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Can Asia Sustain an Export-Led Growth Strategy in the Aftermath of the Global Crisis? An Empirical Exploration

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Abstract

Many developing countries have attempted to pursue the East Asian "growth model" in recent decades. This model is widely perceived to have been based on export-led growth. Given that developed countries are likely to grow at a slower rate and be less willing to run trade deficits in the post financial crisis world, can this growth model be sustained? Using panel data for Asian countries, this paper contributes to addressing this question by distinguishing between different kinds of export- and tradable-led growth in order to more precisely identify the nature of growth in the pre-crisis decades. We find in particular that, among our variables of interest, the proportion of a country's manufactured exports that is destined for industrialized countries is the one most robustly associated with output growth. The results have implications for continued post-crisis growth in Asian developing countries.

JEL classification: F43, O11, O53

Key words: Export-led growth, tradable-led growth, global imbalances, industrialization, capital accumulation.

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1 Introduction and Background

Growth is perhaps the foremost goal of policy makers across the world. In pursuing this objective, strategies have varied across countries, and within countries, across time. One such strategy, that of export-led growth, has been most directly associated with East Asian countries in recent decades. While, as we will see shortly, the term export-led growth could have more than one interpretation, the common thread uniting these is the hypothesis that either exports or *net* exports (i.e., trade surpluses) drive growth.

The original larger East Asian tigers, i.e., South Korea and Taiwan are widely believed to have pursued import-substitution policies in the earlier phases of their rapid growth experience (in the 1950s and 60s), followed by export promotion beginning in the latter half of the 60s.[1] Indeed, the pursuit of export promotion rather than import substitution, is what, according to numerous scholars, has distinguished the East Asian export performance from that of other less successful developing countries.[2] This model of export-led growth in recent years appears to have become a desirable template for many developing countries across the globe. In particular, relatively rapid growth along with current account surpluses in developing countries, especially those in the Asian region, following the Asian financial crisis of 1997-98 and the global recession in 2001 generated considerable interest in the potential of export-led growth. Figure 1 illustrates the weighted current account as a percentage of GDP for the 19 developed countries in our sample below (see Section 3 and Table 2 for details of the sample).[3] Unprecedented growth in China along with its accumulation of record amounts of foreign exchange reserves have only served to confirm the perceived efficacy of such a growth strategy.

Critics, however, have pointed out that the existence of a fallacy of composition or adding-up constraint undermines the sustainability and/or universal applicability of such a strategy. For one country to export more, at least one other country has to import more. A simultaneous pursuit of export-led growth by all developing countries, especially if concentrated in a similar range of manufactured products, could only be successful if demand from developed countries grows at a correspondingly rapid pace, and/or if the terms of trade move against the growing countries, thus increasing competitiveness in an imperfect substitutes framework.[4] Moreover, if the aim is to achieve growth in *net* exports,

[1] See, for example, Weiss [2005].

[2] See, for example, Bhagwati [1990].

[3] The current account to GDP (CA-GDP) ratio was obtained for the period 1999-2009 from the United Nations Conference on Trade and Development (UNCTAD) *COMTRADE* database for 2010 and from the Organization for Economic Cooperation and Development (OECD) *SourceOECD* database for 2010. The annual weights assigned to each developed country for calculating the annual weighted CA-GDP ratio were based on the share of total manufactured exports to developed countries from the 44 Asian countries in our sample that went to that particular country that year. In other words, we weigh the industrialized countries according to their importance as an export destination for Asian countries.

[4] Barring the unlikely case where developing country products are perfect substitutes for developed country products, or where there is complete pass-through of exchange rate changes into developing country export prices when measured in domestic currency terms, a devalua-

then such a strategy requires that developed countries run corresponding trade deficits, which may beyond some point become unsustainable. Thus the strategy of export-led growth, when universally followed by developing countries, is likely to yield diminishing returns.

The recent global financial crisis has served to highlight the adding up constraint. For this constraint becomes even more relevant if, as widely expected, developed countries grow at a slower pace or are less willing to run trade deficits following the recent global financial crisis. Put differently, shrinking global imbalances in the near future may make it much harder, if not impossible, for a large group of developing countries to pursue growth based on exporting to developed countries. Indeed, another look at Figure 1 indicates that current account imbalances, have begun to shrink since the onset of global economic difficulties in 2007. Others, such as Rodrik [2009], have noted, however, that Asian growth successes were based on broader tradable sector growth rather than solely on exports. Before we can evaluate prospects for the future, therefore, it would be helpful to evaluate the past. In particular, we need to clarify terms such as "export-led growth" and "tradable-led growth."

The term "export-led growth" has traditionally been understood in a Keynesian framework, whereby positive net exports or trade surpluses generate a source of demand for domestic output, and hence cause output growth. It is in this sense that the idea of an adding-up constraint makes sense. A logical corollary is that slower growth of demand and greater reluctance to run trade deficits in developed countries will make it harder for developing countries to pursue this kind of a growth strategy. We will call this strategy the net export-led growth strategy, or NEXLG strategy. A related strand in the Post Keynesian tradition, originating with Thirlwall [1979], points to the role of the balance of payments constraint in constraining output growth. Thus, while trade is assumed to be balanced in the long run, exports play the crucial role of facilitating growth by relaxing the balance of payments constraint. Relaxation of this constraint, in turn, facilitates imports of the investment and intermediate goods required for output growth. To the extent that trade surpluses or limited trade deficits must *precede* growth, the implications are similar to those underlying the NEXLG strategy.

As discussed in the next section, a more recent strand of literature, inspired in large part by Melitz [2003], has emphasized the role of exports as harbingers of productivity growth. The hypothesis is that greater international competition, international knowledge spillovers, economies of scale, and other relevant externalities make exports a vehicle for technological change and, hence, economic growth. What makes exports special in this case is not any external account-related consideration but rather the presence of externalities associated with the process of exporting. Thus the emphasis shifts to supply-side factors. Since the kinds of externalities discussed above are generally associated with manufactured exports, we refer to this hypothesis as the manufactured

tion will translate into a deterioration in the terms of trade. In logical terms, the simultaneous pursuit of export-led growth by a number of small developing countries becomes analogous to the large country case.

export-led growth strategy or the MEXLG strategy.

Another distinct hypothesis is that of what we call tradable sector-led growth or TSLG. Rodrik [2008], for example, argues that the tradable sector, which in developing countries is associated mainly with manufactures, is typically afflicted with market failures and institutional weaknesses to a greater extent, leading these countries to devote a sub-optimal proportion of their resources to this sector. Second-best policies to subsidize tradable production, therefore, could promote growth.

Finally, a consideration that has received much less attention is the possibility that all exports may not be created equal. Insofar as knowledge spillovers, technology transfer, and adoption of new management techniques are more likely to result from manufactured exports to developed countries, growth may also potentially be a function of the proportion of a country's manufactured exports destined for industrialized country markets. Developed country firms, may in addition, pursue vertical foreign direct investment in low labor cost developing countries in order to use them as platforms for relatively sophisticated exports to industrialized countries, facilitating technology transfer and productivity growth in the process . We refer to this as the industrialized country-centered export-led growth strategy, or IEXLG.

The four growth strategies listed above have different implications for the post-crisis prospects for developing countries. In particular, the degree to which a global environment in which trade imbalances shrink could hamper a continuation of pre-crisis growth strategies depends on the nature of these strategies. Table 1 lays out a schematic summary of these implications. The NEXLG strategy will face greater adding-up constraints in a post-crisis world if global growth is slower, and if developed countries experience smaller trade deficits. The MEXLG and TSLG strategies, by contrast, may not face that constraint since external imbalances are not a factor. Thus, the distinction between NEXLG on the one hand and TSLG and MEXLG on the other becomes an interesting issue. Succinctly put, developing Asia can continue to pursue TSLG but not NEXLG in a world with zero global imbalances. Moreover, the distinction between NEXLG and TSLG renders the composition of demand for domestic tradables important. For example, if there is something special about exports, then lowering wages may help the pursuit of the MEXLG strategy by freeing up domestic tradables for export. If, on the other hand, it is the entire tradable/industrial sector that is special, then lowering wages would simply shift the composition of demand from domestic to foreign sources, or, in the event that foreign demand does not displace domestic demand, may even hamper growth by lowering demand for domestically produced tradables.[5] Finally, the fact that it is the *industrialized* countries that are expected to shrink their overall trade deficits in the post-crisis world has an interesting implication for the post-crisis world. Since positive net exports provide a boost to demand regardless of destination, at least some countries could continue pursuing NEXLG

[5] This could happen, for example, if the propensity to save out of profits is higher than that out of wages, as is often assumed in the Kaleckian framework.

by substituting trade surpluses with other developing countries for those with developed countries. However, if the destination matters, say because exports to developed countries bring with them more knowledge spillovers and technological improvements to meet higher product standards, then lower export growth to these countries will hamper continuation of pre-crisis growth.

Continuing along a similar vein, a region that has pursued MEXLG will not be affected in a post-crisis world characterized by zero imbalances if that state is arrived at through higher imports into that region, but it will be negatively affected if that state is achieved via reduced exports to the rest of the world. To take another example, a region will be affected negatively by slower developed country growth in a post crisis world if that region pursued IEXLG, but not necessarily if it pursued MEXLG and can replace exports to industrialized countries with those to other developing countries.

This paper empirically investigates the future of pre-crisis growth strategies by attempting to identify the nature of those strategies. Specifically, we try to econometrically distinguish between NEXLG, MEXLG, IEXLG, and TSLG using panel data for pre-crisis years. Given that export-led growth among non-commodity exporters is mainly associated with Asian countries in general, and East/South East Asian ones in particular, we focus on these countries.

We contribute to the existing literature on export-led growth and global rebalancing by distinguishing between these four growth strategies, identifying historically the most relevant ones for Asia, and thereby drawing conclusions for the future. Most interestingly, perhaps, we find that the proportion of an Asian developing country's exports that are destined for industrialized countries has a statistically robust positive effect on output growth, and that this positive effect may work through investment and imports of capital goods. This variable, to our knowledge, has not received much attention in existing literature as a determinant of growth.

Section 2 provides an overview of the main issues and related literature. The next two sections develop the empirical strategy and present the econometric estimates. Section 5 concludes.

