2006

Pursuing Manufacturing-Based Export-Led Growth: Are Developing Countries Increasingly Crowding Each Other Out?

Arslan Razmi
University of Massachusetts - Amherst

DEPARTMENT OF ECONOMICS

Working Paper

Pursuing Manufacturing-Based Export-Led Growth: Are Developing Countries Increasingly Crowding Each Other Out?

by

Arslan Razmi

Working Paper 2006-05

UNIVERSITY OF MASSACHUSETTS
AMHERST

Pursuing Manufacturing-Based Export-Led Growth: Are Developing Countries Increasingly Crowding Each Other Out?

by

Arslan Razmi
University of Massachusetts, Amherst

May 2006

Abstract

This study empirically investigates the presence of crowding out effects emerging from intra-developing country competition in export markets for manufactured goods. Export equations are estimated for a panel consisting of twenty major developing country exporters of manufactures, after developing weighted price and quantity indexes based on their exports to thirteen major industrialized countries. The results indicate that in spite of an increase in the elasticity of industrialized country expenditures on imported products, crowding out effects became much more significant in the 1990s. The estimated crowding out effects vary across time periods, SITC categories, and levels of technological sophistication of exports.

JEL Codes: F10, O01, F42

Keywords: Crowding out, export displacement, real exchange rates, intra-developing country competition, dynamic panel data techniques, generalized method of moments.

Contact Author: Arslan Razmi, Department of Economics, University of Massachusetts, Amherst, MA 01003, Tel: (413) 577-0785, Fax: (413) 545-2921, E-mail: arazmi@econs.umass.edu.

1 Introduction and Background

Recent decades have seen major changes in the structure of the global economy. These changes that are typically discussed under the broad rubric of globalization, liberalization, and economic reforms have many aspects. This paper focuses on two; (1) after decades of relatively internally-focused developmental policies, many developing countries have come to depend on more outward-focused policies, relying to a much greater degree on external sources of demand and technological change, and (2) much of the increase in exports has occurred in manufactures.

Table 1 highlights the relative shift to external sources of demand. The table presents data on sources of demand for a select group of 20 countries.[1] Domestic absorption (household consumption, gross capital formation, and government spending) now constitute a lower proportion of total demand, on average, while exports constitute a significantly larger proportion.[2] Figure 2, which shows the nominal and real (nominal deflated by a weighted export price index) growth rates of exports of manufactures from twenty major low- and middle income developing countries underscores the rapid growth of manufactured exports from these countries.[3]

Figure 1 highlights the other, perhaps even more important, shift – that in the composition of developing country exports and the emergence of many developing countries as major exporters of manufactured products. Manufactures rose as a percentage of developing country exports from about 20 percent in 1980 to almost 70 percent in 1998.

While the relative roles of various factors remain debatable, there is little doubt that the role of policy choices backed by professional economic advice has been significant. Trade-related economic advice typically derives from textbook models based on the small country case. An economically small country faces a perfectly elastic demand curve for its exports, and acts as a price-taker in international markets. In such a world, demand-side constraints do not play a significant role in determining export success. Models taking a more developmental approach, on the other hand, emphasize the different characteristics of manufactured products as compared to primary commodities. Graduating into producing manufactured products potentially enables

[1]As discussed below, these are the countries that constitute our empirical sample.

[2]The increased share of exports has partly been offset by the reduced share of domestic absorption, and partly by the increased share of imported goods in domestic spending.

[3]See section 3.3 for the list of these twenty countries and the basis for their inclusion in our sample. Also see section 3.1 for a description of the construction of the weighted export price index.

countries to escape the declining terms of trade typically associated with primary commodities, in addition to facilitating technological progress and enhanced efficiency in production. Moreover, if the developing world evolves in a manner consistent with the "flying geese" paradigm,[4] then countries that successfully export their way to growth climb up successive rungs of the "technological ladder," creating room for less advanced countries further down the ladder, and indeed becoming a source of demand for their exports. Countries thus scale the steps to industrial development in a more or less harmonious fashion, with the initially rapidly developing exporters "crowding in" the later followers.

