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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

Contents

1. INTRODUCTION AND BACKGROUND

Economic Growth is perhaps the foremost goal of policymakers across the world. In pursuing this objective, strategies have varied across and within countries across time. One such strategy—export-led growth—has been most directly associated with East Asian countries in recent decades. As we will see shortly, while 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) cause growth.

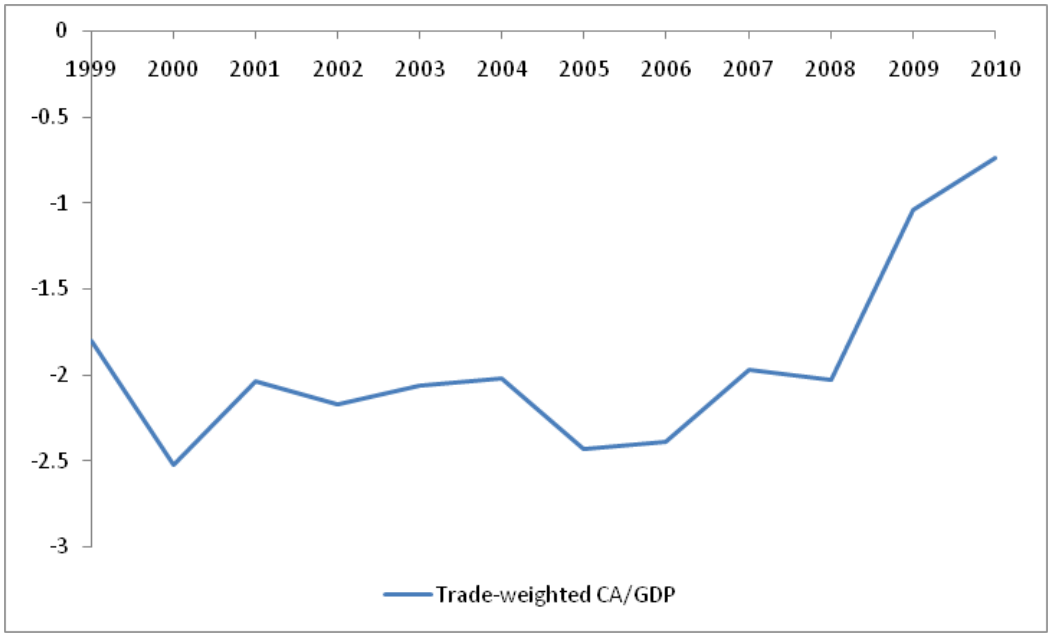
The original larger East Asian "tigers"—the Republic of Korea and Taipei,China—are widely believed to have pursued import substitution policies in the earlier phases of their rapid growth (in the 1950s and 1960s), followed by export promotion beginning in the latter half of the 1960s.[1] Indeed, according to numerous scholars the pursuit of export promotion rather than import substitution is what has distinguished 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 in Asia) following the Asian financial crisis of 1997–1998 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 gross domestic product (GDP) for the 19 developed countries in our sample (see section 3 and Table 2 for details of the sample).[3] Unprecedented growth in the People's Republic of China (PRC) along with its accumulation of record amounts of foreign exchange reserves have only served to confirm the perceived efficacy of such a growth strategy.

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

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

[3] The current account to GDP ratio was obtained for 1999–2009 from the United Nations Conference on Trade and Development (UNCTAD) COMTRADE database for 2010 and from the Organisation for Economic Co-operation and Development (OECD) Source OECD database for 2010. The annual weights assigned to each developed country for calculating the annual weighted current account to 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 export destinations for Asian countries.

Figure 1: Weighted Current Account as a Proportion of Gross Domestic Product for the 19 Industrialized Countries in Our Sample, 1999–2010



Source: United Nations COMTRADE (2011) and authors' calculations

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 corresponding 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, then such a strategy requires that developed countries run corresponding trade deficits, which beyond some point may 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. This constraint becomes even more relevant if, as is 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. However, others such as Rodrik (2009) have noted 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

[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 devaluation 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.

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 (NEXLG) strategy. A related strand in the post-Keynesian tradition, that originated with Thirlwall (1979), points to the role of the balance of payments constraint in limiting 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 export-led growth (MEXLG) strategy.

Another distinct hypothesis is that of what we call tradable-sector-led growth (TSLG). Rodrik (2008), for example, argues that two features are pervasive in many developing countries: (i) institutional weaknesses in the contracting environment, and (ii) market failures. The tradable sector, which in developing countries is associated mainly with manufactures, is typically afflicted with these handicaps to a greater extent, leading to these countries devoting a suboptimal proportion of their resources to this sector. Second-best policies to subsidize tradable production, therefore, could promote growth.[5]

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 developing countries with low labor costs in order to use them as platforms for relatively sophisticated exports to industrialized countries. This will facilitate technology transfer and productivity growth. We refer to this as the industrialized-country-centered export-led growth (IEXLG) strategy.

The four above-mentioned growth strategies have different implications for the post-crisis prospects of developing countries. In particular, the degree to which a global

[5]See also Razmi, Rapetti, and Skott (2011) for a model of an economy that features tradable-led growth in an environment of underemployment of labor resources.