2 Literature Review

The recent international financial crisis has served as a big shock to the global trade and financial architecture. As illustrated by Figure 2, Asian countries in particular had enjoyed rapid growth and trade surpluses in the years leading to the crisis. Due to the unbalanced nature of our panel, we display the means of our variables of interest.[6] The figure highlights the trade surpluses that accompanied growth following the Asian crisis of the late nineties. Also interesting is the upward evolution, since the late seventies, of manufactured exports as a proportion of GDP and that of the proportion of manufactured exports destined for industrialized countries. The size of the industrial sector

[6] More details about the composition of our sample follow in Section 3.

as a proportion of GDP has, on the other hand, stayed more or less the same since the mid-eighties.

The rapid growth in the years leading up to 2007 was widely perceived as having been based on surging exports. Especially impressive in this regard has been the sustained growth in China over the last three decades which has existed alongside huge current account surpluses in recent years. The logical corollary is that, given that developed countries are likely to grow at a slower pace following the crisis, and that countries with big deficits will increasingly resort to direct or indirect protectionist measures, the pre-crisis model of growth based on exporting manufactures to developed countries may have outlived its utility.[7]

Discussion of the sustainability of the growth model cannot be separated from that of the nature of the growth model. Traditionally export-led growth has been interpreted to mean trade surplus- or net export-led growth. Net exports serve as a source of demand for domestic output, and hence, in a demand-led growth framework, as a source of growth. The origins of the idea can of course be traced back to mercantilist literature from the pre-industrial revolution era. In its more modern form, it is most closely associated with the Keynesian framework of demand-led growth.

Export-led growth based on trade surpluses is subject to the fallacy of composition or adding up critique that becomes particularly relevant in the post-crisis world where a shortage of international demand originating from developed countries is likely. Such a constraint could either show up in the form of the crowding out of some countries' exports by other countries, or, relatedly, in the shape of deteriorating terms of trade for developing country exporters. Evidence on the existence of a fallacy of composition has thus far been suggestive although not conclusive. For example, based on panel data estimates for 22 major developing country exporters of manufacturers, Razmi [2007] finds the presence of significant demand-side constraints on export growth. Furthermore, the estimates suggest that rapid Chinese export growth has had a significant impact in this regard. Eichengreen et al. [2007] confirm the tendency for China's exports to crowd out those of other Asian countries but find a difference in the impact of China on low income versus middle and high income Asian countries. This is because the effect is felt mainly in markets for consumer goods which are exported by lower income Asian countries. China's simultaneous tendency to absorb large volumes of capital good imports from its Asian neighbors, on the other hand, has benefited the more advanced Asian economies.

A different basis for export-led growth was offered by a strand of literature following Feder [1983]. This literature has developed the theoretical underpinnings for the inclusion of exports as an explanatory variable in a traditional growth framework with a production function. In Feder's two sector model, the output of the non-export sector depends not only on the factors of production (labor and capital) but also on exports. This captures the externality associated with factors unique to exports such as higher quality labor, internationally

[7] See, for example, the discussions in UNCTAD [2010] and Adams and Park [2009].

competitive management, etc. Moreover, the marginal product of factors in the export sector is greater than that in the non-export sector. Thus, exports, from this perspective, can potentially influence productivity and growth independently of their impact on the external balance.

More recently, several studies following Melitz [2003], have analyzed the relationship between firm heterogeneity, trade, and exports at a more micro level. A relevant empirical finding is that exporting firms tend, on average, to be larger and more productive. This suggests either that more productive firms self-select into export markets (due to extra costs imposed by the process of exporting), and/or that firms that export become more productive. The latter may happen due to several reasons such as economies of scale, dynamic learning, technological spillovers, and competitive pressures. Pack [2001], for example, notes that international competition allowed purchasers abroad to exert heavy pressure on East Asian exporters, producing under contract, to cut costs and increase efficiency. Exporting firms may have easier access to new technologies thanks to their international links. Moreover, exporting firms may receive technical guidance on how to meet higher quality standards from their clients in importing countries. Easier transfer of managerial skills may also be a factor. While empirical evidence for self-selection tends to be quite robust, that for learning-by-exporting appears to be significant only for developing countries. This is not surprising since these countries tend to be farther away from the technological frontier, and hence have greater scope for learning.

Other recent studies too have pointed to the potentially special nature of exports. For example, Cypher and Dietz [2008] provide a discussion of the domestic technological learning capacity that arises from exporting manufactures. In an econometric study of nine African countries, Van Biesebroeck [2005] finds evidence that manufactured exports facilitate productivity growth. The study shows that the presence of scale economies plays an important role in this regard. Credit constraints and contract enforcement issues prevent firms that only produce for the domestic market from fully exploiting this channel. These problems are likely to be more relevant for developing countries, as are the potential gains from imitation.[8]

The special nature of the tradable sector, which in developing countries consists mainly of the manufacturing and agriculture sectors, need not be limited to exports, however. Rodrik [2008] presents an AK-type model of endogenous

[8] De Loecker [2007] finds in an empirical study of the Slovenian manufacturing sector that export entrants become more productive once they start exporting. In a study of British manufacturing firms, Greenaway and Kneller [2007] find that exporting firms experience productivity growth relative to non-exporters. Moreover, the magnitude of divergence across industries appears to be driven by differences in the scope for learning. The export effect is greater, for example, if the distance to the technological frontier is large. Thus, the export effect should generally be larger for low income countries. Among other recent studies, see also Hiep and Ohta [2009] for the case of Vietnamese manufacturing firms, Mahadevan [2007] for Malaysia, and Ogunleye and Ayeni [2008] for Nigeria, and Park et al. [2009] for China. Wagner [2007], Pedro and Yang [2009], and Silva et al. [2010] present comprehensive surveys of studies of the learning-by-exporting channel. Lall [1998] and Lall [2000] provide insightful discussions of the manufacturing export-development nexus in developing countries from a more macro perspective.

growth in which the *tradable* sector is special in the sense that it is characterized to a greater degrees by institutional weaknesses and market failures (information and coordination externalities), leading to a bias against this sector in the allocation of resources. Second-best policies to subsidize tradable production, therefore, could promote growth.[9]

In a recent contribution that perhaps comes closest to the spirit of our paper, Rodrik [2009] tests the tradable-led and the export-led growth hypotheses by running a horse race between the industrial share of GDP (used as a proxy for the size of the tradable sector) and the exports to GDP ratio on the one hand and the former and trade surpluses as a proportion of GDP on the other. The panel data consists of both developed and developing countries. The paper finds evidence that the industrial share of GDP matters more, especially for developing countries. However, since it is *manufactured* exports that are more likely to be the source of learning and knowledge spillovers, the manufactured exports to GDP ratio seems to be the more relevant variable, and this is the variable that we employ in our analysis.

Finally, we end this section with a brief look at another issue that is directly relevant to post-crisis prospects for developing countries. Some literature has suggested that the emerging economies in Asia and elsewhere have "decoupled" from the developed world, and are, therefore, immune to slower growth in the latter. Noting the growth in South-South trade, Canuto et al. [2010], discuss the possible evolution of a new version of export-led growth, in which South-South trade picks up the slack through middle income countries importing more from low-income ones. The authors term this scenario "export-led growth v2.0." This, however, raises a new set of questions. Since it is the developed countries that are expected to limit their trade deficits in the post-crisis years, is there anything *special* about exporting to these countries? In other words, is learning-by-exporting more significant in the case of exports to developed countries, perhaps due to the presence of more stringent product quality expectations, a greater proportion of more sophisticated manufactured products in the basket, more technical guidance from client firms, or other factors? Indeed, existing literature does provide some supportive evidence in this regard. For example, Pack [2001] notes that export-oriented production encouraged East Asian countries to move toward more sophisticated technology to meet the complex contractual requirements from Western industrial countries. De Loecker [2007] finds that productivity gains from exporting are greater for firms exporting to high income countries.[10] If this is the case, a (post-crisis) Export-Led Growth v2.0, which involves other developing countries replacing developed countries as export destinations, may not be a good substitute for (pre-crisis) Export-Led Growth v1.0.

We probe these issues empirically in the next section.

[9] See also Razmi et al. [2011] for a model of an economy that features tradable-led growth in an environment of underemployment of labor resources.

[10] See also Pedro and Yang [2009] and Silva et al. [2010].

3 Data and Econometric strategy

We begin with a baseline regression of the form:

$$\begin{aligned} GRGDPCHF_{jt} &= \alpha + \beta_0 \ln RGDPCH_{jt-1} + \sum_{i=0}^{2} \delta_i Industry\_Prop\_GDP_{jt-i} \\ &+ \sum_{i=0}^{2} \gamma_i Manuf\_X\_GDP_{jt-i} + \sum_{i=0}^{2} \lambda_i TB\_Prop\_GDP_{jt-i} \\ &+ \sum_{i=0}^{2} \pi_i Proportion\_X\_Developed_{jt-i} + f_t + f_j + \varepsilon_{jt} \quad (1) \end{aligned}$$

The dependent variable is the average annual rate of real (chained) GDP per capita growth, $RGDPCH_{it-1}$ (real GDP per capita in the previous period) captures the convergence term, f_t time specific effects, f_j country specific effects, while ε_{it} is the error term. Real GDP growth was obtained from the Penn World Tables version 7. The GDP share of industry is denoted by $Indus\_Prop\_GDP$. Following Rodrik [2009], among other studies, we use this as a proxy for the size of the tradable sector. The variable TB_Prop_GDP represents the trade balance as a proportion of GDP, and captures the effects of net exports on growth. Manufactured exports, i.e., exports of SITC categories 5, 6, 7, and 8, as a proportion of GDP is represented by the variable $Manuf\_X\_GDP$. Data for these four variables were obtained from the World Bank's *World Development Indicators (WDI)* online database. Finally, $Proportion\_X\_Developed$ is the proportion of manufactured exports destined for developed countries. Data for the construction of this variable were obtained from the United Nation's *COMTRADE* database.

Our sample consists of a maximum of 44 Asian developing countries, 20 industrialized countries, and the time period 1953-2009, although data are available for shorter intervals for some of the series. In order to remove short-run cyclical effects, we use data averaged over three year intervals.[11] Table 2 provides a data dictionary along with a list of the countries included in the sample. We pursue a general-to-specific estimation strategy, which is particularly useful given our limited sample size. In each case, we first estimate the most general form based on equation (1). The variables that are not significant at the 10 percent level are then eliminated in a step-wise manner.