Given these overlapping perspectives, it is not surprising that trade emerges as a win-win game, at least as long as we take nation-states as the unit of analysis.[5] However, there are reasons to believe that key assumptions underlying both perspectives may be becoming increasingly shaky. Firstly, a typical developing country may be reasonably seen as a small country, but a group of developing countries attempting to grow by exporting similar products may not. Indeed, in the latter scenario, "immiserizing growth" along the lines first worked out by Bhagwati (1958) becomes a distinct possibility. Secondly, to the extent that a number of developing countries focus on meeting demand emanating from industrial country markets in a similar range of manufactured products, the very nature of manufactured exports may be undergoing changes that enhance price-based competition among developing countries, a phenomenon referred to by Kaplinsky (1993) as the "commoditization" of manufactures. Both reasons for skepticism are valid only to the extent that developing country exports are relatively close substitutes for each other. In other words, if too many countries try to fly simultaneously, tiers of the flying geese formation may become too clogged for their own good. Insofar as export-led growth in a world of close substitutes depends heavily on cost competitiveness, a congested formation creates incentives for short-run measures such as wage suppression as opposed to

[4]The flying geese concept traces back to Akamatsu (1935), who originally used it as a metaphor for the industrial catch-up of technologically less advanced economies. In broad terms, this concept envisions a hierarchically structured formation of economies in which a dominant economy (for example, Japan in East Asia) acts as the growth pilot, followed by other economies at various levels of development; the formation is the widest at the lowest end of the technological/developmental spectrum. As the less developed countries increase their industrial sophistication, they move ahead into the more advanced tiers of the flying geese formation, while the smaller number of countries in the lead continue to move further ahead. See Kasahara (2004) for a review.

[5]Changes in internal income distribution that create winners and losers is a separate matter, of course, and one that can in theory be ameliorated through national compensation schemes.

long-run policies that reduce unit production costs through increased productivity. A third reason derives from a somewhat different source. Classical models of trade are typically based on the idea of "reciprocal demand." Exports from country A to country B provide the former with the purchasing power to import from the latter and results in mutual gains from (balanced) trade, the relative magnitude of gains being determined by the terms of trade.[6] However, if developing countries mainly target industrialized country markets, then the idea of reciprocal demand becomes less applicable, and the potential "crowding out" effect of competitor exports may lead developing countries to pursue price-based competition. The resulting decline in terms of trade (or alternatively, increase in price competitiveness) may, in turn, lead to increased industrialized country protectionism in various forms such as quotas, anti-dumping legislation, and pressure to revalue currencies.[7] To the extent that developing countries hitch their growth to industrial country demand, this also places further demand-side constraints on countries pursuing the export-led growth paradigm.

Table 2 presents the evolution of various country shares in total manufactured exports from developing countries between 1986 and 2002. The statistics, which highlight the emergence of China as an exporting powerhouse more or less across all SITC categories, serve to illuminate our discussion as China is likely to have significantly contributed to increased intra-developing country competition. While maintaining a significant presence amongst exporters of SITC category 6 products (manufactured goods classified chiefly by material), China has been able to increase its industrial country import market share of SITC 8 products (miscellaneous manufactured articles), and has now also become a major presence amongst exporters of SITC category 7 products (machinery and transport equipment). This means that China potentially competes not only with exporters of low-skill, labor intensive manufactures, but also with exporters of relatively high-tech products.

This paper seeks to empirically explore the presence of demand-side constraints in a world where many developing countries have made a major push for export-led growth based on manufactures. The term "demand-side constraints" in our context captures two effects; (1) the constraints imposed by the pace of growth of (industrial country) demand for developing

[6]The terms of trade, in turn, being determined by relative demand.
[7]Think US current account deficits with many developing countries, for instance.

country products, and (2) the constraints imposed by the presence of an increasing number of developing countries attempting to sell internationally-substitutable products in industrial country markets. The latter can be econometrically explored either directly through estimating the degree of substitution between developing country exports, or through testing for the presence of a quantitative crowding out effect. We pursue the latter approach in this study. In doing so, we seek to contribute to existing literature in several ways. Unlike some previous studies we control for common income and relative price-related shocks. We base our study on a large sample of developing countries which have a major share of manufactures in their exports. We limit our study to manufactured products, for which expenditure elasticity of demand is typically considered to be higher, thus stacking the decks against finding significant crowding out effects. We develop carefully designed expenditure and real exchange indexes for each individual country to take into account the relative importance of trading partners and changes in trade patterns over time. Furthermore, we pursue various dynamic panel data approaches to derive estimates for both aggregated and SITC category-wise disaggregated exports. Finally, we explore possible differences in behavior between the two decades covered by our sample period, as well as between countries exporting products at different levels of technological sophistication.