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. 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. 6 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 developing countries could continue pursuing NEXLG by substituting trade surpluses with other developing countries for those with developed countries. However, if the destination matters (because, say, 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 the MEXLG strategy.

Table 1: Different Growth Strategies

Strategy	**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

Source: authors

In summary, developing Asia can continue to pursue TSLG but not NEXLG in a world with zero global imbalances. Similarly, 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 group of developing countries will be affected negatively by slower developed-country growth

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

in a post-crisis world if that group pursued IEXLG, but not necessarily if it pursued MEXLG and can replace exports to industrialized countries with exports 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 noncommodity exporters is mainly associated with Asian countries—and East and Southeast Asian countries 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 the historically most relevant ones for Asia, and thereby drawing conclusions for the future. Most interestingly, perhaps, we find that the proportion of a developing Asian 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 as a determinant of growth has not to our knowledge received much attention in existing literature.

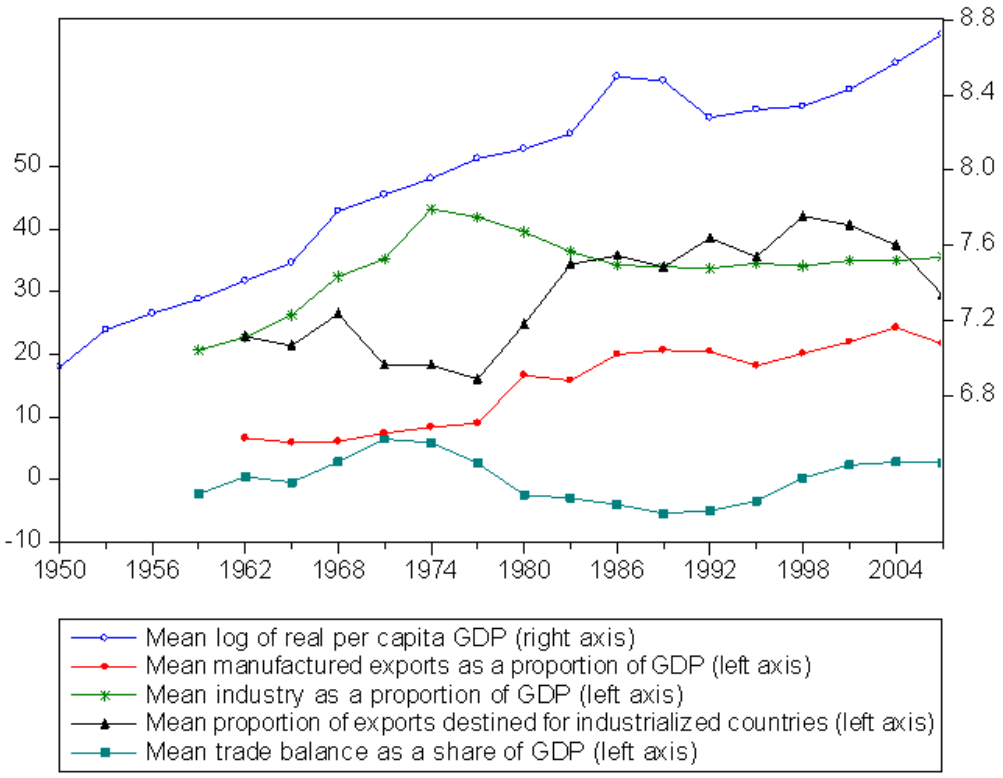
Section 2 provides an overview of the main issues and related literature. Sections 3 and 4 develop the empirical strategy and present the econometric estimates. Section 5 concludes.

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 enjoyed rapid growth and trade surpluses in the years leading up to the crisis. Due to the unbalanced nature of our panel, we display the means of our variables of interest.[7] The figure highlights the trade surpluses that accompanied growth following the Asian crisis of the late 1990s. Also interesting is the upward evolution since the late 1970s of manufactured exports as a proportion of GDP and that of the proportion of manufactured exports destined for industrialized countries. The size of the industry sector as a proportion of GDP has, on the other hand, stayed more or less the same since the mid-1980s.

[7]More details about the composition of our sample are in section 3.

Figure 2: Mean of Real per Capita Gross Domestic Product and Other Variables for Asian Countries, 1950–2007



Source: Penn World Table (2011), United Nations COMTRADE (2011), World Development Indicators (2011), and authors' calculations

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 the PRC over the last three decades, which has occurred 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.[8]

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 growth or growth led by net exports. 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.

The conception of 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 crowding out of some countries' exports by other countries or, relatedly, in deteriorating terms of trade for developing-

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

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 manufactures, Razmi (2007) finds the presence of significant demand-side constraints on export growth. Furthermore, the estimates suggest that rapid export growth in the PRC has had a significant impact in this regard. Eichengreen, Rhee, and Tong (2007) confirm the tendency for the PRC's exports to crowd out those of other Asian countries but find a difference in the impact of the PRC 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. The PRC'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 and internationally competitive management. Moreover, the marginal product of factors in the export sector is greater than that in the non-export sector. Thus, from this perspective exports 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 than non-exporting firms. 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. Firms may become more productive because of several reasons, such as economies of scale, 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 because of their international links. Moreover, exporting firms may receive technical guidance on how to meet higher-quality standards from their clients in importing countries. Again, Pack 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. 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 further from the technological frontier, and hence have greater scope for learning.

