria: (i) its average tariff rate exceeded 40%, (ii) its non-tariff barriers covered more than 40% of imports, (iii) it had a socialist economic system (iv) it had a state monopoly of major exports, or (v) its black-market premium exceeded 20% during either the decade of the 1970s or the decade of the 1980s.	79	+
Quinn (1997)	Shows that capital account liberalization have a positive effects on growth. He used a nuanced 4-point scale and concluded that those countries that open their capital accounts more quickly grow faster.	CS	Uses the difference $(\Delta Share)$ in the value of this indicator between 1988 and 1958 as a regressor in his cross-country analysis of growth over the period 1960 to 1989.	58	+
Rodrik (1998)	Using a binary indicator of capital account openness (*Share*) for a sample of roughly 100 developing and developed countries, the author argued that there was no association between (the level of) capital account openness and growth. He shows that the significance attributed to capital account openness in a cross-country growth regression disappears with the inclusion of an indicator of government reputation, a variable whose coefficient is significant in the growth regression.	CS	*Share*	100	-
Greenaway, D., Morgan, W., and Wright,P. (1998)	Find evidence of a positive relationship between liberalization/openness and growth, although the impact of trade reforms appear to follow a J-curve pattern.	PD	As a liberalization measure they used 1) Sachs-Warner Indicator 2) Dean et al. (1994) indicator which is based on average nominal tariffs, QR coverage and average black market premia, and 3) Structural Adjustment Loans indicator (for details see Greenaway and Milner, 1993).	73	+

Table 1: (continued)

Edwards, S. (1998)	Runs regressions of TFP growth on nine alternative indicators of openness for 93 countries. He concludes that there is a significantly positive relationship between openness and productivity growth. Moreover, they argue that no particular measure of openness may be considered as ideal and absolute.	PD	The author used the following 9 measures of trade restrictions and trade shares: 1) a ratio of taxes on imports and exports to total trade, 2) subjective index of trade distortions proposed by the Heritage Foundation 3) Index of openness based on residuals from regressions explaining trade flows conceived by Leamer (1988), 4) Wolf' (1993) regression-based index of import distortions 5) average levels of import tariffs calculated by UNCTAD[d] 6) average coverage of non-tariff trade barriers calculated by UNCTAD 7) World Bank classification of trade strategies 8) Warner-Sachs trade policy index and 9) average black market premium on a nation's foreign exchange rate.	93	+
Harrison and Hanson (1999)	Suggest that many approaches to measuring 'openness' are significantly flawed. As an illustration, they showed that work Sachs and Warner (1995) measure of openness is not robust and therefore fails to establish a robust link between more open trade policies and SSGR	CS	They estimate a cross-country growth regression which corresponds exactly to the specification presented by Sachs and Warner, except that they decompose Sach and Warner's openness measure into its five separate components. The dependent variable is the average annual growth in real GDP per capita for the period 1970 through 1989.	72	-
Klein and Olivei (1999)	The authors show a statistically significant and economically relevant effect of open capital accounts on financial depth and economic growth in a cross-section of countries over the period 1986 to 1995.	CS	They used *Share* indicator, which in their case represents the proportion of years between 1986 and 1995 in which the country had unrestricted capital mobility.	93	+
Rodriguez and Rodrik (2000)	They conclude that this link has not been convincingly demonstrated, and they remain "skeptical that there is a strong negative relationship in the data between trade barriers and economic growth, at least for levels of trade restrictions observed in practice"	CS, PD	A wide range of measure according to variety of authors	var	-

Table 1: (Continued)

Edwards (2001)	Did point out the possibility that capital account openness may be beneficial only once a certain level of development is reached. To some extent, this provides a support to the view that there is an optimal sequencing for capital account liberalization.	CS	Uses in separate regressions, either the level of *Share* indicator or its change.	62	+
Arteta, Eichengreen and Wyplosz (2001)	They found a positive relationship between capital account liberalization and growth. However, this association varies with time relying on how the capital account liberalization is measured and how it is estimated. They argue about the need to eliminate major macroeconomic imbalances before opening the capital account.	CS,PD	They use in a standard cross-country growth regression, *Share* and the product of this indicator and the logarithm of GDP per capita. They find that the effect of capital account openness on growth declines with the level of income and, as mentioned above, scant evidence of an effect for richer countries.	61	±
O'Donnel (2001)	O'Donell finds increased financial integration to be associated with lower output volatility for OECD countries but with higher output volatility in non-OECD countries.	CS,PD	*Share* (not significant) Capital flows (significant)	93	±
Bekaert, Harvey, and Lundblad (2002)	They find capital account openness to reduce output and consumption volatility, though not significantly. Their results, however, show capital account openness to increase output and consumption volatility in emerging market countries.	CS	They used three different indicators of openness. The first one is "official liberalization indicator" which takes a value of one when the equity market is officially liberalized, and zero otherwise. The second one is "First Sign Liberalization Indicator", which takes a value of one when the "first sign" of equity market liberalization takes place (see Bekaert and Harvey, 2000 for details). The third one is a measure of the intensity of the liberalization. The intensity indictor measures the ratio of equity market capitalization available to foreign investors to the total market capitalization, and therefore captures the gradual nature of financial liberalizations.	95	±
Edison, Hali J., Ross Levine, Luca Ricci, and Torsten Sløk (2002)	The paper finds that although international financial integration is associated with high levels of GDP per capita and strong institutions, the data do not lend much support to the view that international financial integration spurs economic growth.	CS,PD	They used Share, Quinn's and an annual measure of portfolio and direct investment assets and liabilities as a percent of GDP as a long-run indicator of financial openness (Lane and Milessi-Ferreti, 2002). They also used Flow of Capital, stock of capital inflows and inflows of capital.	57	-

Table 1: (Continued)