Some of the variables in our sample could potentially be endogenous in the sense that these are jointly determined with the dependent variable. For example, the share of industry in the economy may not be exogenous to the GDP growth rate. Moreover, some of the variables are likely to exhibit hysteresis

[11] Ideally we would have liked to use 5 year periods but the sample size constrains our choice. The 3 year average for $GRGDPCH$, a variable in growth rate form, was calculated using the following formula:
$GRGDPCH = [(RGDPCH_t / RGDPCH_{t-1})\hat{}(1/3)] - 1$

or persistence over time. To address the robustness of our baseline OLS estimates to potential endogeneity/simultaneity issues, we therefore, carry out dynamic panel estimations using the Arellano-Bover General Method of Moments (GMM) approach. We specify the second and third lags of the dependent variable as instruments in addition to the third lags of $Indus\_Prop\_GDP$, TB_Prop_GDP , $Manuf\_X\_GDP$, and $Proportion\_X\_Developed$. Consistent with our OLS strategy, we specify time and cross-section effects, and pursue a more parsimonious specification based on eliminating variables that are not statistically significant. The Sargan test of overidentifying restrictions is employed to test the validity of our instruments.

It may be warranted here to re-visit the choice of our main variables of interest, as included in equation (1). Our focus is on exploring the nature of Asia's growth strategy. More specifically, whether Asian growth can be identified either as tradable-led or export-led (or both), and, if so, what implications does the past pattern of growth have for a future in which slower developed country growth translates into less global demand. The motivation behind the inclusion of a proxy for the tradable sector is obvious in light of the discussion in Section 1. If, as Rodrik [2009] argues, pre-crisis Asian growth was tradable-led, then subsidies for tradable production for domestic consumption may be good substitutes for global demand in terms of boosting growth. If, however, pre-crisis growth was export-led, then this may not be true and shrinking global imbalances and/or reduced global demand become more serious concerns. The trade balance as a proportion of GDP captures Keynesian demand-side *net* export-led growth stimulus. As discussed in Section 1, this is only one channel – and perhaps not the most important one at that – through which exports could facilitate growth, and exports, especially manufactured ones, could be special for other reasons. This provides the grounds for including manufactured exports as a proportion of GDP and the proportion of manufactured exports destined for developed countries as explanatory variables. If exports to industrialized countries feature the benefits and positive externalities associated with knowledge spillovers, competition, learning-by-exporting, and quality control to a greater degree, then more limited demand from these countries in the post-crisis environment could become a significant constraint on developing country growth.

Table 3 provides summary statistics for the variables of primary interest. Figure 3 shows the corresponding distributions with the help of histograms.

Asia had an impressive mean growth rate of 3 per cent per year in real GDP per capita. The series ranges from a minimum of -23.5 percent (Lebanon, 1989-91) to a maximum of 20.8 percent (Azerbaijan, 2007-09). The latter is the only observation greater than 16 percent. An overwhelming majority of the observations lie between ± 5 percent.

Industry as a proportion of GDP ranges from a minimum of 7.7 percent (Hong Kong, 2007-09) to a maximum of 90.2 percent (Brunei Darussalam, 1974-76), with a mean of 34.7 percent.[12] Most of the observations lie within the 20-45

[12] Services contributed more than 90 percent of the Hong Kong's value-added during this period.

percent range.

The distribution of manufactured exports as a percentage of GDP is much more skewed with most values clustered in the 0-10 percent range and very few beyond 50 percent. The full range extends from a minimum of 0.002 percent (Maldives, 2007-09) to 151.2 percent (Hong Kong, 2004-06). Moreover there is a significant difference between the mean (16.6 percent) and the median (6.7 percent), indicating that a relatively small number of countries pulls the average up. Only a few values lie above the 60 percent level.

The trade balance as a proportion of GDP is centered around zero percent, as one would expect. The highest number of values lies between negative 5 percent to zero. The values between negative and positive 40 percent almost entirely exhaust the observations, although Lebanon in 1989-91 had a trade deficit of 75.4 percent while Brunei Darussalam in 1977-79 had a trade surplus of 80 percent. The mean is a trade deficit of 0.23 percent although the median (-1.93 percent) suggests that a relatively small number of countries with large surpluses characterizes the series.[13]

The proportion of manufactured exports that is destined for developed countries ranges from almost zero for Bhutan in 2004-06 to almost 100 percent for Maldives in 2004-06. The former is a landlocked country that exports almost exclusively to its South Asian neighbors India and Bangladesh. Very few values lie outside the 0-60 percent range. The mean is almost 31 percent. Since Japan itself is an Asian country, albeit a high income industrialized one, we exclude it from the list of industrialized countries while calculating the series *Proportion_X_Developed*. As a robustness test, we also then estimate regressions with Japan included among the industrialized countries, and show that such a change does not qualitatively affect our results. Including Japan, however, raises the mean of this series to 37 percent. Moreover, the inclusion of Japan makes 50-60% the most populated segment of the distribution.

Returning to our econometric analysis, once we have explored the nature of Asian growth in the past, we add additional control variables to assess the robustness of our results. Next, we briefly explore possible channels through which various factors could have fostered growth. We focus on gross fixed capital formation (as a proportion of GDP) and capital goods imports (as a proportion of total imports). Investment is a channel that is widely associated with growth and technological progress, especially in the Asian case.[14] Moreover, imports of sophisticated capital goods (mainly from industrialized countries) often constitute a necessary (but not sufficient) condition for technological upgrading and productivity growth.

[13] There was one value that was so implausibly high that we excluded it from the outset. The trade deficit to GDP ratio for Kazakhstan was reported as 10,133 percent for 1989-91!

[14] On this note, see Rodrik [1995].

4 Estimates

4.1 Baseline regressions

Columns (1)-(3) of Table 4 present the results of our baseline OLS regressions, proceeding from the most general form based on equation (1) to more specific/parsimonious specifications based on the strategy discussed earlier. The upper half of the table reports the individual coefficient estimates while the lower half details the summed coefficients along with their statistical significance (where applicable, i.e., only in the cases where more than one of the contemporary and lagged instances of a variable form part of the reported specification). Consistent with standard expectations, the convergence term ($LRGDPCHT$) has a negative sign and is generally significant at the 1 percent level.[15] The most general form in column (1) has few significant coefficients (the contemporary coefficient of $Indus\_\Pr op\_GDP$, the first lagged coefficient of $Manuf\_X\_GDP$, and the second lagged coefficients of $Manuf\_X\_GDP$ and $Proportion\_X\_Developed$). This is perhaps due to the number of lags specified which limits an already somewhat small panel. Column (2) reports estimates for the more specific form. Only the contemporary and lagged instances of $Indus\_\Pr op\_GDP$ and the twice-lagged $Proportion\_X\_Developed$ survive. Thus, the latter variable tends to effect growth with two lags. Moreover, the Wald test indicates that the summed coefficient of $Indus\_\Pr op\_GDP$ is not significant at the 10 percent level. None of the instances of the other two variables $TB\_\Pr op\_GDP$ and $Manuf\_X\_GDP$ have a statistically significant effect on output growth.

Column (3) reports the results of a regression similar to that reported in column (2), but with the lagged instance of $Industry\_Prop\_GDP$ eliminated. The contemporary coefficient on this variable is positive and significant. The coefficient on the twice lagged instance of $Proportion\_X\_Developed$ is still positive and significant, and somewhat larger in magnitude.

In order to facilitate comparison, column (4) presents the *standardized* coefficients based on the specific regression in Column (2). The combined long-run effect (sum of coefficients), with a summed value of 0.246, is larger for $Industry\_Prop\_GDP$, although recall that the Wald test for joint significance indicates that it is not significant at the 10 percent level. Thus, the proportion of total exports to developed countries appears as the only significant variable. A one standard deviation variation in this variable boosts growth by 0.175 standard deviations.

Columns (5) and (6) present the results of the robustness tests using the GMM approach, as described earlier. With this approach, we can address persistence by including the lagged dependent variable.[16] Column (5) reports

[15] This remains true for most of the regressions reported below, although the magnitude of the estimated effect varies.

[16] The inclusion of the lagged dependent variable as a regressor means that the long-run coefficient for each variable now is the sum of coefficients on that variable divided by one minus the coefficient on the lagged dependent variable.

the most general regression, which again yields very few significant variables.[17] Moving to the more parsimonious regression reported in column (6), again, the second lag of $Proportion\_X\_Developed$ turns out to be significant, and the effect is larger than in the OLS case. The first lag of $Industry\_Prop\_GDP$ is barely significant at the 10 percent level but appears with a negative sign and a small coefficient. Interestingly, first and second lags of $Manuf\_X\_GDP$ now become individually significant, although the Wald test indicates that the sum of the two variables can be rejected at traditional levels of significance. The Sargan tests of overidentifying restrictions, reported for all three regressions, do not raise any concerns at the 5 percent level of significance.

In sum, both the OLS and GMM approaches suggest that, of the variables included in our benchmark regression, only the second lag of $Proportion\_X\_Developed$ has had a positive and significant long-run effect on per capita GDP growth in Asian countries. The coefficient on this variable is larger in the GMM regressions. The role of the share of industry in GDP is less clear, with the standardized OLS estimates showing a positive effect that is larger than that of $Proportion\_X\_Developed$, but is jointly insignificant. The trade balance as a proportion of GDP does not appear to effect growth in any of the regressions.

4.2 Taking the Asian crisis into account

As is well known, the Asian crisis of 1997-99, which began with a speculative run on the Thai Baht and quickly spread to other parts of Asia had a negative impact on income and employment. Does this effect show up in our data? To explore this dimension more directly,[18] we re-ran the baseline regressions with a dummy for the period 1998-2000. Time fixed effects were now excluded from the model in equation (1) for obvious reasons. Again, we estimated using both OLS and GMM techniques. Table 5 summarizes the results. As expected, the Asian crisis had a negative and significant impact on Asian growth regardless of the estimation technique. The coefficient on this dummy variable ranges from -0.02 to -0.04. Industry as a proportion of GDP has a negative effect, although it is statistically insignificant in the OLS case. There is a positive and significant positive contemporary effect which is more than offset by the lagged effect. Interestingly enough, the inclusion of the dummy increases the impact of the second lag of $Proportion\_X\_Developed$. This is true for both the OLS and GMM estimates, although the latter yields a larger coefficient (compare columns (2) and (6) of Table 4 with columns (2) and (4) of Table 5, respectively). In qualitative terms, the only difference from the baseline regression is that the second lag of the trade balance too now becomes significant, indicating that trade surpluses have a positive impact on future growth. Again, this is true regardless of the estimation technique.