Other recent studies have also 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 of manufactured exports resulting in 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.[9]

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 endogenous growth model in which the tradable sector is special in the sense that it is characterized to a greater degree by institutional weaknesses and market failures (information and coordination externalities), leading to a bias against this sector in the allocation of resources. A subsidy, say in the form of exchange rate undervaluation, boosts profits in the tradable sector and the resulting sector reallocation raises the growth rate.

In a recent paper 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 comparison between the industry share of GDP (used as a proxy for the size of the tradable sector) and the exports–GDP ratio on the one hand, and the industry share of GDP 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 industry 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 emerging economies in Asia and elsewhere have decoupled from the developed world and are, therefore, immune to slower growth in the developed world. Noting the growth in South–South trade, Canuto, Haddad, and Hanson (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 (i) exports to developed countries, perhaps due to the presence of more stringent product quality expectations; (ii) a greater proportion of more-sophisticated manufactured products in the basket; (iii) more technical guidance from client firms; or (iv) other factors? Indeed, existing literature does provide some supportive evidence in this regard. For example, De Loecker (2007) finds that productivity gains from exporting are greater for firms exporting to high-income countries.[10] If this is the case, (post-crisis) export-led

[9] 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. For example, the export effect is greater 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 manufacturing firms in Viet Nam, Mahadevan (2007) for Malaysia, Ogunleye and Ayeni (2008) for Nigeria, and Park et al. (2009) for the PRC. Wagner (2007), Pedro and Yang (2009), and Silva et al. (2010) present comprehensive surveys of studies of the learning-by-exporting channel. Lall (1998, 2000) provides insightful discussions of the nexus between manufacturing exports and development in developing countries from a more macro perspective.

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

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.

3. DATA AND ECONOMETRIC STRATEGY

We begin with a baseline regression of the following form:

$$GRGDPCHF_{it} = \alpha + \beta_0 \ln RGDPCH_{it-1} + \sum_{i=0}^{2} \delta_i Industry\_prop\_GDP_{jt-i} + \sum_{i=0}^{2} \gamma_i Manuf\_X\_GDP_{jt-i} + \sum_{i=0}^{2} \lambda_i TB\_prop\_GDP_{jt-i} + \sum_{i=0}^{2} \pi_i proportion\_X\_Developed_{jt-i} + f_t + f_j + \varepsilon_{it} \quad (1)$$

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 captures time-specific effects, f_j captures country-specific effects, and ε_{it} is the error term. Real GDP growth was obtained from Penn World Table (2011). The GDP share of industry is denoted by $Industry\_prop\_GDP$. 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 categories 5–8 in the Standard International Trade Classification (SITC), as a proportion of GDP are represented by the variable $Manuf\_X\_GDP$. Data for these four variables were obtained from World Development Indicators (2011). Finally, $proportion\_X\_Developed$ is the proportion of manufactured exports destined for developed countries. Data for the construction of this variable were obtained from United Nations COMTRADE (2011).

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. To remove short-run cyclical effects, we use data averaged over 3-year intervals.11 Table 2 provides a data dictionary along with a list of the Asian and developed 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% level are then eliminated in a stepwise manner.

[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: $GRGDPCH = [(RGDPCH_t / RGDPCH_{t-1})\hat{}(1/3)] - 1$.

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). Calculations 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
CONINDEX	Export concentration index (Herfindahl–Hirschmann index)	UNCTAD	1980–2009
Developed countries	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, UK, and US		
Asian developing economies	Afghanistan; Armenia; Azerbaijan; Bahrain; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; PRC; Hong Kong, China; Macao, China India; Indonesia; Iran; Iraq; Israel; Jordan; Kazakhstan; Kuwait; Kyrgyzstan; Lao PDR; Lebanon; Malaysia; Maldives; Mongolia; Myanmar; Nepal; Occupied Palestinian Territories; Oman; Pakistan; Papua New Guinea; Philippines; Qatar; Republic of Korea; Saudi Arabia; Singapore; Sri Lanka; Syria; Tajikistan;		

	Thailand; Timor-Leste; Turkey; Turkmenistan; United Arab Emirates; Viet Nam; Yemen		
East and Southeast Asian economies	Brunei Darussalam; Cambodia; PRC; Hong Kong, China; Indonesia; Republic of Korea; Lao PDR; Macao, China; Malaysia; Philippines; Singapore; Thailand; Timor-Leste; Viet Nam		

COMTRADE = , GDP = , Lao PDR = , PRC = , SITC = , UK = , UN = , US = , WDI = .

PWT: Penn WorldTables

WDI: World Development Indicators

UN: United Nations

Source: authors

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 in our data are likely to exhibit hysteresis or persistence over time. To address the robustness of our baseline Ordinary least squares estimates OLS to potential endogeneity and/or simultaneity issues, we carry out dynamic panel estimations using the Arellano–Bond two-step general method of moments (GMM) method. We specify the second and third lags of the dependent variable as instruments in addition to the third lags of $Industry\_prop\_GDP$, 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 revisit 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, our focus is on 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 more limited 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 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 a more serious concern. 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.