Dollar, D. and Kraay, A. (2003)	They argue that the simple cross-country linear instrumental variables regressions, either in levels or in decadal differences, cannot provide definitive answers about questions as complex as the interacting roles of institutions and trade for growth. In case they consider the institutions as exogenous variables, find a significant partial association between trade and growth which survives the inclusion of a variety of proxies for institutional quality. However, if institutions are considered to be endogenous, then the model is too weakly identified to be able to sharply estimate any of the parameters of interest.	CS,PD	Their identifying assumption is that while trade volumes and institutional quality may be correlated with the contemporaneous and lagged shocks to GDP growth, they are uncorrelated with future shocks to GDP growth. Therefore, they instrument for lagged growth using the log-level of per capita income and instrument for the changes in trade and institutional quality using their levels.	var[e]	±
Klein (2003)	The estimates presented here show statistically significant and economically meaningful growth benefits from an open capital account for middle-income countries, but not for poor or rich countries.	CS	They use *Share* indicator and KQuinn which reflects the average value of Quinn's indicator of capital account openness in 1973, 1982 and 1988. They indicate that the correlation between these two variables is 0.73 for the 51 countries for which both variables are available.	53	±
Stiglizts, J. (2003)	Countries that have managed the globalization process well have shown that globalization can be a powerful force for economic growth.	-	-	Conceptual paper	
Clemens and Williamson (2004)	Demonstrate a positive relationship between tariffs and growth prior to World War II. The relationship reverses during the post-War period. They argue that high tariffs need not necessarily impede growth and the benefits of openness are neither inherent nor irreversible but rather depend upon the state of the world.	CS	Average Tariff rates	35	±
Chanda (2005)	Capital Contrds have an important impact of economic growth. The author argues that the negative or positive impact depends on the degree of heterogeneity of the country under consideration. For countries with high degrees of heterogeneity, capital controls lead to greater inefficiencies and lower economic growth. On contrary, for countries which did not face such heterogeneity, capital controls enhance economic growth.	CS	*Share*	57	±

Table 1 : (Continued)

Minier, J. (2005)	The question addressed in this paper is whether countries with lower barriers to international trade have higher growth rates, controlling for other country characteristics. The author find that tariff barriers are positively correlated with growth in countries with a comparative disadvantage in primary goods, and negatively correlated in countries with a comparative advantage in primary goods.	CS	Average tariffs as the measure of trade barriers	74	±
Dreher, Axel (2006)	The author empirically examines the effects of several dimensions of globalization on economic growth using cross section time series analysis. The results show that globalization promotes growth.	PD	The author formulated a comprehensive measure of globalization process. The proposed globalization index includes three sub indices; Economic, Social and Political (for details see Dreher, 2006).	123	+

Note:

a) Indicates the largest number of countries considered in the study

b) The impact of trade variables on growth indicator. + indicates positive impact; - exerts negative and; ± designates mixed results.

c) *"Share"* is the proportion of years in which countries had open capital accounts. This indicator is drawn from information in the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) published by the International Monetary Fund. For instance, if the *AREAER* judged capital markets open for ten years out of a 20-year period, then this indicator would be 0.5. A larger value of it represents a higher proportion of years with an unrestricted capital account

d) Same data as used by Barro and Lee (1994)

e) Variable number of countries

* CS = Cross Section; PD= Panel Data

3. Methodological and Specification Issues

Dreher (2006) is an important contribution and should satisfy the critiques of the way globalization is measured. Further refinements are perhaps possible, but the Dreher methodology would serve as a useful framework. Therefore, in what follows we assume that the Dreher index of globalization is satisfactory and attention is given two other issues of which the more important one is about the specification of the estimated growth equations in both the panel data and time series studies.

On the importance of the specification issues it is worth recalling from our introduction the observation made by Easterly et.al. (2004). Dreher and many similar panel data studies have often used 5 year average growth rates of per capita output to measure the unobservable *SSGR*s. However, a time span of 5 years is too short for an economy to attain its steady state growth when perturbed. This is so because simulations with the closed form solutions show that an economy takes several periods to converge anywhere close to its steady state. This transition period may be more than 30 years even for small perturbations; see Sato (1963) and Rao (2006). For example when Easterly et.al., (2004) have used 8 year average growth rates of output, instead of the popular 5 year growth rates, to check the robustness of the results in Burnside and Dollar (2000) on the effects of aid on growth, the coefficient of aid and the conditionality variables became insignificant. They have also experimented with various lengths for panels—ranging from annual growth rates to the average growth rate for the entire sample period of 1970 to 1993 of Burnside and Dollar—and found that this did not alter their findings. This is an indication that even average growth rate of over two decades is not a good proxy for the *SSGR*. More explicitly this limitation is recognized by Demirgüç-Kunt and Levine (2008), in their work on finance and growth, by noting that "To the extent that five years does not adequately proxy for long-run growth, the panel methods may be less precise in assessing the finance growth relationship than methods based on lower frequency data." This limitation of measuring the unobservable *SSGR*s did not so far receive much attention of the experts of growth economics

and econometrics.[9] Dreher's panel data growth equations, based on the conventional methods, have also this specification bias.

In light of such limitations, what can be estimated at best, with annual data or even with short panels, seems to be the production function. The production function can be modified to capture the permanent growth effects of variables like globalization through their effects on the total factor productivity (*TFP*). Edwards (1998) and Dollar and Kraay (2004) suggest a similar procedure, but our method is somewhat different because this extension depends on the selected growth model. In this paper we select the Solow (1956) growth model for a few reasons. Firstly, the Solow exogenous growth model, with constant returns, is easy to extend and estimate compared to a variety of endogenous growth models which need more complicated non-linear dynamic specifications. Greiner et.al,, (2004) have estimated such endogenous growth models with country specific time series data to determine the permanent growth effects of R&D expenditure. Secondly, there is no convincing evidence that endogenous growth models, with increasing returns, empirically perform better than the Solow model; see Jones (1995), Korcherlkota and Ke-Mu Yi (1996), Parente (2001) and Solow (2000). Solow (2000) observed that "The second wave of runaway interest in growth theory—the endogenous-growth literature sparked by Romer and Lucas in the 1980s, following the neoclassical wave of the 1950s and 1960s—appears to be dwindling to a modest flow of normal science. This is not a bad thing. Nevertheless, a wider variety of growth models is now available for trying out; and some of the main empirical uncertainties have been specified, and perhaps narrowed down even if not settled." Our extended Solow model may be called the Solow model with an endogenous framework. The well known extension to the Solow model by Mankiw, Romer and Weil (1991)