[17] Notice that we are down to 149 observations in this case.

[18] Notice that the time fixed effects in earlier specifications should capture this Asia-wide shock. In our baseline regression, the time fixed effect is the largest for the period 1998-2000, and is -0.025 in magnitude.

4.3 Including Japan

We mentioned earlier that we excluded Japan from the list of industrialized countries while calculating the variable *Proportion_X_Developed*. Exports to Japan have been a major area of growth for East and South East Asian countries in particular, but also other Asian developing countries in general. Are our estimates robust to the inclusion of Japan in the list of developed countries? Table 6 addresses this question. Starting with the estimates derived without controlling for the Asian crisis (columns (1) and (2)), notice first that the second lag of *Proportion_X_Developed* continues to be positively and significantly associated with growth (see column(2)). Second, *Industry_Prop_GDP* too has a positive effect, but just as in the baseline case (column (2) of Table 4), the overall effect is statistically insignificant. The other two variables representing the trade balance and the manufactured exports' share of GDP continue to be insignificant, as in the baseline case. The inclusion of a dummy variable for the Asian crisis increases the positive effect of (twice lagged) *Proportion_X_Developed*, and, as in the case of Table 5, also renders the effect of the trade balance positive and significant, but the other results remain qualitatively the same. Reassuringly, the inclusion of Japan does not appear to affect our results much.

4.4 Regional and Temporal Asymmetries

Much of the debate surrounding global imbalances and export-led growth has involved the East Asian tigers and the South East Asian export dynamos that followed their lead in what is sometimes called a "flying geese" formation. Do these countries behave differently than the rest of Asia in terms of our main variables of interest? In order to explore this possibility, we divided the sample into East and South East (ESE) countries on the one hand and the rest of Asia (ROA) on the other. Columns (1)-(4) of Table 7 summarize the estimates derived for these groups. Focusing again on the parsimonious form estimates (columns (2) and (4)), there is some evidence of differing behavior. While the industry share of GDP and the proportion of exports destined for industrialized countries both play a positive and statistically significant role in boosting real per capita GDP growth in the ESE countries, that appears not to be the case for the ROA countries, where only the coefficient on the former variable is positive and significant. As is generally the case with our previous regressions, the trade balance and share of manufactured exports are either insignificant and/or have a negative impact on output growth. Thus, the main finding reported by Rodrik [2009], that is, the existence of a positive association between the share of the industrial/tradable sector holds for both groups of countries. However, we find that, for East and South East Asian countries at least, the proportion of exports destined for industrialized countries too is an important driver of growth. These results provide some suggestive evidence for the widely perceived export- and tradable-led basis of East and South East Asian growth.

Columns (5)-(8) present results for regressions run with the sample period

split into two overlapping periods, 1953-1995 and 1989-2009. The periods were allowed to overlap in order to have evenly split and reasonably large sub-samples.[19] Our general finding that the proportion of exports sold in industrialized country markets is robustly and positively associated with output growth holds only for the second sub-period (again, as always, with two lags). For the first sub-period, however, $Industry\_Prop\_GDP$ and $Manuf\_X\_GDP$ are significantly and positively associated with growth. The trade balance variable is negative and insignificant in both cases. Thus, the proportion of exports destined for industrialized countries appears to have mattered only in recent decades. Given the small sizes of the sub-samples, however, this evidence should only be seen as suggestive and preliminary.

4.5 Excluding outliers

Table 8 addresses potential concerns raised by the presence of outliers. One such concern is that our results could be driven by a handful of high income oil exporting countries. Suppose, for example, that commodity exporters have, on average, a lower proportion of exports destined for developed countries. Since some of these countries are high income, and since high income countries may, on average, grow slower, this introduces a bias in favor of finding a positive impact of $Proportion\_X\_Developed$. Figure 4 highlights this concern. The points to the right of the 50,000 level of real per capita GDP almost exclusively represent observations for Qatar and Brunei Darussalam, two relatively small oil and gas exporting countries. Moreover, these two countries have a relatively low proportion of exports destined for developed countries. Notice first that his concern should be addressed in principle by our inclusion of a convergence term. Second, as seen in Figure 5, the negative correlation between $RGDPCH$ and $Proportion\_X\_Developed$ almost vanishes once we restrict the sample to countries below the $20,000 threshold of real per capita GDP. Re-running our OLS regression with this more limited sample delivers results similar to our baseline regression that includes all data points (compare column (2) of Table 4 and column (2) of Table 8). One somewhat minor difference is that, the first and second lags of $Manuf\_X\_GDP$ now survive the reduction to a parsimonious form, although their sum is negative and jointly insignificant (as indicated by Wald tests).[20] The only other difference is that the contemporary and lagged coefficients of $Industry\_Prop\_GDP$ now become jointly significant at the 10 percent level (and remain positively signed). Thus both the proportion of exports to industrialized countries and the GDP share of the industrial sector now become positive and statistically significant determinants of per capital output growth.

As discussed earlier, and as highlighted by Figure 3, a few small open

[19] Much less data are available for the earlier period so that even though it spans more years, the number of observations is almost the same as the second sub-period.

[20] We also ran regressions with interaction terms to explore whether the impact of $Proportion\_X\_Developed$ varies with real per capita GDP. The interaction terms were found to be insignificant.

economies in our sample (mainly Singapore and Hong Kong but also Macao and Malaysia) have exceptionally high proportions of manufactured exports as a share of GDP. Could these historically fast growing economies be driving our results? Columns (3) and (4) of Table 8 present the estimates derived once we limit the sample to values of $Manuf\_X\_GDP$ less than or equal to 60 percent. Again the results are very similar to our baseline OLS regression, the Wald test of joint significance indicating that the summed coefficient on $Indus\_\Pr op\_GDP$ is insignificant (compare column (2) of Table 4 and column (4) of Table 8). The coefficients on $Proportion\_X\_Developed$ are identical in magnitude (and significant) in both cases.

Finally, we noticed while discussing Figure 3 that a few countries export almost entirely to developed countries. Could these countries be driving our results? To investigate this aspect, we re-estimate our baseline growth equation after excluding data points with $\Pr oportion\_X\_GDP$ greater than 60 percent. Columns (5) and (6) of Table 8 present the results. Once again the estimates are very similar to those derived for the full sample (see column (2) of Table 4). The summed coefficient of $Industry\_Prop\_GDP$ is not statistically significant, leaving $Proportion\_X\_Developed$ as the only significant and positive influence on real per capita GDP growth.

4.6 Controlling for Possible Omitted Influences

So far we have investigated factors that could help us gauge prospects for the future of tradable- and export-led growth in Asia. We found $Proportion\_X\_Developed$ to be the most robust correlate of growth. Now we briefly explore the effects of other control variables that are typically included in growth regressions as determinants of growth. We add twice lagged values of four variables to a baseline regression: (1) openness ($OPENC$), as measured by the ratio of the sum of exports and imports to GDP, (2) savings as a proportion of GDP (SAV_GDP), government expenditure as a proportion of GDP (GG), and the terms of trade (TOT). The use of twice lagged instances is designed to avoid endogeneity problems.[21] Data for TOT, GG, and SAV_GDP came from the WDI while that for $OPENC$ was obtained from the Penn World Tables (version 7). We pursue the GMM approach to address the presence of lagged $GRGDPCH$ on the right hand side. Also, we only introduce one control variable at a time in order to conserve degrees of freedom.

Table 9 summarizes the results. Positive terms of trade shocks and an increase in the saving to GDP ratio have a small positive effect on output growth, although both are statistically indistinguishable from zero. Greater openness has a small negative effect, although again it is statistically insignificant. The coefficient on government spending is small, negative, and significant. The coefficient on our main variable of interest, i.e., $Proportion\_X\_Developed$,

[21] For example, $\Pr op\_X\_Developed_{t-2}$ could affect the degree of openness in the next period, which could then have a positive impact on growth. The variable underlying growth would still be the proportion of exports destined for industrialized countries but some of this effect will now indirectly show up as a positive coefficient on the savings to GDP ratio.

remains positive and statistically significant with one exception. It becomes insignificant when the terms of trade variable is included. This latter result may be driven by the small sample size (recall that the terms of trade variable is insignificant too; we only have terms of trade data post-1980).

4.7 Potential channels for capital accumulation and technological progress

The East Asian growth model has often been associated with not only rapid export growth but also high investment. Indeed, some analysts have termed rapid Asian growth as export- and investment-led. The investment angle may be particularly important if capital goods, especially sophisticated ones, embody technological progress. It could, for instance, be the case that countries that export more manufactures to industrialized countries have to ensure higher quality through investment in domestic and imported capital goods. As a preliminary step toward exploring these possibilities, we estimate a regression of the following form:

$$\begin{aligned} X_{it} &= \alpha'' + \beta_0'' \ln RGDPCH_{it-1} + \sum_{i=0}^{2} \delta_i'' Industry\_Prop\_GDP_{jt-i} \\ &\quad + \sum_{i=0}^{2} \gamma_i'' Manuf\_X\_GDP_{jt-i} + \sum_{i=0}^{2} \lambda_i'' TB\_Prop\_GDP_{jt-i} \\ &\quad + \sum_{i=0}^{2} \pi_i'' Proportion\_X\_Developed_{jt-i} + f_t'' + f_j'' + \varepsilon_{it}'' \qquad (2) \end{aligned}$$

where, depending on the equation estimated, X denotes either $GFCF\_\Pr op\_GDP$ (fixed capital formation as a proportion of GDP) or $K\_\Pr op\_Total\_\mathrm{Im}ports$ (capital goods imports as a proportion of total imports). Table 10 provides the estimation results for the specific equation in both non-standardized and standardized forms (columns (1) and (3), and columns (2) and (4), respectively). A look at column (1) suggests that a positive trade balance is negatively associated with investment as a proportion of GDP, although the twice lagged instance has a small positive effect. The negative contemporary effect, which dominates, may indicate the heavy imported good content of Asian growth. Not surprisingly, industry as a proportion of GDP has a positive and significant impact on investment. Much less recognized in existing literature is the positive and significant effect on investment of the share of exports to industrialized countries. This is consistent with the hypothesis that exports to industrialized countries require more sophisticated production processes, and hence more investment. A look at the standardized coefficients in column (2) indicates that the normalized effect of the industrial share of GDP is greater than that of $Proportion\_X\_Developed$.