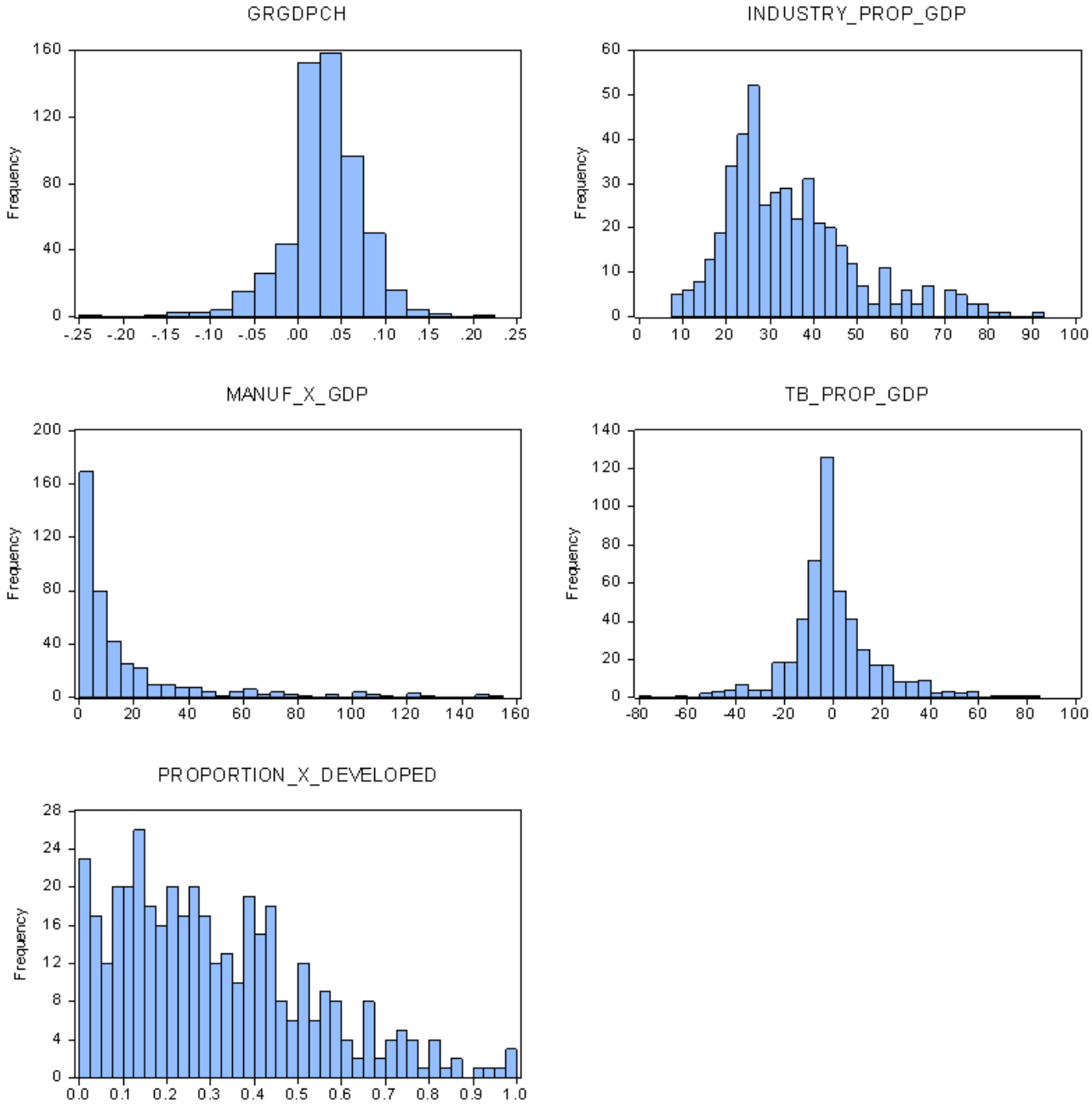
Table 3 provides summary statistics for the variables of primary interest. Figure 3 shows the corresponding distributions with the help of histograms.

Table 3: Summary Statistics

Statistics					
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	1,704.083	15,337.320	6,857.411	(113.198)	12,499.160
Sum Sq. Dev.	113.640	101,395.000	275,514.800	164,838.600	1,948.831
Observations	576	442	412	496	405

Source: Penn World Table (2011), World Development Indicators (2011) and authors' calculations.

Figure 3: Distributions of Main Variables of Interest



Source: Penn World Table (2011), United Nations COMTRADE (2011), World Development Indicators (2011), and authors' calculations

Asia had an impressive mean growth rate of 3% per year in real GDP per capita from 1953 to 2009. The series ranges from a minimum of -23.5% (Lebanon 1989–1991) to a maximum of 20.8% (Azerbaijan 2007–2009). The Azerbaijan figure is the only observation greater than 16%. An overwhelming majority of the observations lie between 5% and -5%.

Industry as a proportion of GDP ranges from a minimum of 7.7% (Hong Kong, China 2007–2009) to a maximum of 90.2% (Brunei Darussalam 1974–1976), with a mean of 34.7%.[12] Most of the observations lie within the 20%–45% range.