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10. Winters (2004) also recognized that 5 year average growth rates are inadequate to measure the unobservable SSGRs. However, he suggests that 5 year growth rates are a pragmatic option to capture the transitional growth rates. We disagree with Winter's view because of two reasons. Firstly, globalization (or any other variable) is found to have transitional growth effects, by definition its permanent growth effects are nil. Secondly, even if the only aim is to estimate the transitional growth effects, then the degrees of freedom and efficiency of the estimates can be vastly improved with annual observations of the variables. This latter criticism also applies to other panel data works in growth.

is based on a similar approach. However, our extension differs somewhat but its underlying spirit is similar.

Let the Cobb-Douglas production function with the constant returns and Hicks-neutral technical progress be

$$y_t = A_t k_t^{\alpha} \qquad 0<\alpha<1 \qquad (1)$$

where y = per worker output, A = stock of technology and k = capital per worker. It is well known that *SSGR* in the Solow model equals the rate of growth of A. It is common in the Solow model to assume that the evolution of technology is given by

$$A_t = A_0 e^{gT} \qquad (2)$$

where A_0 is the initial stock of knowledge. Therefore, the steady state growth of output per worker (*SSGR*) equals g. It is also plausible to assume for our purpose that

$$A_t = f(T, GLO_t) \quad f_T \text{ and } f_{GLO} > 0 \qquad (3)$$

where *GLO* is a measure of globalization. For example Winters (2004), Edwards (1998) and Dollar and Kraay (2004) take the view that a more convincing and robust evidence between openness or globalization and growth should be derived from their effects on productivity.[10] The effect of *GLO* on *TFP* can be captured with a few alternative empirical specifications for (3). Simple linear and non-linear specifications of the extended production function of equation (1) are as follows.

[10] Edwards (1998) has used an alternative method which is particularly useful for estimates with panel data. In his approach *TFP* is computed as the residual from the growth accounting exercises for each country. Their averages over ten year panels were used as the dependent variable. Using alternative measures of trade openness he found that they all have significant effects on *TFP*. However, we have reservations on his short lengths of panels.

$$y_t = A_0 e^{(g_1 + g_2 GLO_t)T} k_t^{\alpha} \quad (4)$$

$$y_t = A_0 e^{\left(g_3 - g_4 \frac{1}{GLO_t}\right)T} k_t^{\alpha} \quad (5)$$

A third alternative is to introduce *GLO* as a shift variable into the production function implying that

$$A_t = A_0 e^{gT} GLO_t^{\beta} \quad (6)$$

and

$$y_t = \left(A_0 e^{gT} GLO_t^{\beta}\right) k_t^{\alpha} \quad (7)$$

These formulations can also be used, in a similar way, to test for the growth effects of other variables. It is also possible to introduce conditionality variables into our specifications. However, this may not be necessary when a comprehensive measure of globalization (e.g., Dreher's) is used.[11] These alternative specifications imply that the corresponding *SSGR*s are:

$$\Delta \ln y^* = g_1 + g_2\ GLO \quad (4')$$

$$\Delta \ln y^* = g_4 - g_5 GLO^{-1} \quad (5')$$

$$\Delta \ln y^* = g + \beta\, \Delta \ln GLO \quad (7')$$

These specifications are well suited to test, for example, Dreher's findings that countries with higher globalization grow faster because the *SSGR* (denoted as Δy^* above) depends on *GLO*.

[11] Rodriguez and Rodrick (2001) and Winters (2004) have argued in favour of additional conditionality variables because globalization is often measured partially with a few economic variables. Let this conditionality variable be *Z*. The extended specification based on equation (4) will be

$$y_t = A_0 e^{(g_1 + g_2 GLO_t + g_3 GLO_t \times Z_t)T} k_t^{\alpha}$$

4. Empirical Results

4.1 Singapore and Malaysia

The specifications in (4), (5) and (7) are estimated with the London School of Economics (LSE) and Hendry's general to specific method (*GETS*). Some advantages of *GETS* are that the parameters of both the long run equilibrium relationship and the variables that capture the dynamic adjustments, i.e., the *ARDL* terms, can be estimated in one step. Second, any endogenous variable bias can be minimized by estimating with the instrumental variables method. Finally, it is relatively simple to impose the non-linear constraints on the variables and parameters; see Rao, Singh and Kumar (2008) for the advantages of *GETS* which are not easy with alternative methods like the Johansen, Phillips and Perron and Bounds Test methods. We shall use the Ericsson and McKinnon (2000) test as the cointegration test. All the variables are tested for their stationarity properties and found to be I(1) in levels and I(0) in their first differences. For illustration the *GETS* specification of equation (4) with the *ARDL*s and in its most general form is as follows.

$$\Delta \ln y_t = -\lambda[\ln y_{t-1} - (lnA_0 + (g_1 + g_2 GLO_{t-1})T + \alpha \ln k_{t-1}] + \sum_{i=0}^{n1} \gamma_{1i} \Delta \ln k_{t-i} + \sum_{i=0}^{n2} \gamma_{2i} \Delta GLO_{t-i} + \sum_{i=0}^{n3} \gamma_{3i} \Delta \ln y_{t-i} \qquad (8)$$

We have included in (8) current period changes of the variables because some of them may have short run dynamic and transitory effects on the growth rate and the endogenous variable bias is minimized due the instrumental variable estimation method; see below. In general it is to be expected that current period investment i.e., Δk_t would have significant growth effects especially in the developing countries. Using the variable deletion tests, this long specification can be reduced into a parsimonious equation. It may be noted that the expression in the square brackets is the lagged error correction term (*ECM*). Similar specifications for equations (5) and (7) can be obtained by replacing the *ECM* in (8) with the appropriate terms and these are as follows.