The rest of this paper is organized as follows. Section 2 presents a brief review of existing literature. Sections 3 and 4 discuss the empirical approach, alternative estimation methodologies, and the results obtained. Section 5 then summarizes the conclusions.

2 Literature Review

The empirical studies most relevant to this paper can broadly be classified into three categories, (1) general equilibrium simulation studies, (2) studies of price-based competition, and (3) studies of quantitative "crowding out" effects.

The ongoing Doha Round of trade negotiations, and the entry of China into the World Trade Organization (WTO) has drawn some much-needed attention to the repercussions of intra-developing country competition. For example, Walmsley and Hertel (2000) explored the effects of China's WTO accession to the WTO over the period 1995 - 2020 using the dynamic GTAP (Global Trade Analysis Project) model applied to 19 regions and 22 commodities. Most relevant to our study is the result derived from simulations that while the world as a whole would benefit, China's competitors in the labor-intensive apparel industry would experience significant losses in real income, partly due to declining terms of trade.

General equilibrium simulations, while useful for carrying out policy experiments, suffer from some serious limitations. Firstly, these impose restrictions on the data that may abstract away some of the most interesting aspects of the questions at hand.[8] Secondly, such studies assume the values of the parameters involved, unlike empirical studies where these are actually estimated. Thus, the results follow from the calibration of the parameters.

A few studies of the degree of substitutability between developing country products have appeared over the last fifteen years. Faini *et al.* (1992), Muscatelli *et al.* (1994), and Razmi and Blecker (2005) estimated export demand equations for several developing countries. The estimates tended to undermine the assumption implicit in many pro export-led growth arguments that developing country manufactures tend to face large elasticities of export demand, and that, therefore, supply-side factors play the dominant role in determining export values.[9] Moreover, the estimates showed that, for most of the developing countries in the sample, competition with other developing country exporters was a more important consideration than that with industrial country exporters.[10] Razmi and Blecker (2005) found further that intra-developing country competition is significant only among countries exporting mainly low-technology products, while countries that export more high-technology products (mainly the more technologically advanced East and Southeast Asian countries) compete more with industrial country producers and also have higher income (expenditure) elasticities of demand for their exports. The general conclusion emerging from these studies is that if developing countries as a group embark on export-oriented development strategies the output and employment gains are likely to be less than those estimated by studies which ignore intra-developing country competition.

[8]For example, the GTAP model assumes full (or constant) utilization of resources and balanced trade (or constant trade imbalances).

[9]See Balassa (1988), for instance.

[10]As inferred from the higher price elasticities of individual countries with respect to other developing countries as a bloc than those with respect to the industrial countries as a bloc.

While estimates of the extent of substitutability between developing country manufactured exports provide very useful information regarding the nature of international price competition, an alternative approach is to explore possible quantitative displacement or crowding out effects on individual countries of changes in competitor exports. In the absence of demand-side constraints, a change in competitor exports would be expected to have no effect on individual country exports. However, if external demand grows at a pace that is insufficient to accommodate increases in developing countries' export supply, we will expect to see crowding out effects of competitors' export growth. While the crowding-out angle, unlike the degree of substitution one, does not directly test underlying structural mechanisms, it does have two advantages; (1) to the extent that a significant proportion of developing country export production is now part of globally integrated supply chains, which may be relatively less sensitive to relative price effects and more sensitive to other factors affecting the composition and nature of vertical supply chains, competitive effects may be easier to identify through quantitative changes rather than real exchange rate changes, and (2) insofar as disaggregated export prices for individual SITC categories are not available (unlike quantitative data), testing for quantitative crowding out effects has an advantage over testing for relative price effects. A very limited number of studies have explored quantitative crowding out effects. Given their relevance to our study, we now discuss these in relatively greater detail.