Column (4) presents the parsimonious form estimates with $K\_Prop\_Imports$ as the dependent variable. Somewhat surprisingly, industry as a proportion of

GDP does not appear to significantly affect the proportion of capital goods imported. However, the share of manufactured exports does have a positive and significant impact. Moreover, the lagged value of the trade balance and the proportion of exports destined for industrialized countries have important roles to play too, in terms of both statistical significance and economic magnitude. This latter finding provides more empirical support for the hypothesis that exports to industrialized countries require more advance production processes that typically require imported capital goods.

In sum, Table 10 provides suggestive evidence for at least two channels underlying the positive effect of *Proportion_X_Developed* on growth. This variable appears to have a positive relationship to both investment as a proportion of GDP and the share of capital goods in total imports.

5 Conclusions and Implications

Our effort involves a rather ambitious question; is it likely that Asian countries will be able to pursue the pre-crisis patterns of rapid growth? To help tackle this question, one first needs to establish the characteristics of pre-crisis growth. We have attempted to explore the trade- and export-related characteristics. More specifically, to what extent was Asian growth tradable sector-led, net export-led, or export-led in some other sense. As we have stressed, the answers have implications for a future in which industrialized countries are likely to grow at a slower pace and global external account imbalances are likely to shrink.

We ran a series of growth regressions to derive OLS and GMM estimates, to test robustness for sub-samples and to the exclusion of outliers, to control for possible influences missing from our benchmark regressions, and to explore possible transmission channels. Our main finding is that, among our variables of interest, the proportion of total Asian country exports destined for industrialized countries is the most robust correlate of real per capita GDP growth. The industrial share of GDP, used as a proxy for the size of the tradable sector, is positively associated with growth too – indeed the standardized coefficient in the baseline regression is larger than that for the share of exports destined for industrialized countries – but the overall effect is statistically insignificant in most cases. The other two variables of interest, that is, the share of manufactured exports in GDP and the trade balance as a proportion of GDP generally appear to play no significant role in promoting output growth in Asian countries. We find some suggestive evidence that the proportion of exports destined for industrialized countries may have mattered more for the East and South East Asian countries, a group that is distinguished by its high growth rate over past decades. We also find some preliminary evidence that countries that export more to developed countries have a higher share of GDP devoted to investment and a higher share of capital goods in imports.

It is perhaps not surprising that, for developing countries that are well inside the technological frontier, manufactured exports to industrialized countries can facilitate growth through knowledge and technology spillovers and the effects

of international competition. Indeed our main finding is consistent with the body of recent literature that has found some evidence for exports leading to productivity growth. Most of this literature, however, is based on firm-level data. We, on the other hand, find evidence at the macroeconomic/national level. Moreover, we find suggestive evidence that two channels through which exports to industrialized countries may facilitate growth are those of investment and the import of capital goods from these countries.

These findings have some important implications for the post-crisis global economic architecture. To the extent that our findings suggest some role for the size of the tradable sector in promoting growth, the post-crisis world could still witness rapid growth in Asian countries, albeit one based on the growth of tradable production for domestic consumption rather than exports. Industrial policy such as subsidies for tradable production will then have to substitute for export subsidies. Furthermore, policies that penalize domestic consumption in order to generate exports will have to be reversed in the face of shrinking external demand. Shrinking global imbalances need then not be a pressing concern.

Our finding that the proportion of exports sold to industrialized countries is, among our variables of interest, the most robustly (and positively) associated with growth, however, has less sanguine implications. Since pre-crisis global imbalances largely involved industrial country trade deficits, a shrinking of such imbalances will almost certainly require a decline in these deficits. In principle such deficits could decline through greater industrialized country export growth without a fall in import growth. However, add to this the near certainty that slow industrialized country income growth will cause demand from these countries to grow at a slower clip, and we get the important implication that Asian exports to industrialized countries are likely to decelerate, which in light of our main finding, is a cause for concern. Put differently, the fact that tradable production for domestic consumption may not be good substitutes for exports to industrialized countries magnifies the challenges facing sustained Asian growth in the coming years. Export-led growth v2.0 in this sense may not be a good substitute for export-led growth v1.0.

Our study has focused on the growth determinants that relate to tradable and exportable sector issues. A more exhaustive analysis, beyond the scope of our study, will incorporate other variables that are typically seen as causing or hampering growth. It might be interesting too to extend the analysis to investigate whether other developing countries behave differently than the Asian sample that we analyzed. We hope to pursue these questions in future work.

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Table 1: Different Growth Strategies

		Shrinking trade deficits *necessarily* bad	Shrinking industrialized country demand *necessarily* bad
Tradable-led growth (TSLG)		No	No
Net export-led growth (NEXLG)		Yes	No
Export-led growth	Driven by manufactured exports (MEXLG)	No	No
	Driven by exports to industrialized countries (IEXLG)	No	Yes

Table 2: Data and sample definitions

CODE	DEFINITION	SOURCE	COVERAGE
GRGDPCH	Growth rate of (chained)real GDP per capita	PWT 7.0	1950-2009
RGDPCH	Real GDP chain per capita	PWT 7.0	1950-2009
Industry_Prop_GDP	Industry value added (% of GDP)	WDI	1960-2009
Manuf_X_GDP	Manufactured exports (% of GDP). Calculation based on manufactured exports (% of merchandise exports), merchandise exports (current US$) and GDP (current US$)	Authors' calculations based on WDI	1960-2009
TB_Prop_GDP	External balance on goods and services (% of GDP)	WDI	1960-2009
Proportion_X_Developed	Manufactured exports (SITC 5-8) to developed countries as a proportion of manufactured exports to World	UN COMTRADE	1962-2010
GFCF_Prop_GDP	Gross fixed capital formation (% of GDP)	WDI	1960-2009
K_Prop_Total_Imports	Capital goods imports (SITC 7, -73 (transportation equipment),+86 (scientific and professional equipment) as a proportion of total imports	UN COMTRADE	1962-2010
GG	Government spending as a share of GDP	WDI	1960-2006
TOT	Terms of trade	WDI	1980-2006
Sav_GDP	Saving as a proportion of GDP	WDI	1960-2006
Openc	Openness [(exports+imports)/GDP]	PWT 7.0	1960-2009
Developed countries	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, UK, and USA		
Asian developing countries/regions	Afghanistan, Armenia, Azerbaijan, Bahrain, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Hong Kong SAR, China, Macao SAR, India, Indonesia, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lao (PDR), Lebanon, Malaysia, Maldives, Mongolia, Myanmar, Nepal, West Bank and Gaza, Oman,Pakistan, Papua New Guinea, Philippines, Qatar, Rep. of Korea, Saudi Arabia, Singapore, Sri Lanka, Syria, Tajikistan, Thailand, Timor-Leste, Turkey, Turkmenistan, United Arab Emirates, Viet Nam, Yemen		
East and Southeast Asian countries/regions	Brunei Darussalam, Cambodia, China, Hong Kong SAR, Indonesia, Rep. of Korea, Laos, Macao SAR, Malaysia, Philippines, Singapore, Thailand,Timor-Leste, Viet Nam		

Table 3: Summary Statistics

	$GRGDPCH$	$Industry\_Prop\_GDP$	$Manuf\_X\_GDP$	TB_Prop_GDP	$Prop\_X\_Developed$
Mean	2.959	34.700	16.644	-0.228	30.862
Median	3.120	31.746	6.645	-1.933	27.149
Maximum	20.771	90.167	151.233	80.003	99.741
Minimum	-23.472	7.698	0.002	-75.379	0.112
Std. Dev.	4.446	15.163	25.891	18.248	21.963
Sum	1704.083	15337.320	6857.411	-113.198	12499.160
Sum Sq. Dev.	113.640	101395.000	275514.800	164838.600	1948.831
Observations	576	442	412	496	405

Table 4: Baseline growth regressions, 1953-2009

Dependent variable: GRGDPCH (Growth rate of real GDP per capita)[a]	(1) OLS Baseline	(2) OLS Specific I	(3) OLS Specific II	(4) OLS Specific I Standardized variables	(5) GMM Baseline	(6) GMM Specific I
Constant	0.1799	0.2462***	0.3369***			
	(1.52)	(3.67)	(4.16)			
GRGDPCH $_{t-1}$					0.0227	0.1320*
					(0.13)	(1.76)
Ln RGDPCH $_{t-1}$	-0.0236	-0.0300***	-0.0444***	-1.0024***	-0.0249	-0.0217*
	(-1.64)	(-3.67)	(-4.02)	(-4.02)	(-1.08)	(-1.78)
INDUSTRY_PROP_GDP	0.0032**	0.0033***	0.0017***	1.0023***	0.0034	
	(2.28)	(2.60)	(2.67)	(2.67)	(1.47)	
INDUSTRY_PROP_GDP $_{t-1}$	-0.0013	-0.0024***		-0.7569***	-0.0064**	-0.0013*
	(-0.85)	(-2.49)		(-2.49)	(-2.37)	(-1.66)
INDUSTRY_PROP_GDP $_{t-2}$	-0.0007				0.0019	
	(-0.62)				(0.79)	
MANUF_X_GDP	-0.0006				-0.0023**	
	(-1.54)				(-2.09)	
MANUF_X_GDP $_{t-1}$	0.0011**				0.0032**	0.0021**
	(2.37)				(2.24)	(2.37)
MANUF_X_GDP $_{t-2}$	-0.0007**				-0.0012	-0.0017**
	(-2.20)				(-1.11)	(-2.02)
TB_PROP_GDP	-0.0003				-0.0007	
	(-0.54)				(-0.58)	
TB_PROP_GDP $_{t-1}$	-0.0009				0.0003	
	(-1.35)				(-0.19)	
TB_PROP_GDP $_{t-2}$	0.0005				0.0005	
	(1.51)				(0.68)	
PROPORTION_X_DEVELOPED	-0.0034				-0.1918*	
	(-0.16)				(-1.88)	
PROPORTION_X_DEVELOPED $_{t-1}$	0.0150				0.1997*	
	(0.54)				(1.75)	
PROPORTION_X_DEVELOPED $_{t-2}$	0.0261**	0.0336**	0.0413***	0.1746***	-0.0142	0.0753***
	(2.31)	(2.40)	(4.11)	(2.40)	(-0.23)	(2.61)
Time Dummies	yes	yes	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes	yes	yes
$LnIND_t + LnIND_{t-1} + LnIND_{t-2}$	0.0012	0.0150		0.2454	-0.0011	
Wald statistic	2.91	1.24		1.24	0.36	
p-value	[0.090]	[0.266]		[0.266]	[0.549]	
$LnMAN_t + LnMAN_{t-1} + LnMAN_{t-2}$	-0.0001				-0.0003	0.0003
Wald statistic	0.52				0.28	1.54
p-value	[0.471]				[0.598]	[0.216]
$LnTB_t + LnTB_{t-1} + LnTB_{t-2}$	-0.0006				0.0001	
Wald statistic	1.84				0.04	
p-value	[0.176]				[0.848]	
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$	0.0378				-0.0065	
Wald statistic	2.40				0.01	
p-value	[0.122]				[0.927]	
Adjusted R-squared	0.56	0.50	0.57	0.57		
J-statistic					16.69	32.89
Instrument rank					41	40
Sargan test (p-value)					0.34	0.06
Cross-sections included	29	33	33	33	25	27
Observations	209	252	258	258	149	172