$$\Delta \ln y_t = -\lambda[\ln y_{t-1} - (lnA_0 + (g_3 - g_4 GLO_{t-1}^{-1})T + \alpha \ln k_{t-1}] + \sum_{i=0}^{n4} \gamma_{1i} \Delta \ln k_{t-i} + \sum_{i=0}^{n5} \gamma_{2i} \Delta GLO_{t-1}^{-1} + \sum_{i=0}^{n6} \gamma_{3i} \Delta \ln y_{t-i} \quad (9)$$

$$\Delta \ln y_t = -\lambda[\ln y_{t-1} - (lnA_0 + gT + \beta \ln GLO_{t-1} + \alpha \ln k_{t-1}] + \sum_{i=0}^{n7} \gamma_{1i} \Delta \ln k_{t-i} + \sum_{i=0}^{n8} \gamma_{2i} \Delta \ln GLO_{t-1} + \sum_{i=0}^{n9} \gamma_{3i} \Delta \ln y_{t-i} \quad (10)$$

We have estimated these *GETS* equations with the methods stated above for Singapore, Malaysia, Thailand, India and the Philippines for the period 1974-2004. Two-stage non-linear least squares instrumental variables method (2SNL-IV) is used for estimation and lagged values of the variables are used as the instrumental variables. The Sargan χ^2 test is used to validate the choice of instrumental variables. However, of the three alternative specifications, equation (8) with linear effects of *GLO* performed far better. This may be due to the use of Dreher's comprehensive measure of *GLO*. Elsewhere when globalization is measured with only trade ratio only, the non-linear specification (9) performed better; see Rao and Singh (2007). Compared to the trade ratio or similar variables, the potential growth effects of a broad based measure of *GLO* are likely to continue for longer periods. Therefore, a non-linear specification where these effects taper off over one or two decades may be an inappropriate specification when globalization is measured comprehensively.

Estimates of the parsimonious equations of (8) for these 5 countries are in Tables 2 and 3. First, we shall discuss the estimates for Singapore and Malaysia because these are very similar. Furthermore, this also helps to understand if the *SSGR* of Singapore is higher than in Malaysia because the average value of *GLO* in the former is significantly more. Equations (I) and (II) in Table 1 are for Singapore. Although equation (I) is well determined and its residuals have no serial correlation and normally distributed, estimates of g_1 and g_2 which are crucial parameters for determining *TFP* due to autonomous factors and *GLO*, respectively, are insignificant. However, when this equation is re-estimated in (II) with the constraint that $g_1 = 0$, g_2 became significant. This implies that improvements in *TFP* and *SSGR* in Singapore are mostly due to its

rapid globalization policies. This is not surprising because the Dreher globalization index is comprehensive and includes many growth enhancing variables from the economic, social and political sectors. Therefore, it is to be expected that g_1 will be small and insignificant for other countries also.

TABLE-2
Singapore and Malaysia
NL2SLS-IV Estimates, 1974-2004

	I (SGP)	II (SGP)	III (MAL)
Intercept	6.0376 (3.23)*	6.1544 (5.45)*	6.2805 (14.98)*
λ	-0.4665 (4.18)*	-0.4726 (5.81)*	-0.5837 (6.43)*
g_1	-0.0029 (0.08)		
g_2	0.3259E^{-3} (8.25)*	0.3009 E^{-3} (6.88)*	0.2409 E^{-3} (7.23)*
α	0.3519 (1.93)**	0.3399 (3.43)*	0.2926 (6.96)*
$\Delta \ln k_t$	0.9864 (2.61)*	0.9999 (3.07)*	1.0542 (5.91)*
$\Delta \ln k_{t-1}$	-0.6572 (-3.58)*	-0.6494 (-6.14)*	0.9649 (3.98)*
$\Delta \ln y_{t-1}$	0.4679 (2.80)*	0.4671 (3.01)*	-
1971-2004 *Mean SSGR*	2.1276%	2.1276%	1.318%
$\bar{R}^2$	0.30602	0.33975	0.61679
Sargan's χ^2	1.0756 [0.783]	1.1316 [.889]	5.8359 [.323]
SEE	0.02839	0.02769	0.02408
$\chi^2(sc)$	.74991 [.387]	0.59447 [.441]	1.0768 [.299]
$\chi^2(n)$	1.3542 [.058]	1.4374 [.487]	.31429 [.855]

Notes: Absolute *t*-ratios (White-adjusted) are in the parentheses below the coefficients; 5% and 10% significance are denoted with * and ** respectively; *p*-values are in the square brackets for the χ^2 tests.

The Dreher index for Singapore is the highest in our sample. The mean value of *GLO* for Singapore is 70.7 compared to a lower mean of 54.7 for Malaysia and the minimum of 30.2 for India. It is noteworthy that the estimates of the share of profits (α) in equations (I) and (II) are close to their stylized value of one third in the growth accounting exercises. All other coefficients are significant.

Estimates for Malaysia are similar to Singapore in that while all other coefficients are significant, both g_1 and g_2 were insignificant. This estimate is not shown to conserve space. Estimates for Malaysia with the constraint that $g_1 = 0$ are in equation (III) and these are similar to (II) for Singapore but with a smaller value of g_2. The share of profits (α) for Malaysia is marginally lower than Singapore but not significantly different from the stylized value of one third.