The distribution of manufactured exports as a percentage of GDP is much more skewed, with most values clustered in the 0%–10% range and very few beyond 50%. The full range extends from a minimum of 0.002% (Maldives 2007–2009) to 151.200% (Hong Kong, China 2004–2006). Moreover, there is a significant difference between the mean (16.6%) and the median (6.7%), indicating that a relatively small number of countries pulls the average up; there are only a few values above 60%.

The trade balance as a proportion of GDP is centered around zero, as one would expect. The highest number of values lies between –5% and 0%. The values between –40% and 40% include almost all the observations, although Lebanon in 1989–1991 had a trade deficit of 75.4% while Brunei Darussalam in 1977–1979 had a trade surplus of 80.0%. The mean is a trade deficit of 0.23% although the median (–1.93%) 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 2004–2006) to almost 100% (for Maldives in 2004–2006). Bhutan is a landlocked country that exports almost exclusively to its South Asian neighbors India and Bangladesh. Very few values lie outside the 0%–60% range; the mean is almost 31%. 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 (section 4), and show that such a change does not qualitatively affect our results. If Japan is included, however, the mean of this series rises to 37%. 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 then dig deeper by investigating possible channels through which various factors could have fostered growth. We focus on gross fixed capital formation (as a proportion of GDP), capital goods imports (as a proportion of GDP), and a Herfindahl–Hirschmann index of export concentration as the possible channels.[14] Investment is a channel that is widely associated with growth in general, and in the Asian case in particular.[15] Imports of sophisticated capital goods (mainly from industrialized countries) often constitute a necessary (but not sufficient) condition for technological upgrading and productivity growth. Moreover, exports to developed countries may boost imports from these countries for two reasons. First, such exports relax bilateral trade balance constraints, enabling easier access to imports. Second, to the extent that such exports adhere to higher quality standards and are technologically more sophisticated, these are likely to require sophisticated capital goods imports to a greater degree. Finally, recent literature has found that low-income countries tend to diversify during their development phase, and that diversification may be a channel for

[12] Services contributed more than 90% of the Hong Kong, China value-added figure during this period.

[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% for 1989–1991.

[14] Data for the first two variables come from the WDI while data for the third variable originate from UNCTAD's UNCTADSTAT online database.

[15] On this note, see Rodrik (1995).

more rapid growth.16 We, therefore, explore the impact of our variables of interest on export concentration.

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 (baseline1) to more specific and 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% level.17 The most general form in column 1 has few significant coefficients (the contemporary coefficient of $Industry\_prop\_GDP$, 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 $Indus\_prop\_GDP$ and the twice-lagged $proportion\_X\_Developed$ survive. Thus, $proportion\_X\_Developed$ tends to affect growth with two lags. Moreover, the Wald test indicates that the summed coefficient of $Indus\_prop\_GDP$ is not significant at the 10% level. None of the instances of the other two variables TB_prop_GDP and $Manuf\_X\_GDP$ have a statistically significant effect on output growth.

[16] See, for example, Imbs and Wacziarg (2003) and Cadot, Carrére, and Strauss-Kahn (2009). For the growth effects of diversification, see Agosin (2009).

[17] This remains true for most of the regressions reported in table 4, although the magnitude of the estimated effect varies.

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	(7) GMM Specific II
Constant	0.1799	0.2462***	0.3369***				
	(1.52)	(3.67)	(4.16)				
GRGDPCH $_{t-1}$					0.0227	0.1320*	0.1619***
					(0.13)	(1.76)	(2.49)
Ln RGDPCH $_{t-1}$	-0.0236	-0.0300***	-0.0444***	-1.0024***	-0.0249	-0.0217*	-0.0422***
	(-1.64)	(-3.67)	(-4.02)	(-4.02)	(-1.08)	(-1.78)	(-3.97)
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***	0.0641***
	(2.31)	(2.40)	(4.11)	(2.40)	(-0.23)	(2.61)	(2.44)
Time Dummies	yes	yes	yes	yes	yes	yes	yes
Country Dummies	yes	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	23.14
Instrument rank					41	40	34
Sargan test (p-value)					0.34	0.06	0.23
Cross-sections included	29	33	33	33	25	27	34
Observations	209	252	258	258	149	172	237

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

Source: Authors

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. Moreover, the coefficient on the twice-lagged instance of $proportion\_X\_Developed$ is still positive and significant, and somewhat larger in magnitude.

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% 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 5–7 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.[18] Column 5 reports the most general regression, which again yields very few significant variables.[19] Moving to the more parsimonious regression reported in column 6, the second lag of $proportion\_X\_Developed$ turns out to be significant again, and the effect is larger than in the OLS case. The first lag of $Industry\_prop\_GDP$ is barely significant at the 10% 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. Column 7 presents the GMM equivalent of the OLS regression reported in column 3. Only the second lag of $proportion\_X\_Developed$ has a positive and significant effect. The Sargan tests of overidentifying restrictions, reported for all three regressions, do not raise any concerns at the 5% level of significance.

In summary, 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 affect growth in any of the regressions.

4.2 Taking the Asian financial crisis into account

As is well known, the Asian financial crisis of 1997–1999, which began with a speculative run on the 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

[18] 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 1 minus the coefficient on the lagged dependent variable.