Table 5: Growth regressions that include an Asian crisis dummy, 1953-2009

Dependent variable: GRGDPCH (Growth rate of real GDP chain per capita)[a]	(1) OLS General	(2) OLS Specific	(3) GMM General	(4) GMM Specific
Constant	0.1512*	0.2004***		
	(1.88)	(3.29)		
GRGDPCH $_{t-1}$			-0.0018	0.1138*
			(-0.01)	(1.90)
Ln RGDPCH $_{t-1}$	-0.0182*	-0.0211***	-0.0296**	-0.0185*
	(-1.70)	(-2.61)	(-2.16)	(-1.77)
INDUSTRY_PROP_GDP	0.0035***	0.0023***	0.0032	
	(3.07)	(3.35)	(1.40)	
INDUSTRY_PROP_GDP $_{t-1}$	-0.0010		-0.0046**	-0.0022***
	(-0.77)		(-2.38)	(-3.00)
INDUSTRY_PROP_GDP $_{t-2}$	-0.0018*	-0.0026***	0.0013	
	(-1.92)	(-3.53)	(0.63)	
MANUF_X_GDP	-0.0006		-0.0012	
	(-1.54)		(-1.23)	
MANUF_X_GDP $_{t-1}$	0.0010**		0.0017	
	(2.14)		(1.44)	
MANUF_X_GDP $_{t-2}$	-0.0005		-0.0005	
	(-1.54)		(-0.51)	
TB_PROP_GDP	-0.0004		-0.0003	
	(-0.95)		(-0.35)	
TB_PROP_GDP $_{t-1}$	-0.001		-0.0007	
	(-1.63)		(-0.82)	
TB_PROP_GDP $_{t-2}$	0.0011***	0.0006***	0.0011**	0.0007**
	(4.02)	(3.80)	(2.22)	(2.55)
PROPORTION_X_DEVELOPED	-0.0153		-0.1118**	
	(-0.67)		(-1.98)	
PROPORTION_X_DEVELOPED $_{t-1}$	0.0086		0.1024	
	(0.31)		(1.24)	
PROPORTION_X_DEVELOPED $_{t-2}$	0.0518***	0.0647***	0.0513	0.0877***
	(3.5212)	(5.27)	(0.96)	(4.12)
ASIAN_CRISIS (PERIOD 1998-2000 =1)	-0.0289***	-0.0293***	-0.0221*	-0.0402***
	(-5.47)	(-11.14)	(-1.80)	(-5.30)
Country Dummies	yes	yes	yes	yes
$LnIND_t + LnIND_{t-1} + LnIND_{t-2}$	0.0007	-0.0003	-0.0002	
Wald statistic	0.99	0.755	0.019	
p-value	[0.322]	[0.386]	[0.890]	
$LnMAN_t + LnMAN_{t-1} + LnMAN_{t-2}$	-0.0000		0.0000	
Wald statistic	0.07		0.001	
p-value	[0.797]		[0.973]	
$LnTB_t + LnTB_{t-1} + LnTB_{t-2}$	-0.0002		0.0000	
Wald statistic	0.37		0.02	
p-value	[0.543]		[0.883]	
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$	0.0451		0.0418	
Wald statistic	5.66		0.728	
p-value	[0.018]		[0.395]	
Adjusted R-squared	0.55	0.53		
J-statistic			18.55	19.94
Instrument rank			29	28
Sargan test (p-value)			0.18	0.34
Cross-sections included	29	33	25	27
Observations	209	229	149	163

[a] (t-statistic), *p<0.10, **p<0.05, ***p<0.01

Table 6: Growth regressions run after including Japan as a destination exporting country, 1953-2009

Dependent variable: GRGDPCH (Growth rate of real GDP chain per capita)[a]	(1)	(2)	(3) Dummy Asian Crisis	(4) Dummy Asian Crisis
	General	Specific	General	Specific
Constant	0.1746	0.2462***	0.1340	0.1719***
	(1.38)	(3.59)	(1.61)	(2.96)
Ln RGDPCH $_{t-1}$	-0.0232	-0.0300***	-0.0162	-0.0174**
	(-1.53)	(-3.56)	(-1.46)	(-2.20)
INDUSTRY_PROP_GDP	0.0032**	0.0033***	0.0035***	0.0023***
	(2.32)	(2.67)	(3.13)	(3.50)
INDUSTRY_PROP_GDP $_{t-1}$	-0.0012	-0.0025**	-0.0010	
	(-0.80)	(-2.55)	(-0.75)	
INDUSTRY_PROP_GDP $_{t-2}$	-0.0007		-0.0018*	-0.0027***
	(-0.63)		(-1.89)	(-3.71)
MANUF_X_GDP	-0.0006		-0.0006	
	(-1.53)		(-1.50)	
MANUF_X_GDP $_{t-1}$	0.0011**		0.0010**	
	(2.33)		(2.09)	
MANUF_X_GDP $_{t-2}$	-0.0008**		-0.0005	
	(-2.17)		(-1.40)	
TB_PROP_GDP	-0.0003		-0.0004	
	(-0.59)		(-1.02)	
TB_PROP_GDP $_{t-1}$	-0.0009		-0.001	
	(-1.38)		(-1.61)	
TB_PROP_GDP $_{t-2}$	0.0005		0.0011***	0.0006***
	(1.48)		(3.90)	(3.67)
PROPORTION_X_DEVELOPED	-0.0023		-0.0058	
	(-0.10)		(-0.25)	
PROPORTION_X_DEVELOPED $_{t-1}$	0.0110		-0.0034	
	(0.34)		(-0.13)	
PROPORTION_X_DEVELOPED $_{t-2}$	0.0220	0.0249*	0.0492***	0.0530***
	(1.63)	(1.81)	(3.28)	(4.58)
ASIAN_CRISIS (PERIOD 1998-2000 =1)			-0.0294***	-0.0285***
			(-5.78)	(-10.21)
Time Dummies	yes	yes	no	no
Country Dummies	yes	yes	yes	yes
$LnIND_t + LnIND_{t-1} + LnIND_{t-2}$	0.0013	0.0009	0.0007	-0.0004
Wald statistic	3.47	2.02	0.92	1.15
p-value	[0.07]	[0.157]	[0.338]	[0.285]
$LnMAN_t + LnMAN_{t-1} + LnMAN_{t-2}$	-0.0002		0.0000	
Wald statistic	0.58		0.03	
p-value	[0.446]		[0.852]	
$LnTB_t + LnTB_{t-1} + LnTB_{t-2}$	-0.0007		-0.0003	
Wald statistic	2.15		0.51	
p-value	[0.144]		[0.476]	
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$	0.0307		0.04	
Wald statistic	1.35		3.71	
p-value	[0.247]		[0.056]	
Adjusted R-squared	0.56	0.50	0.54	0.52
Cross-sections included	29	33	29	33
Observations	209	252	209	229