Compared to the estimates for the other countries, which will be reported shortly, estimates for these two neighboring countries are well determined and robust. Further, the Sargan χ^2 is insignificant at the 5% level and validates our choice of instrumental variable. The test statistic for cointegration viz., the t-ratios of the adjustment coefficients (λ) in (II) and (III) are more than the Ericsson-McKinnon critical vale at the 5% level and reject the null of no cointegration.[12] Therefore, we shall use these results in the first instance to examine the differences in the contribution of *GLO* to *SSGR*s of Singapore and Malaysia. Some estimates of the relevant average values for different sample periods for the 5 countries are in Table 4. As stated earlier the average *GLO* for Singapore and Malaysia during 1970-2004 are, respectively, 70.7 and 54.7. The mean estimated value of *SSGR* for Singapore is 2.5% compared to 1.3% for Malaysia. Therefore, our results support the view that countries with higher globalization levels permanently grow faster. Within Singapore itself the level of globalization is different at the beginning and end of the sample period. During 1971-1975 the mean values of *GLO* and *SSGR* are, respectively, 58.9 and 1.8%. During 200-2004 the corresponding values are 83.0 and 2.5%. Thus a 34% increase in globalization seems to have increased Singapore's *SSGR* by 35%. For Malaysia the corresponding increases are about 53% each. In comparison, the actual average rate

[12] Details about this test.

of growth of per worker output in both countries has declined between these two periods implying that five year average growth rates of many panel data studies are not good for proxying the long run and steady state rates of growth.[13] Singapore being an advanced country, its actual rate of growth of output is now close to its *SSGR*, but Malaysia seems to be growing at slightly above its *SSGR*.

4.2 Other Asian Countries

In comparison to the estimates for Singapore and Malaysia, estimates for Thailand, India and the Philippines showed that the point estimates of the share of profits (α) are higher ranging from 0.48 for Thailand to 0.64 for the Philippines. However, the Wald test showed that these are not significantly more than one third at the 5% but not at the 10% level. The estimates for these 3 countries which have lower levels of globalization are in Table 3.

2.2.1 Thailand

In the initial estimates (not reported to conserve space), without constraining that $g_1 = 0$, the estimate of g_1 was 0.009 and significant only at the 15% level. Therefore, this equation is re-estimated with the constraint that $g_1 = 0$ and the results are in equation (IV) of Table 3. All the other coefficients are significant and the residuals are free from serial correlation and normally distributed. The Sargan χ^2 is insignificant at 5% level and validates our choice of instrumental variable. The Ericsson-McKinnon test rejects the null of no cointegration. However, the point estimate of profit share is high at 0.47 but the Wald test showed that at the 5% level it is not significantly different from one third. It was also necessary to include a dummy variable (*FCDUM*) for the effects of the 1998 financial crisis which seem to have had a large adverse effects on the economy. Consequently Thailand's rate of growth of output decreased by a large magnitude of 11.7% in 1998 but recovered quickly. The average level of globalization and *SSGR* for the entire sample period are, respectively 37.35 and 1%, and these are not unexpected values

[13] The average rates of growth of output per worker for Singapore are 5.6% (1971-1974) and 2.5% (2000-2004). The corresponding rates for Malaysia are 6.6% and 2% respectively.

because globalization in Thailand has been much less than in Singapore and Malaysia. However, towards the end of our sample period, i.e., by 200-2004, the average globalization level and *SSGR* have increased to 56.37 and 1.5% respectively.

4.2.2 India[14]

Estimates for India are similar to Thailand and g_1 was insignificant. Estimates with the constraint that $g_1 = 0$ are in equation (V) of Table 3. All the estimated coefficients are significant and the residuals are free from serial correlation and non-normality. The Sargan χ^2 is insignificant at 5% level and validates the choice of the instrumental variables. The Ericsson-McKinnon test rejected the null of no cointegration. It was necessary to introduce a dummy variable (*DUM79*) to capture the negative effects of the emergency imposed by the then Prime Minister Indira Gandhi and the severe effects of drought. These factors seem to have decreased output growth by 9% in 1979. The estimated share of profits is 0.43 but not significantly different from the stylized value of one third. India's globalization index is the lowest in our sample with an average of 34.2 and its average *SSGR* is 1.1%. However, policies for globalization started from the late 1990s. By the end of the sample period 2000-2004 the average level of globalization and *SSGR* have increased to 47.35 and 1.6% respectively.

[14] Estimates for India are for the period 1974-2003.

TABLE-3
Thailand, India and Philippines
NL2SLS-IV Estimates, 1974-2004

	I (THA)	II (IND)	III (PHI)
Intercept	5.0986 (6.43)*	-2.9679 (-15.95)*	3.1018 (3.73)*
λ	-0.4915 (5.47)*	-1.2255 (6.24)*	-0.3326 (2.05)*
g_2	0.2604E^{-3} (3.76)*	0.3344E^{-3} (9.75)*	0.6486E^{-4} (1.72)**
α	0.4662 (6.59)	0.4333 (10.61)*	0.63886 (9.11)*
$\Delta \ln k_t$	1.5275 (6.72)*	2.2355 (3.01)*	1.9442 (3.05)*
$\Delta \ln k_{t-1}$		2.4320 (2.68)*	1.4325 (2.28)*
ΔGLO_t	0.0102 (1.91)**	0.0223 (2.68)*	
$FCDUM$	-0.1050 (-6.97)*	----	----
$DUM79$	----	-0.0960 (-4.38)*	----
$FCPHI$	----	----	-0.0288 (-4.17)*
$\Delta \ln y_{t-1}$	----	----	0.19984 (1.66)
1971-2004 *Mean SSGR*	0.9722%	1.1395%#	0.2442%
$\bar{R}^2$	0.63253	0.51691	0.71899
Sargan's χ^2	2.0869 [0.720]	3.4275 [.489]	0.014140 [.993]
SEE	0.0255	0.0204	0.0196
$\chi^2(sc)$	0.50124 [0.479]	0.52140 [0.470]	0.81749 [0.366]
$\chi^2(n)$	2.3199 [0.314]	0.25414 [0.881]	0.33634 [0.845]

Notes: Absolute *t*-ratios (White-adjusted) are in the parentheses below the coefficients; 5% and 10% significance are denoted with * and ** respectively; *p*-values are in the square brackets for the χ^2 tests. # SSGR for India is estimated for the period 1970 to2003.