Eichengreen *et al.* (2004) studied the impact of Chinese export growth on other developing countries using a gravity model to estimate coefficients for the sample period 1990-2002. The study found that while Chinese exports of consumer goods crowd out exports from other Asian countries, those of capital goods do not. The implication is that Chinese export growth is likely to have negative consequences for relatively less technologically advanced consumer goods-exporting Asian countries, but positive consequences for exporters of more sophisticated capital goods, who benefit from the high Chinese income elasticity of import demand for such products. Eichengreen *et al.* (2004) is an important study. However, it limits its scope to analyzing China's export growth, and the possible crowding out of Asian country exports by China. Moreover, the sample period leaves out the early and mid-eighties, which spans crucial years in the transformation of many developing countries into more outward-oriented economies.

Ahearne *et al.* (2003) explored possible crowding out effects using data for the four Asian newly industrialized economies (NIEs) and four other emerging Asian economies (ASEAN-4) by adding China's real export growth as a regressor to a constant elasticity of substitution (CES) export equation that included trading partner income growth and real exchange rates as the other regressors. The study, found that, for the sample period 1981-2001, overall Chinese exports played a complementary (although statistically insignificant) role to NIE plus ASEAN-4 exports, and that a major shifting of trade patterns has occurred over time consistent with a 'flying geese' pattern in which China and the ASEAN-4 moved into the product space vacated by the NIEs. However, the non-econometric analysis of industry-wise disaggregated data did find some crowding out effects. While this study is a useful attempt to study intra-developing country competition, it suffers from some limitations. Firstly, it only tests for displacement of NIE and ASEAN-4 exports by Chinese exports. While China's presence in global markets has increased manifold in recent decades, other developing country exporters remain important. Moreover, China may be a more important competitor for some countries than for others. Secondly, the study estimates equations for aggregate export data only. Thirdly, the aggregate data includes primary commodities and agricultural products, which may be subject to a different kind of international environment than manufactured products. Fourthly, by using fixed effects panel techniques, the methodology pursued in the study may not take into account possible correlations between the regressors and the error terms, making the estimates inconsistent. Fifthly, by using trading partner income growth, the study largely ignored the fact that imports into industrialized countries grew at a much faster pace than their GDP growth rates. This would tend to overestimate the income elasticity of demand for developing country products, while underestimating any potential crowding out effects. Finally, in order to explain the observation that NIE share of industrial country markets has declined at the same time as their share of the Chinese market has increased, the authors hypothesize that both changes partly resulted from the movement of NIE producers into China, which then imports inputs from the NIEs while exporting final products to western markets. While this may explain shifts in the nature of NIE exports, it can hardly explain the more general case of other developing countries whose firms do not have the size or capacity to move and set up shop in other countries.

Palley (2003) analyzed the presence of crowding effects in US imports from several countries. The study used growth rates of merchandise imports from various individual countries as the dependent variable while using growth rates of US merchandise imports and growth rates of imports from various competing countries as regressors. A negative sign on the latter variable was interpreted as evidence of crowding out of exports by competitors. The study found that, over the period 1978-1999, exports from the NIEs were subject to large crowding out effects from China, while Japanese exports experienced displacement from Mexico. However, the study was limited to imports into the US, which is relatively more open to developing country exports compared to many other industrialized countries. Moreover, the study ignored relative price effects, which may be particularly important in the case of low-tech, labor-intensive manufactures. Furthermore, the study included merchandise in general, thus not limiting the data to manufactures. The data is analyzed at an aggregated level only. Finally, the use of several variables to capture exports from individual country competitors (one regressor per competing country or region) is likely to have led to serious collinearity problems since many of these countries experienced similar growth trends over the period.[11]

3 Empirical Approach and Data

Our objective is to study the existence of possible demand-side constraints on export-led growth in the form of crowding out of developing country exports by competitor exports. The most direct way to do so would be to look at correlations between individual country export volumes and those of its competitors. However, this approach does not control for the influence of developments that raise exports from both the country under consideration and its competitors. For example, a developing country's exports could rise due to a general increase in industrialized country expenditures, even though nothing else has changed. Similarly, a developing country's exports could rise due to a depreciation of its real exchange rate relative to industrialized countries, without any change in its real exchange rate relative to other developing country competitors. Since our focus is on crowding out effects due to intra-developing country competition, not controlling for these factors will tend to bias our estimates downwards. Following

[11] Indeed, the author explicitly recognizes collinearity-related concerns.