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

this dimension more directly,[20] we re-ran the baseline regressions with a dummy for 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. The first lag of 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, 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..In qualitative terms, the only difference from the baseline regression is that the second lag of the trade balance also now becomes significant, indicating that trade surpluses have a positive impact on future growth. Again, this is true regardless of the estimation technique.

[20] 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 1998–2000, and is –0.025 in magnitude.

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

Source: Authors

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 Southeast 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 (column 2). Second, $Industry\_prop\_GDP$ also 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.

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)	(4)
			Dummy Asian Crisis	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

Source: Authors

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 Southeast 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? To explore this possibility we divided the sample into East and Southeast Asian countries (ESE) 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 $Industry\_prop\_GDP$ 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), i.e., the existence of a positive association between the share of the tradable industrial sector and economic growth, holds for both groups of countries. However, we find that, for East and Southeast Asian countries at least, the proportion of exports destined for industrialized countries is also an important driver of growth.

Table 7: Growth Regressions for Cross-Sectional and Temporal Subsamples

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] 0.0004	[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

Source: Authors

Columns 5–8 of Table 7 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 subsamples.[21] Our general finding that the proportion of exports sold in industrialized-country markets is robustly and positively associated with output growth appears to hold only for the second subperiod (again, as always, with two lags). For the first subperiod, 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 subsamples, however, this evidence should only be seen as suggestive and preliminary.

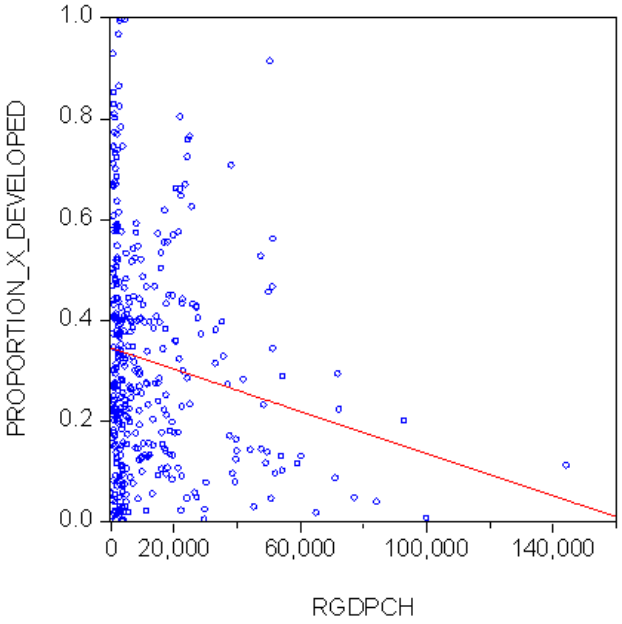
4.5 Excluding outliers

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 more slowly, 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. The first thing to note, however, is that this 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).[22] The only other difference is that the contemporary and lagged coefficients of $Industry\_prop\_GDP$ now become jointly significant at the 10% level (and remain positive). Thus, both the proportion of exports to industrialized countries and the GDP share of the industry sector now become positive and statistically significant determinants of per capita output growth.

[21] 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 subperiod.

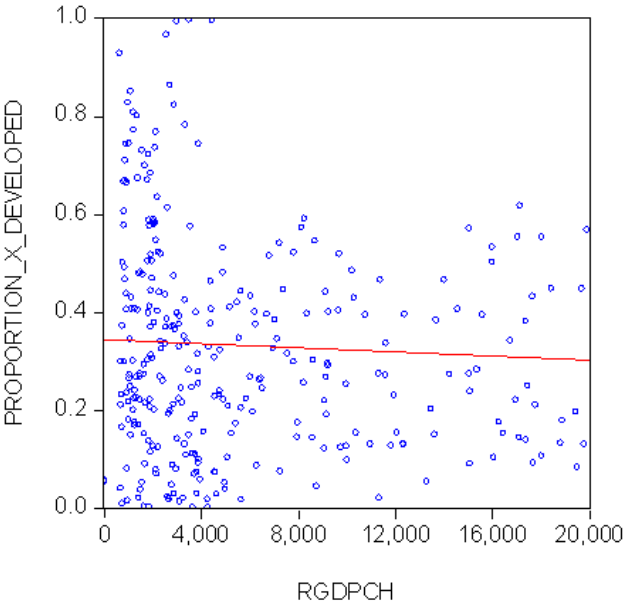
[22] We also ran regressions with interaction terms to explore whether the impact of $proportion\_X\_Developed$ varies with real per capita GDP. The interaction terms were found to be insignificant.

Figure 4: Scatterplot of *RGDPCH* versus *proportion_X_Developed* for the Entire Sample



Source: Penn World Table (2011), United Nations COMTRADE (2011), World Development Indicators (2011), and authors' calculations

Figure 5: Scatterplot of RGDPCH versus proportion_X_Developed for RGDPCH<$20000



Source: Penn World Table (2011), United Nations COMTRADE (2011), World Development Indicators (2011), and authors' calculations

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

Source: Authors

As discussed earlier, and as highlighted by Figure 3, a few small open economies in our sample (mainly Singapore and Hong Kong, China but also Malaysia and Macao, China) 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%. Again, the results are very similar to our baseline OLS regression

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 $proportion\_X\_GDP$ greater than 60%. 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 Channels of influence