[a](t-statistic), *p<0.10, **p<0.05, ***p<0.01

Table 7: Growth regressions for cross-sectional and temporal sub-samples

Dependent variable: GRGDPCH (Growth rate of real GDP per capita)[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	East and South East Asia		Rest of Asia		1953-95		1989-2009	
	General	Specific	General	Specific	General	Specific	General	Specific
Constant	0.0629	-0.0267	0.5464*	0.7107***	0.3417	0.1375	0.4634**	0.5973***
	(0.29)	(-1.07)	(1.79)	(3.35)	(1.64)	(0.74)	(2.03)	(2.83)
Ln RGDPCH $_{t-1}$	-0.0006		-0.0779*	-0.0963***	-0.0565**	-0.0211	-0.0495*	-0.0609
	(-0.33)		(-1.96)	(-3.48)	(-2.11)	(-0.82)	(-1.83)	(-2.57)
INDUSTRY_PROP_GDP	0.0048***	0.0011**	0.0025**	0.0022***	0.0072***	0.0056***	0.0008	
	(3.13)	(1.95)	(2.35)	(3.79)	(3.963)	(5.90)	(0.92)	
INDUSTRY_PROP_GDP $_{t-1}$	-0.0043***		0.0006		-0.0021		-0.0004	
	(-3.61)		(0.44)		(-1.10)		(-0.33)	
INDUSTRY_PROP_GDP $_{t-2}$	-0.0000		0.0007		-0.0009	-0.0041***	-0.0010	-0.0007**
	(-0.05)		(0.61)		(-0.99)	(-3.53)	(-0.82)	(-1.98)
MANUF_X_GDP	0.0001	-0.0005**	0.0000		-0.0005		-0.0010***	-0.0005***
	(0.31)	(-2.54)	(0.07)		(-0.76)		(-3.47)	(-2.62)
MANUF_X_GDP $_{t-1}$	0.0002	0.0013**	0.0020*		0.0010	0.0007*	0.0009***	
	(0.39)	(2.20)	(1.76)		(0.86)	(1.70)	(3.33)	
MANUF_X_GDP $_{t-2}$	-0.0003	-0.0011**	-0.0011		-0.0001		-0.0004	
	(-0.65)	(-2.34)	(-0.91)		(-0.11)		(-1.40)	
TB_PROP_GDP	-0.0022***		0.0002		-0.0012*	-0.0011*	0.0004	
	(-2.88)		(0.32)		(-1.72)	(-1.82)	(1.24)	
TB_PROP_GDP $_{t-1}$	0.0019***		-0.0025***	-0.0014**	-0.0012	-0.0011*	-0.0009	
	(2.74)		(-2.78)	(-2.12)	(-1.66)	(-2.16)	(-1.15)	
TB_PROP_GDP $_{t-2}$	-0.0005		-0.0005		0.0008**	0.0015***	0.0002	
	(-0.61)		(-1.04)		(2.4)	(3.46)	(0.38)	
PROPORTION_X_DEVELOPED	-0.0170		0.0155		-0.0157		0.0579	
	(-0.27)		(0.38)		(-0.48)		(0.95)	
PROPORTION_X_DEVELOPED $_{t-1}$	0.0235	0.0373**	-0.0197		-0.0143		0.0283	
	(0.75)	(2.57)	(-0.28)		(-0.43)		(0.77)	
PROPORTION_X_DEVELOPED $_{t-2}$	0.0271	0.0646***	-0.0317		0.0442*		0.0073	0.0334***
	(1.24)	(3.69)	(-0.72)		(1.77)		(0.43)	(2.77)
Time Dummies	yes	yes	yes	yes	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes	yes	yes	yes	yes
$LnIND_t + LnIND_{t-1} + LnIND_{t-2}$	0.0004		0.0039		0.0042	0.0015	-0.0007	
Wald statistic	0.59		5.68		9.66	3.64	2.06	
p-value	[0.44]		[0.02]		[0.002]	[0.057]	[0.151]	
$LnMAN_t + LnMAN_{t-1} + LnMAN_{t-2}$	0.0000	-0.0003	0.0009		0.0004		-0.0005	
Wald statistic	0.003	1.30	0.35		0.51		3.04	
p-value	[0.955]	[0.257]	[0.556]		[0.438]		[0.081]	
$LnTB_t + LnTB_{t-1} + LnTB_{t-2}$	-0.0007		-0.0028		-0.0015	-0.00075	-0.0003	
Wald statistic	1.99		2.82		4.47	2.65	0.12	
p-value	[0.162]		[0.09]		[0.025]	[0.1034]	[0.726]	
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$	0.0335	0.1020	-0.0358		0.0141		0.0935	
Wald statistic	0.84	32.37	1.08		0.22		3.22	
p-value	[0.362]	[0.000]	[0.30]		[0.640]		[0.073]	
Adjusted R-squared	0.70	0.59	0.51	0.33	0.56	0.60	0.67	0.6
Cross-sections included	11	11	18	26	20	23	29	30
Observations	95	116	114	222	119	149	142	160

[a](t-statistic), *p<0.10, **p<0.05, ***p<0.01

Table 8: Growth regressions excluding outliers (1953-2009)

Dependent variable: GRGDPCH (Growth rate of real GDP per capita)[a]						
	(1)	(2)	(3)	(4)	(5)	(6)
	RGDPCH <=20,000		MANUF_X_GDP<=60%		Proportion_X_Developed<=60%	
	General	Specific	General	Specific	General	Specific
Constant	0.1403	0.2751***	0.1688	0.0266***	0.1799	0.2625***
	(1.42)	(3.67)	(1.44)	(4.26)	(-1.52)	4.34
Ln RGDPCH $_{t-1}$	-0.0189	-0.0389***	-0.0222	-0.0331***	-0.0236	-0.0315***
	(-1.36)	(-3.39)	(-1.52)	(-3.76)	(-1.64)	(-4.36)
INDUSTRY_PROP_GDP	0.0035**	0.0049**	0.0032**	0.0026**	0.0032**	0.0024**
	(2.18)	(2.73)	(2.24)	(2.28)	2.28	(2.44)
INDUSTRY_PROP_GDP $_{t-1}$	-0.0015	-0.0031**	-0.0014	-0.0017**	-0.0007	-0.0017***
	(-0.79)	(-2.31)	(-0.97)	(-2.49)	(-0.85)	(-2.70)
INDUSTRY_PROP_GDP $_{t-2}$	-0.0015		-0.0007		-0.001	
	(-0.79)		(-0.60)		(-0.62)	
MANUF_X_GDP	-0.0006		-0.0001**		-0.0006	
	(-1.25)		(-2.00)		(-1.54)	
MANUF_X_GDP $_{t-1}$	0.0018*	0.0012**	0.0014**		0.0011**	
	(1.96)	(2.24)	(2.01)		(2.37)	
MANUF_X_GDP $_{t-2}$	-0.0015***	-0.0014***	-0.0006		-0.0007**	
	(-2.67)	(-3.12)	(-1.22)		(-2.200)	
TB_PROP_GDP	-0.0011		-0.0002		-0.0003	
	(-1.30)		(-0.46)		(-0.54)	
TB_PROP_GDP $_{t-1}$	0.0002		-0.0009		-0.0009	
	(0.39)		(-1.422)		(-1.35)	
TB_PROP_GDP $_{t-2}$	0.0005		0.0006		0.0005	
	(0.89)		(1.63)		(1.51)	
PROPORTION_X_DEVELOPED	0.0075		-0.0014		-0.0034	
	(0.35)		(-0.06)		(-0.16)	
PROPORTION_X_DEVELOPED $_{t-1}$	-0.0002		0.0169		0.0151	
	(-0.01)		(0.59)		(0.54)	
PROPORTION_X_DEVELOPED $_{t-2}$	0.0403***	0.0387**	0.0234**	0.3373**	0.0261**	0.0372***
	(2.891)	(2.32)	(1.97)	(2.53)	(2.31)	(2.85)
Time Dummies	yes	yes	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes	yes	yes
$LnIND_t + LnIND_{t-1} + LnIND_{t-2}$	0.0009	0.0018	0.0011	0.0009	0.0012	0.0008
Wald statistic	0.58	3.41	1.34	1.24	2.91	1.56
p-value	[0.446]	[0.0648]	[0.247]	[0.266]	[0.088]	[0.212]
$LnMAN_t + LnMAN_{t-1} + LnMAN_{t-2}$	-0.0002	-0.0002	-0.0002		-0.0002	
Wald statistic	0.92	0.84	0.16		0.05	
p-value	[0.338]	[0.358]	[0.686]		[0.471]	
$LnTB_t + LnTB_{t-1} + LnTB_{t-2}$	-0.0004		-0.0006		-0.0006	
Wald statistic	0.14		1.32		1.84	
p-value	[0.712]		[0.250]		[0.175]	
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$	0.0476		0.0389		0.0378	
Wald statistic	4.01		2.533		2.4	
p-value	[0.045]		[0.112]		[0.121]	
Adjusted R-squared	0.56	0.55	0.56	0.49	0.56	0.51
Cross-sections included	24	27	27	29	29	31
Observations	180	197	196	217	209	241

[a](t -statistic), *p<0.10, **p<0.05, ***p<0.01

Table 9: Robustness to additional variable(s) "Z" (GMM panel regressions)

Dependent variable: GRGDPCH (Growth rate of real GDP per capita)	(1) Baseline	(2) OPENC(-2)	(3) SAV_GDP(-2)	(4) GG(-2)	(5) TOT(-2)
GRGDPCH $_{t-1}$	0.1654***	0.1749***	0.0700	0.0538	0.0438
	(2.81)	(2.94)	(1.22)	(0.97)	(0.59)
Ln RGDPCH $_{t-1}$	-0.0340***	-0.0302***	-0.0503***	-0.0416***	-0.0491***
	(-4.92)	(-3.86)	(-5.88)	(-6.08)	(-3.24)
PROPORTION_X_DEVELOPED $_{t-2}$	0.0452*	0.0471*	0.0706***	0.0611***	0.0408
	(1.80)	(1.88)	(3.25)	(2.78)	(1.41)
Z		-0.0001	0.0003	-0.0017***	0.0000
		(-0.86)	(1.04)	(-3.57)	(0.33)
Time Dummies	yes	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes	yes
J-statistic	103.23	102.35	108.03	100.98	51.36
Instrument rank	102	102	102	102	57
Sargan test (p-value)	0.10	0.10	0.05	0.11	0.27
Cross-sections included	37	37	35	34	30
Observations	276	276	246	247	118

(t -statistic), *p<0.10, **p<0.05, ***p<0.01

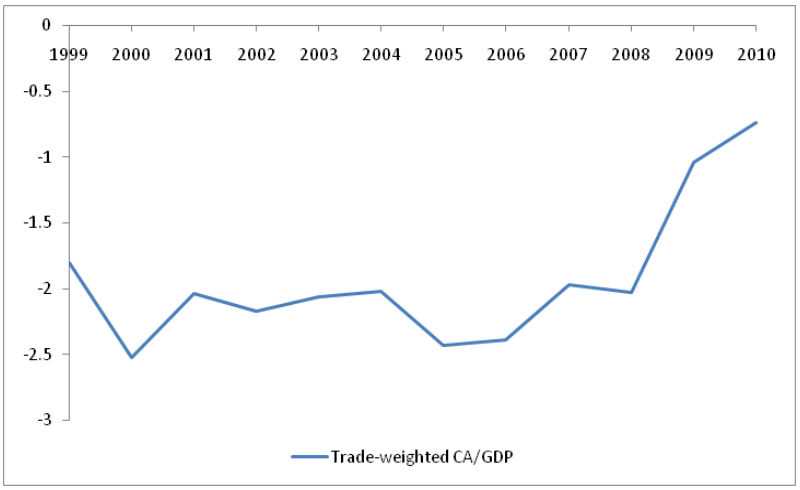

Figure 1: Weighted current account as a proportion of GDP for the 19 industrialized countries in our sample (1999-2010)