Ahearne *et al.* (2003), therefore, our specification consists of an export equation of the standard CES form, with a regressor added that captures the effect of changes in competitors' exports. Unlike Ahearne *et al.* (2003), however, we use a real effective exchange rate index specifically constructed to reflect relative prices between each individual developing country and the bloc of industrialized countries only. This is done for two reasons; (1) several studies have shown that the elasticity of substitution between developing country products is different from that between industrialized country and developing country products,[12] and (2) the crowding out hypothesis implicitly assumes that developing country products are to a significant degree substitutes for each other. Including a separate real effective exchange rate index relative to other developing countries will therefore introduce serious redundancy into the specification, with two variables capturing the same effect.[13]

Our empirical specification for developing country j can be expressed in a summarized implicit form as:

$$X^I_{j,real} = f(M^I_{real}, RPX^I_j, X^I_{com,real}); \qquad f_1, f_2 > 0, f_3 \lesseqgtr 0 \tag{1}$$

where $X^I_{j,real}$ denotes real exports (export values deflated by an export price index), M^I_{real} denotes real industrial country expenditures on imports, RPX^I_j denotes the real effective exchange rate relative to industrialized countries, and $X^I_{com,real}$ denotes the real exports of country j's developing country competitors (total value of competitors' exports deflated by a weighted price index). *A priori*, we would expect an increase in industrialized country expenditures on imported goods to raise manufactured exports from developing countries. Similarly we would expect a real devaluation relative to industrialized countries to boost exports from developing countries. The sign of the coefficient of the third variable on the right hand side, however, is ambiguous. If manufactured exports from developing countries are relatively close substitutes for each other, we would expect to see crowding out appear in the form of a negatively signed coefficient.[14] However, if developing country manufactures do not significantly compete with each other, we would expect to see either a null coefficient, or in the presence of strong income

[12]See, for example, Spilimbergo and Vamvakidis (2003).

[13]In other words, a relatively high degree of substitution would show up both in the coefficient for the real effective exchange rate variable vis-à-vis other developing countries and the coefficient for quantitative displacement. This will create a (downward) redundant variable bias in the estimate of the crowding out effect.

[14]Note that this crowding out effect would capture both price- and quality-based competition.

effects and/or complementarity, even a positive coefficient (see section 4.3). Thus, our test of the crowding out hypothesis mainly turns on the sign of f_3, which we henceforth refer to as the *crowding out* or *displacement* coefficient.

A qualification is in order here. At the broadest level, real exchange rate movements can be decomposed into two components; (1) nominal exchange rate movements, and (2) relative price movements. To the extent that a developing country's nominal exchange rate movements are largely identical relative to other countries irrespective of whether the latter are industrialized or developing countries,[15] component (1) would therefore capture changes in competitiveness relative to both industrial country producers and other developing country exporters. It is highly likely, therefore, that f_2 does not purely reflect changes in price competitiveness relative to industrialized countries only, and that it picks up some of the effects that f_3 is supposed to capture. This has two implications. Firstly, the crowding out coefficient is likely to be under-estimated, and secondly, insofar as developing country products are closer substitutes for other developing country products, the elasticity of substitution with respect to industrialized country products is likely to be over-estimated.

3.1 Construction of Quantitative and Price Indexes

The construction of aggregated indexes in the presence of multiple countries raises several issues.[16] This section briefly explains our construction of each index.