4.2.3 The Philippines

In the estimates for the Philippines g_1 is also found to be insignificant and the estimates with the constraint that $g_1 = 0$ are in equation (VI) of Table 3. All the coefficients are significant and the residuals show no serial correlation and non-normality. The Sargan χ^2 is insignificant at 5% level and validates the choice of instrumental variable. It is somewhat disappointing to note that the Ericsson-McKinnon test could not reject the null of no cointegration.[15] The share of profits is high at 0.64 but not significantly different from one third at the 5% but not at the 10% level. Further, it was necessary to take into account not only the negative growth effects of the East Asian financial crisis in 1997-1998 but also the negative effects of political instability during 1984-1985 and 1991-1992. The dummy variable (*FCPHI*), therefore, is unity during these three periods and zero in all other periods. Their combined effect is a decline in the rate of growth of per worker income of about 3%.

Globalization in the Philippines was low with an average value of 37.65 and consequently its average *SSGR* is less than 1% at 0.2%. Towards the end of the sample period in 2000-2004 their average values, respectively, are 53.58 and 0.35%. Thus the *SSGR* of this country is the lowest of all and its Dreher globalization index and our estimates may need further attention.

4.2.4 Some Comparisons

Panel data studies are often criticised because they generally assume that the effects of growth enhancing variables are the same irrespective of considerable differences in the structure of

[15] It may be argued that there is no need for the cointegration tests in the *GETS* because all the variables are I(0) in the specification. Therefore, the classical methods of estimation are valid and there is no need to estimate *GETS* specifications with the time series methods; see Rao, Singh and Kumar (2008). However, since these are methodological views, Ericsson and McKinnon (2000) have developed cointegration tests to make GETS consistent with the cointegration approach.

countries in the sample. For example they imply that R & D expenditure will have equal growth effects in the USA and Kiribati. In spite of these limitations, panel data methods are justified on the grounds that many growth enhancing variables do not show much variance in country specific time series data. Thus there seems to be a trade off between the objectives of panel data studies and country specific studies. To get some perspective on the differences in the growth effects of globalization we have tabulated in Table 4 the average values of *GLO* and *SSGR*s for two sub-periods for the 5 countries in our sample.

It can be seen from this table that in general higher levels of globalization leads to higher *SSGR* both within a country and across the countries. In the entire sample period Singapore's *SSGR* at 2.14% is higher than India's *SSGR* of 1.1% because globalization in Singapore has been twice that of India. However, increases in globalization seem to have different effects which may be due the differences in the structure of these economies. A 10 points increase in the index of globalization has the highest effect on *SSGR* of 0.36% in India compared to only 0.07% in the Philippines. Further, in all the countries in our study the permanent effects of globalization on the rate of growth of per worker output i.e., *SSGR* is smaller in comparison to the estimates in the panel data studies with 5 year panels. In Dreher, with his comprehensive measure of globalization (see his Table 4 and column 5), a one point increase in globalization leads to 7% increase in the rate of growth of per capita output. Our highest estimate for this effect is 3% for India with an average of 2.37% for all the five countries.

Table-4

Comparisons of the Effects of Globalization

	SGP		**MAL**		**THA**		**IND**		**PHI**	
	GLO	***SSGR***	***GLO***	***SSGR***	***GLO***	***SSGR***	***GLO***	***SSGR***	***GLO***	***SSGR***
1971-2004	71.12	2.14%	55.13	1.33%	37.35	1.00%	34.2	1.1%	37.65	0.20%
1971-1975	58.92	1.77%	41.39	1.00%	**23.75**	**0.60%**	24.82	0.80%	24.71	0.16%
2000-2004	83.04	2.50%	70.37	1.70%	56.37	1.50%	47.35	1.60%	53.58	0.35%
		0.6		0.7		0.9		0.8		0.19
	Effect of a 10 point increase of *GLO* on *SSGR*									
		0.30%		0.24%		0.28%		0.36%		0.07%

5. Summary and Conclusions

In this paper, firstly, we have used a comprehensive measure of globalization of Dreher and extended the Solow growth model to derive the estimates of *SSGR*s for five Asian countries with different levels of globalization. Our empirical results, with the country specific time series data, showed that countries with higher globalization policies have also higher *SSGR*s. In this process we have argued that what can be at best estimated with annual data or even with short panels is a production function not a growth equation. If this is accepted it will increase the degrees of freedom and efficiency in the panel data estimation methods by increasing their time series dimension.

Secondly, our results indicate that the permanent growth effects of globalization do not seem to be uniform across all the countries. Therefore, the assumption in the panel data methods that these effects are uniform across all the countries needs attention. We found that globalization had the highest effect in India and the lowest in the Philippines. While India's *SSGR* can be permanently increased by 0.36 percentage points if its globalization index can be increased by 10 points, the corresponding increase for the Philippines is only 0.07 percentage points.

Thirdly, because of specification errors in the panel data estimates they are likely to overestimate the permanent growth effects of globalization, and similar growth enhancing variables, considerably. Our results showed that the permanent growth effects of improving globalization by one point is at best only 3 percentage points increase compared to the 7% estimate of Dreher.

Finally, although our sample consists of only 5 countries, for the purpose of estimating the growth effects of globalization, these countries can be classified into three groups viz., countries where the growth effects of globalization are highest, and close, as in Singapore and India, modest as in Malaysia and Thailand and lowest as in the Philippines. This may be useful for those working with the panel data methodology.

Nevertheless, there are some limitations in our findings. Firstly, our sample size is small and we have used data only for about 35 years. Estimates for more countries and longer time spans may reveal both the advantages and limitations of our methodology. Secondly, we did not estimate the effects of globalization using Dreher's alternative measures. Similarly, it would be useful to estimate the cointegrating equations with some alternative methods. In spite of these limitations we hope that this paper and our methodology will encourage others to improve methods of estimating the growth effects of globalization and other variables.