Table 10: Possible Transmission Channels, OLS, 1953-2009

	(1)	(2)	(3)	(4)
Dependent variable:[a]	GFCF_PROP_GDP		K_PROP_TOTAL_IMPORTS	
	Specific	Standardized	Specific	Standardized
Constant	4.1913	-0.1953**	0.2521***	-0.1112
	(1.48)	(-2.32)	(14.11)	(-1.41)
INDUSTRY_PROP_GDP	0.5152***	0.9494***		
	(5.85)	(5.85)		
INDUSTRY_PROP_GDP $_{t-1}$				
INDUSTRY_PROP_GDP $_{t-2}$				
MANUF_X_GDP			0.0030***	0.6578***
			(7.25)	(7.25)
MANUF_X_GDP $_{t-1}$				
MANUF_X_GDP $_{t-2}$				
TB_PROP_GDP	-0.4292***	-0.9518***		
	(-8.13)	(-8.13)		
TB_PROP_GDP $_{t-1}$			0.0009***	3.7416***
			(2.62)	-2.62
TB_PROP_GDP $_{t-2}$	0.0543*	3.2772*		
	(1.92)	(1.92)		
PROPORTION_X_DEVELOPED				
PROPORTION_X_DEVELOPED $_{t-1}$	5.9136**	0.1582**		
	(2.28)	(2.28)		
PROPORTION_X_DEVELOPED $_{t-2}$			0.0924**	0.1706**
			(2.33)	(2.33)
Time Dummies	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes
$LnIND_t + LnIND_{t-1} + LnIND_{t-2}$				
Wald statistic				
p-value				
$LnMAN_t + LnMAN_{t-1} + LnMAN_{t-2}$				
Wald statistic				
p-value				
$LnTB_t + LnTB_{t-1} + LnTB_{t-2}$	-0.3749	2.3254		
Wald statistic	47.23	1.90		
p-value	[0.000]	[0.1676]		
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$				
Wald statistic				
p-value				
Adjusted R-squared	0.79	0.79	0.72	0.72
Cross-sections included	33	33	33	33
Observations	256	256	280	280

[a](t -statistic), *p<0.10, **p<0.05, ***p<0.01

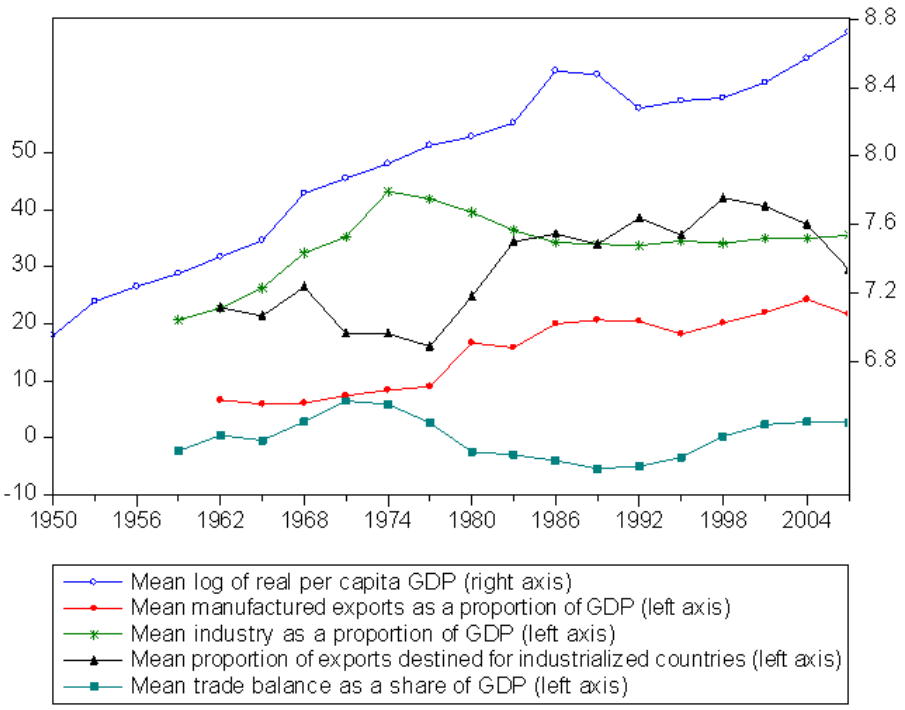

Figure 2: Mean of real per capita GDP and other variables for Asian countries (1950-2007)

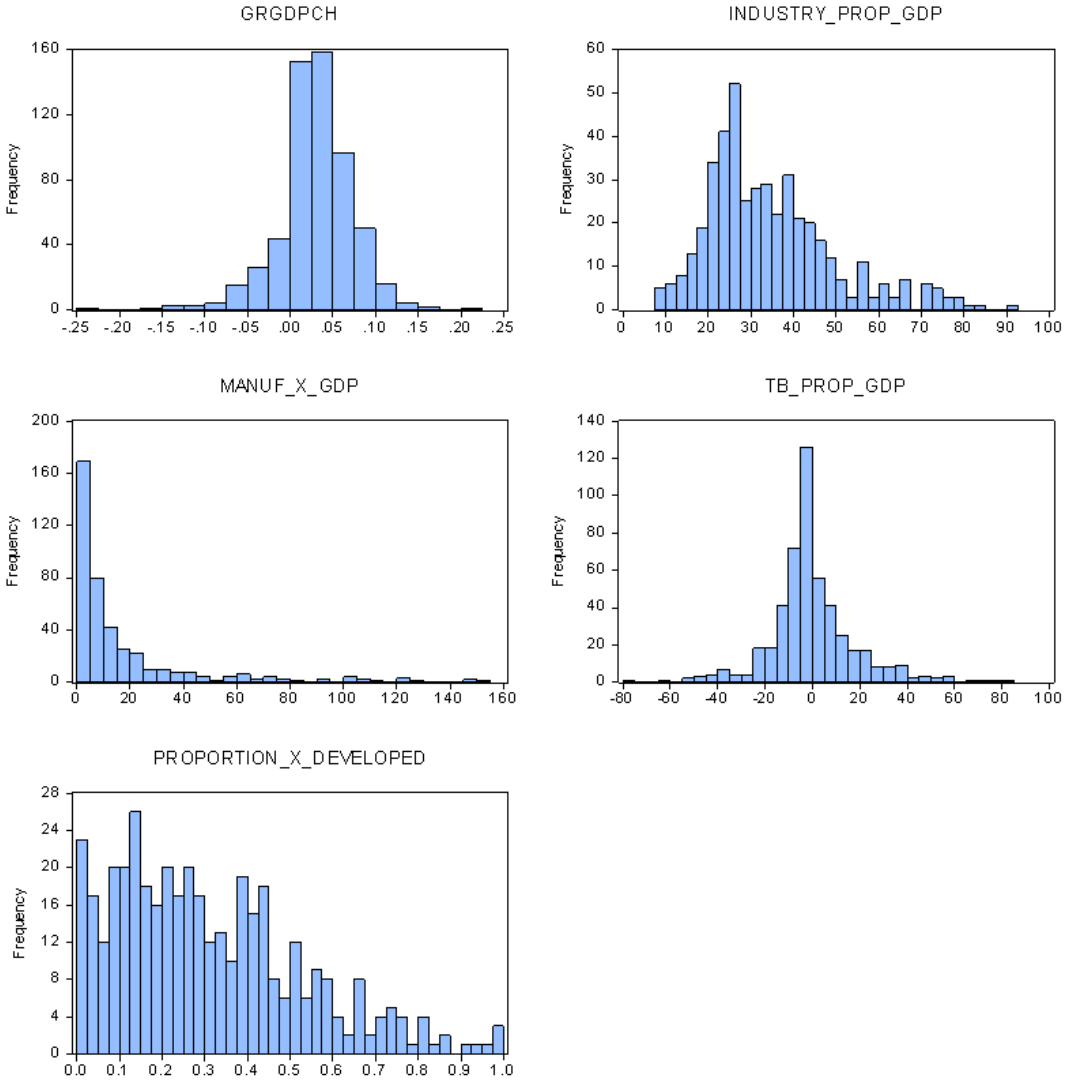

Figure 3: Distributions of main variables of interest

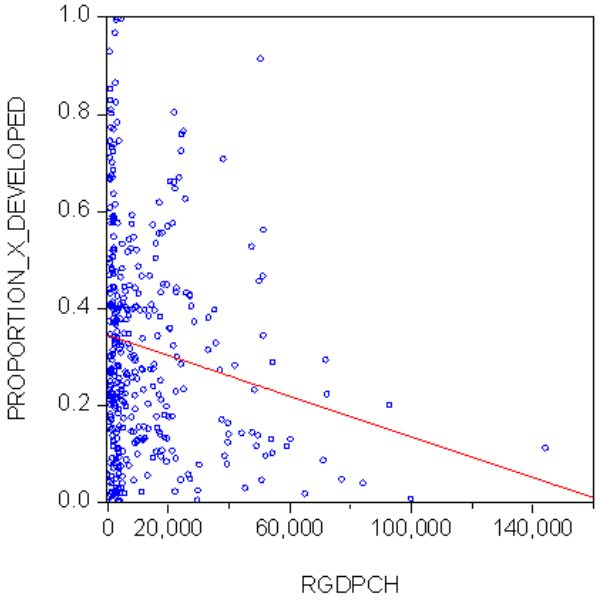

Figure 4: Scatterplot of $GRGDPCH$ versus $\Pr oportion\_X\_Developed$ for the entire sample.

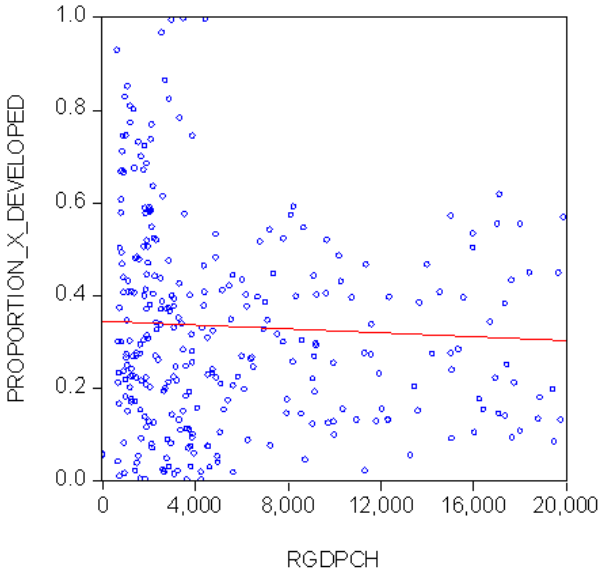

Figure 5: Scatterplot of $GRGDPCH$ versus $\Pr oportion\_X\_Developed$ for $RGDPCH \leqslant 20,000$.