As a preliminary step toward identifying channels through which our variables of interest can influence per capita GDP growth, we regressed $GRGDPCH$ on up to two lags of three variables: (i) investment as a proportion of GDP ($GFCF\_prop\_GDP$), (ii) capital goods imports as a proportion of total imports $K\_prop\_Total\_\mathrm{Im}ports$, and (iii) a Herfindahl–Hirschmann index of export concentration ($CONINDEX$). The value of the index varies between 0 (no concentration) and 1 (maximum concentration).[23] More specifically, we estimated an equation of the following form:

$$GRGDPCH_{it} = \alpha' + \beta_0' \ln RGDPCH_{it-1} + \sum_{i=0}^{2} \delta_i' GFCF\_prop\_GDP_{jt-i} + \sum_{i=0}^{2} \gamma_i' K\_prop\_Total\_\mathrm{Im}ports_{jt-i} + \sum_{i=0}^{2} \lambda_i' CONINDEX_{jt-i} + f_t' + f_j' + \varepsilon_{it}' \quad (2)$$

where again we include a convergence term and country and time fixed effects. The first variable, $GFCF\_prop\_GDP$, has traditionally been seen as a determinant of output growth and hence does not require much explanation. Developing countries often

[23] UNCTAD calculates this index number using the following formula:

$$H_j = \frac{\sum_{i=1}^{n} \sqrt{(z_{ij}/Z)^2} - \sqrt{1/n}}{1 - \sqrt{1/n}};\ Z = \sum_{i=1}^{n} z_i$$

where H_j denotes the index for country j, is the total number of export products (SITC Revision 3 at three-digit group level), and z_i is the value of export of product i by country j.

require sophisticated imported capital goods during their rapid growth and industrialization phases. Capital goods imports, therefore, often serve the role of an important transmission channel. Finally, as discussed in section 2, several recent studies have found that developing countries tend to diversify during their development phase, only specializing once they have attained middle-income status. Furthermore, recent empirical studies have found some evidence of a positive effect of export diversification on growth.

Column 1 of Table 9 reports the general form obtained. Column 2 reports the specific from derived after eliminating the insignificant variables. Again, the convergence term is negative and significant, as expected. The contemporary value of $GFCF\_prop\_GDP$ is statistically significant and positive, as are the contemporary and twice-lagged values of $\mathrm{K\_prop\_Total\_Imports}$ (the coefficient on the first lag is negative). Wald tests for joint significance indicate a positive and significant sum of coefficients for this variable. The contemporary instance of $CONINDEX$ is also significant, and positive, indicating that export concentration boosts growth. A look at the standardized coefficients in column 3 allows us to compare the magnitude of effects. The total effect of a 1.00 standard deviation increase in investment as a proportion of GDP is to boost the growth rate by 0.36 standard deviations, while a corresponding increase in the proportion of imported capital goods raises the growth rate by 0.24 standard deviations and a corresponding increase in export concentration raises the growth rate by 0.32 standard deviations. Thus, all three variables appear to play statistically significant roles in influencing growth, although our preliminary evidence suggests that export concentration rather than diversification is associated with growth.

Table 9: Growth Channels, 1953–2009

Dependent variable: GRGDPCH (Growth rate of real GDP per capita)[a]	(1) General	(2) Specific	(3) Standardized
Constant	0.6287***	0.4572***	
	(3.79)	(3.31)	
Ln RGDPCH $_{t-1}$	-0.0757***	-0.0592***	
	(-4.23)	(-3.89)	
GFCF_PROP_GDP	0.0017***	0.0019***	0.3559***
	(2.98)	(3.83)	(3.83)
GFCF_PROP_GDP $_{t-1}$	-0.0002		
	(-0.17)		
GFCF_PROP_GDP $_{t-2}$	-0.0003		
	(-0.56)		
K_PROP_TOTAL_IMPORTS	0.0972***	0.0900***	0.2583***
	(6.00)	(5.46)	(5.46)
K_PROP_TOTAL_IMPORTS $_{t-1}$	-0.0979***	-0.0852**	-0.2614**
	(-2.82)	(-2.32)	(-2.32)
K_PROP_TOTAL_IMPORTS $_{t-2}$	0.0751**	0.0745**	0.2192**
	(2.40)	(2.26)	(2.26)
CONINDEX	0.0640	0.0571**	0.3156**
	(1.40)	(2.57)	(2.57)
CONINDEX $_{t-1}$	0.0264		
	-0.62		
CONINDEX $_{t-2}$	-0.0444		
	(-0.97)		
Time Dummies	yes	yes	
Country Dummies	yes	yes	
$GFCF_t + GFCF_{t-1} + GFCF_{t-2}$	0.0012		
Wald statistic	2.41		
p-value	[0.122]		
$KPROP_t + KPROP_{t-1} + KPROP_{t-2}$	0.0745	0.079	0.2431
Wald statistic	5.11	5.01	5.01
p-value	[0.03]	[0.03]	[0.03]
$CON_t + CON_{t-1} + CON_{t-2}$	0.0460		
Wald statistic	1.46		
p-value	[0.284]		
Adjusted R-squared	0.70	0.64	
Cross-sections included	35	35	
Observations	198	240	