Data Appendix

Indicator	Source
Y is the real GDP at constant 1990 prices (in millions and national currency)	Data are from the UN National accounts database.
L is labour force or population in the working age group (15-64), whichever is available	Data obtained from the World Development Indicator CD-ROM 2002 and new WDI online. URL:http:/ / www.worldbank.org/ data/ onlinedatabases/ onlinedatabases.html
K is real capital stock estimated with the perpetual inventory method with the assumption that the depreciation rate is 4%. The initial capital stock is assumed to be 1.5 times the real GDP in 1969 (in million national currency).	Investment data includes total investment on ?xed capital from the national accounts. Data are from the UN National accounts database.
DUMFC is a dummy variable to capture the effects of the East Asian financial crisis during 1997-98. It is one in 1997 and 1998 and zero in all other periods.	Own estimates
DUM79 is one in 1979 and zero in all other periods to capture the adverse economic effects of emergency rule in India	Own estimates
FCPHI is a dummy variable which is one in 1997, 1998 (East Asian Financial Crisis), 1984 to 1985 (end of Marco's regime) and 1991 to1992 (political uncertainty due to power struggles and three leadership changes).This dummy captures the effects of Asian Financial crisis and political instability in the Philippines.	Own estimates

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References

Alesina, A., Grilli, V., and Milesi, G. (1994): "The Political Economy of Capital Controls"; in Leiderma, L. and Razin, A. (eds.), *Capital Mobility: The Impact on Consumption, Investment and Growth*. Cambridge, New York and Melbourne: Cambridge University Press, pages 289-321.

Arteta, C., Eichengreen, C., and Wyplosz, C. (2001): "On the Growth Effects of Capital Account Liberalization", *manuscript*, University of California, Berkeley, CA.

Baldwin R.E., Sbergami, F., (2000): "Non-linearity in Openness and Growth Links: Theory and Evidence," Working Paper of the Graduate Institute of International Studies, Geneva.

Baldwin, R. E. (2004): "Openness and growth: what's the empirical relationship," in Baldwin, R. E. and Winters, L. A. (eds.) *Challenges to Globalisation: Analysing the Economics*, Chicago: University of Chicago Press for National Bureau of Economic Research.

Baldwin, R. E. (2003): Openness and Growth: What's the Empirical Relationship? NBER Working Paper 9578. Cambridge MA.

Barro, R. and Lee, J. W. (1994): "Data Set for a Panel of 138 Countries," Harvard University, January.

Barro, R. and Sala-i-Martin, X. (1995): *Economic Growth* (New York: McGraw Hill).

Bekaert, G. and Harvey, C. R. (2000): "Foreign speculators and emerging equity markets," *Journal of Finance*, 55, 565-614.

Bekaert, G., Harvey, C. R. and Lundblad, C., (2002): Does Financial Liberalization Spur Growth? mimeo, Columbia University.

Ben-David, D. (1993): "Equalizing exchange: trade liberalization and income convergence," *Quarterly Journal of Economics,* 108(3): 653-679.

Blinder, A. (2006): "Off shoring: The Next Industrial Revolution?" Foreign Affairs, March/ April 2006.

Breitung, J. (2006): "A parametric approach to the estimation of cointegration vectors in panel data," *Econometric Reviews*, 24, 151–173.

Brunner, A. D., (2003): "The Long-Run Effects of Trade on Income and Income Growth," IMF Working Paper 03/ 37 (Washington: International Monetary Fund).

Demirgüç-Kunt, A. and Levine, R. (2008): "Finance, Financial Sector Policies and Long-Run Growth," Policy Research Working Paper No. 4469, (Washington: the World Bank).

Burnside, C., and Dollar, D. (2000): "Aid, policies, and growth," *American Economic Review,* 90(4), 847-868

Chanda, A. (2005): "The Influence of Capital Controls on Long Run Growth," *Journal of Development Economics,* 77, 441– 466.

Clemens, Michael A., and Williamson, J. (2004): Why Did the Tariff-Growth Correlation Reverse after 1950? *Journal of Economic Growth*, 9(1), 5-46.

Dean, J., Desai, S. and Riedel, J. (1994): "Trade policy reform in developing countries since 1985: a review of the evidence," World Bank Development Policy Group, mimeo.

Dollar, D. (1992): "Outward-oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976-1985," *Economic Development and Cultural Change*, 40(3), 523-544.

Dollar, D. and Kraay, A. (2003): "Institutions, Trade, and Growth," *Journal of Monetary Economics*, 50, 133-62.

Dollar, D., and Kraay, A. (2004): "Trade, growth and poverty," *Economic Journal,* 114(493): F22–F49.

Dreher, A. (2006): "Does Globalization Affect Growth? Evidence from a new Index of Globalization," *Applied Economics*, 38(10), 1091-1110.

Easterly, W., Kremer, M., Pritchett, L.. and Summers, L. H. (1993): "Good Policy or Good Luck? Country Growth Performance and Temporary Shocks," *Journal of Monetary Economics*, 32, 459-83.

Easterly, W., Levine, R., and Rodman, D. (2004): "Aid, Policies and Growth: Comment," *American Economic Review*, 94(3), 774–80.

Edison, H. J, Levine, R., Ricci, L., and Slok, T. (2002): "International Financial Integration and Economic Growth," *Journal of International Money and Finance* 21: 749-76.

Edison, H., M. Klein, L. R., and Slok, T. (2004): "Capital Account Liberalization and Economic Performance: Survey and Synthesis," *IFM Staff Papers*, 51(2), 220-256,

Edwards, S. (1998): "Openness, Productivity and Growth: What Do We Really Know?" *Economic Journal*, 108(447), 383-98.

Edwards, S. (2001): "Capital Mobility and Economic Performance: Are Emerging Economies Different?" *NBER Working Paper* 8076, Cambridge, MA.

Ericsson, N., and MacKinnon, J. (2002): "Distributions of error correction tests for cointegration," *Econometrics Journal,* 5: 285-318.

Frankel, J., and Romer, D. (1999): "Does trade cause growth?" *American Economic Review,* 89(3), 379-399.

Greenaway, D. and Milner, C. R. (1993): *Trade and Industrial Policy in Developing Countries,* London: Macmillan.

Greenaway, D., Morgan, W. and Wright, P. (1998): "Trade reform, adjustment and growth: What does the evidence tell us," *Economic Journal*, 108(450), 1547–1561.

Greiner, A., Semler, W. and Gong, G. (2004): *The Forces of Economic Growth: A Time Series Perspective,* Princeton, NJ: Princeton University Press.

Grilli, V. and G.M. Milesi-Ferreti (1995): "Economic Effects and Structural Determinants of Capital Controls," *IMF Staff Papers*, 42(3), 517-51.

Harrison, A. and Hanson, G. (1999): "Who gains from trade reform? Some remaining Puzzles," *Journal of Development Economics*, 59, 125–54.

Jones, C. (1995): "R&D-based models for economic growth," *Journal of Political Economy,* 103(4), 759-84.

Klein, M. and G. Olivei (1999): "Capital account liberalization, financial depth and economic growth," NBER Working Paper 7384.

Klein, M. W. (2003): "Capital Account Openness and the Varieties of Growth Experience," NBER Working Paper No. 9500.

Kohcerlakota , N., and Kei-Mu Yi. (1996): "A simple time series test of endogenous vs. exogenous growth models: An application to the United States," *Review of Economics and Statistics,* 78(1), 126-134.

Krugman, P. (2007): "Trade and Inequality, Revisited," available online at http:/ / www.voxeu.org/ index.php?q=node/ 261

Lane, P.R. and Milesi-Ferreti, G. M. (2002): Long term capital movements, in Bernanke, B. S. and Rogoff, K. (eds.) *NBER Macroeconomics Annual 2001*, Cambridge: MIT Press.

Leamer, E. (1983): "Let's take the con out of econometrics," *American Economic Review*, 73, 31-43.

Leamer, E. (1988): "Measures of Openness" , in R. Baldwin (Ed.), *Trade Policy and Empirical Analysis* (Chicago: Chicago University Press), 147-200.

Levine, R. and Renelt, D. (1992): "A Sensitivity Analysis of Cross-Country Growth Regressions," *American Economic Review*, 82(4), 942-63.

Mankiw, N. G., Romer, D., and Weil, D. N. (1992): "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics*, 107(2), 407-37.

Mark, N.C. and Sul, D. (2003): "Cointegration vector estimation by Panel DOLS and long-run money demand," *Oxford Bulletin of Economics and Statistics*, 65, 655-680.

Minier, J. (2005): "When is Trade Protection Good for Growth?" unpublished manuscript, University of Kentucky.

O'Donnell, B. (2001): "Financial Openness and Economic Performance", unpublished manuscript, Trinity College, Dublin, Ireland.

Parente, S., (2001): "The failure of endogenous growth," *Knowledge Technology and Policy,* 13, 49-58.

Pedroni, P. (1999): "Critical values for cointegration tests in heterogeneous panels with multiple regressors," *Oxford Bulletin of Economics and Statistics*, 61, 653-70.

Pedroni, P. (2004): "Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis," *Econometric Theory*, 20, 597-625.

Pritchett, L. (1996): "Measuring outward orientation in LDC's: can it be done?" *Journal of Development Economics*, 49(2), 307-335.

Quinn, D. (1997): "The Correlates of Change in International Financial Regulation," *AmericanPolitical Science Review*, 91(3), 531-51.

Rao, B. B., (2006): "Investment ratio and growth," *ICFAI Journal of Applied Economics,* 3, 68-72.

Rao, B. B. And Sing, R. (2007) "Effects of Trade Openness on the Steady State Growth Rates of Selected Asian Countries with an Extended Exogenous Growth Model," available at http://mpra.ub.uni-muenchen.de/5851/

Rao, B. B., Singh, R. And Kumar, S. (2008) "Do we need Time Seriesconometrics?" available at http://mpra.ub.uni-muenchen.de/6627/

Rodríguez, F. and Rodrik, D. (2000): Trade policy and economic growth: a skeptic´s guide to the cross-national evidence, in Ben Bernanke & Kenneth Rogoff (eds.) NBER Macroeconomics Annual 2000, pp. 261– 324. Cambridge, Mass.: MIT Press.

Rodrik, D. (1998): "Who Needs Capital-Account Convertibility?" in "Should the IMF Pursue Capital-Account Convertibility", *Essays in International Finance*, 207, Princeton University.

Romer, P. (1994): "New goods, old theory, and the welfare costs of trade restrictions," *Journal of Development Economics,* 43(1), 5-38.

Sachs, J.D. and Warner, A. M. (1995): "Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity*, 1-118.

Sato, R. (1963): "Fiscal policy in a neo-classical growth model: An analysis of time required for equilibrium adjustment," *Review of Economic Studies*, 30, 16-23.

Solow, R. (1956): "A contribution to the theory of economic growth," *Quarterly Journal of Economics* 70(1): 65-94.

Solow, R. (2000): "Toward a Macroeconomics of the Medium Run," *Journal of Economic Perspectives*, 14(1), 151-58.

Summers, L. (2006): Financial Times, October 29.

Stiglizts, J. (2003): "Globalization and growth in emerging markets and the New Economy," *Journal of Policy Modeling*, 25, 505–524.

Vamvakidis, A. (1998): "Regional Integration and Economic Growth," *World Bank Economic Review,* 12(2), 251–70.

Vamvakidis, A. (2002): "How Robust Is the Growth-Openness Connection? Historical Evidence," *Journal of Economic Growth,* 7(1), 57–80.

Warner, A, (2002): "Once More into the Breach: Economic Growth and Global Integration" (unpublished; Cambridge, Massachusetts: Harvard University).

Winters, A. (2004): " Trade liberalisation and economic performance: An overview", *Economic Journal,* 114(493): F4-F21.

Wolf, H. (1993): "Trade Orientation: Measurement and Consequences," *Estudios de Economia*, 20, 52-72.

World Bank (1993): *Report on Structural Adjustment Lending III,* Washington DC: World Bank.