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

Source: Authors

Let us turn now to the next link in the chain by looking at the effect of our main variables of interest on each one of the growth channels identified. We do this by estimating a regression of the following form:

$$X_{it} = \alpha'' + \beta_0'' \ln RGDPCH_{it-1} + \sum_{i=0}^{2} \delta_i'' Industry\_prop\_GDP_{jt-i} + \sum_{i=0}^{2} \gamma_i'' Manuf\_X\_GDP_{jt-i} + \sum_{i=0}^{2} \lambda_i'' TB\_prop\_GDP_{jt-i} + \sum_{i=0}^{2} \pi_i'' proportion\_X\_Developed_{jt-i} + f_t'' + f_j'' + \varepsilon_{it}'' \quad (3)$$

where X denotes either $GFCF\_prop\_GDP$ or $K\_prop\_Total\_imports$ or $CONINDEX$, depending on the equation estimated. Table 10 provides the estimation results for the specific equation in both nonstandardized forms (columns 1, 3, and 5) and standardized forms (columns 2, 4, and 6). 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, providing one transmission channel for our earlier finding of a positive correlation between this variable and output growth. A look at the standardized coefficients in column 2 indicates that the normalized effect of the industry share of GDP is greater than that of $proportion\_X\_Developed$.

Column 3 presents the most parsimonious form estimates with $K\_prop\_Total\_\mathrm{Im}ports$ 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 also have important roles to play, in terms of both statistical significance and economic magnitude. This finding provides more empirical support for the hypothesis that exports to industrialized countries require more advanced production processes that typically require imported capital goods.

Table 10: Proximate Determinants of Growth Through Transmission Channels, Ordinary Least Squares (OLS), 1953–2009

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:[a]	GFCF_PROP_GDP		K_PROP_TOTAL_IMPORTS		CONINDEX	
	Specific	Standardized	Specific	Standardized	Specific	Standardized
Constant	4.1913	-0.1953**	0.2521***	-0.1112	0.4969***	0.2487**
	(1.48)		(14.11)		(7.75)	
INDUSTRY_PROP_GDP	0.5152***	0.9494***				
	(5.85)					
INDUSTRY_PROP_GDP $_{t-1}$					-0.0038**	-0.2626**
					(-2.46)	
INDUSTRY_PROP_GDP $_{t-2}$						
MANUF_X_GDP			0.0030***	0.6578***	-0.0016*	-0.1920*
			(7.25)		(-1.70)	
MANUF_X_GDP $_{t-1}$						
MANUF_X_GDP $_{t-2}$						
TB_PROP_GDP	-0.4292***	-0.9518***			0.0030**	0.2499**
	(-8.13)				(2.38)	
TB_PROP_GDP $_{t-1}$			0.0009***	3.7416***	-0.0039***	-8.4322***
			(2.62)		(-3.73)	
TB_PROP_GDP $_{t-2}$	0.0543*	3.2772*			0.0000***	0.0571***
	(1.92)				(5.03)	
PROPORTION_X_DEVELOPED						
PROPORTION_X_DEVELOPED $_{t-1}$	5.9136**	0.1582**				
	(2.28)					
PROPORTION_X_DEVELOPED $_{t-2}$			0.0924**	0.1706**		
			(2.33)	(2.33)		
Time Dummies	yes	yes	yes	yes	yes	yes
Country Dummies	yes	yes	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			-0.0009	-8.1251
Wald statistic	47.23	1.90			1.35	14.00
p-value	[0.000]	[0.1676]			[0.247]	[0.0002]
$LnPRO_t + LnPRO_{t-1} + LnPRO_{t-2}$						
Wald statistic						
p-value						
Adjusted R-squared	0.79	0.79	0.72	0.72	0.83	0.83
Cross-sections included	33	33	33	33	36	36
Observations	256	256	280	280	246	246

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

Source: Authors

Considering next the index of export concentration (column 5), three variables—$Industry\_prop\_GDP$, TB_prop_GDP, and $proportion\_X\_Developed$—have a negative effect on export concentration, although the summed coefficient of the trade balance variable is not statistically significant. The results thus suggest that export concentration tends to decline with an increase in the share of industry and manufactured exports in GDP. Again, these results are in line with intuition, given that industrialization and investment is expected to promote diversification of the export basket. What is less consistent with recent literature is our earlier finding that diversification is not positively associated with output growth, at least in the Asian case.

In summary, 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. However, we do not find any effect of $proportion\_X\_Developed$ on export concentration or diversification.

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 subsamples and to the exclusion of outliers, and for possible transmission channels. Our main finding is that the proportion of total Asian country exports destined for industrialized countries is the most robust correlate of real per capita GDP growth. The industry share of GDP, used as a proxy for the size of the tradable sector, is also positively associated with growth—indeed the standardized coefficient is larger than that for the share of exports destined for industrialized countries—but the overall effect is statistically insignificant in many regressions. The other two variables of interest—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 found some suggestive evidence that the proportion of exports destined for industrialized countries may have mattered more for East and Southeast Asian countries, a group that is distinguished by the high share of manufactures in exports.

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 or 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.

Most importantly, 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 based on the growth of tradable production for domestic consumption rather than exports. Industry 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 rate and we get the 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 subsidies for domestic tradable production and removal of penalties on 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 also be interesting 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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