$X^I_{j,real,t}$: This was conceptually the simplest index to construct, and consists for a given time period t of the total value of exports from developing country j to the 13 industrialized countries ($i = 1, 2, \ldots, 13$) in our sample deflated by country j's export price. Or,

$$X^I_{j,real,t} = \frac{\sum_{i=1}^{I} X^i_{j,t}}{P_{j,t}} \tag{2}$$

$M^I_{real,t}$: Total expenditures by all 13 industrialized countries on imports deflated by a weighted import price index. The inclusion of imports from the *entire* world, and of *all* products is meant to ensure the exogeneity of this regressor. In other words, an increase in exports

[15] A nominal depreciation, for example, is relative to all currencies, and not just one set of currencies, given the competitive nature of international currency markets.

[16] See, for example, Maciejewski (1983) for a detailed discussion.

of manufactures from Bangladesh is not likely to noticeably affect total imports by the US of all products from the entire world. The weights used represent the share of each industrialized country in total imports of all industrialized countries. The idea is to control for any increase in exports from developing country j that occurs simply due to increased industrialized country spending on imports (due to cyclical upswings, greater openness, rise in income, or other reasons).[17] Mathematically,

$$M^I_{real,t} = \frac{\sum_{i=1}^{I} M^i_t}{\sum_{i=1}^{I}\left(\frac{M^i_t}{\sum_{i=1}^{I} M^i_t}\right) P^{M,i}_t} \tag{3}$$

where $P^{M,i}_t$ denotes the import price of industrialized country i.

$RPX^I_{j,t}$: The ratio of a weighted index of industrialized country wholesale price index to developing country j's own export price. The idea is to capture the competitiveness of country j's exporters relative to industrial country producers. The weights capture the importance of each industrialized country for each developing country. For example, while the European Union (EU) is a more important market than the US for Tunisia, the reverse is true for Mexico. The EU should therefore, be assigned a greater weight while calculating the relative competitiveness of Tunisian exports to industrialized countries, while the US should be assigned a greater weight for Mexico. This variable controls for any change in country j's exports due to relative price changes with respect to industrialized countries *irrespective* of whether any crowding out takes place or not. In other words, a developing country j's exports to industrialized countries could increase simply because its price relative to industrial country producers falls, even if there is no relative price change or crowding out vis-a-vis other developing countries.

$$RPX^I_{j,t} = \frac{\sum_{i=1}^{I}\left(\frac{X^i_{j,t}}{\sum_{i=1}^{I} X^i_{j,t}}\right) P^i_t}{P^j_t} \tag{4}$$

Notice the implicit assumption that developing country exporters compete mainly with industrialized country domestic producers, and not industrialized country exporters.

$X^I_{com,real,t}$: This is the variable most directly of interest. It is constructed for each developing

[17] One could construct this index using a weighted average of individual industrialized country GDPs instead of expenditures on imports. However, such a measure would include expenditures on both tradables and non-tradables. Moreover, since industrialized country imports grew much faster than industrialized country GDP (partly due to lower trade barriers), using GDPs would tend to underestimate expenditure coefficients.

country j by deflating the sum of all manufactured exports from all non-j developing countries to all industrialized countries by a weighted export price index aggregated over all competing developing countries. The weight for each competitor ($l = 1, 2, \ldots L, l \neq j$) represents its importance in the group of all competitors, as measured by its share of exports. The idea is to attempt to measure the crowding out effect as carefully as possible. Mathematically,

$$X^I_{com,real,t} = \frac{\sum_{l \neq j}^{L} \sum_{i=1}^{I} X^i_{l,t}}{\sum_{l \neq j}^{J} \left(\frac{\sum_{i=1}^{I} X^i_{l,t}}{\sum_{l \neq j}^{L} \sum_{i=1}^{I} X^i_{l,t}} P^l_t \right)} \tag{5}$$

3.2 Econometric Approach(es)

Panel unit root tests indicated that all the variables used in our analysis are integrated of order one, i.e., I(1).[18] We, therefore, used the Bewley specification to derive our first set of estimates. This specification is a reparametrization of the autoregressive distributed lag (ARDL) approach. As suggested by the simulations in Inder (1993), incorporating more information in the regression via the Bewley transformation is likely to yield estimators with improved characteristics. In its simple bivariate form, the Bewley specification can be expressed as follows:

$$Y_t = \alpha_0 + \beta_0 W_t - \beta_n \Delta W_{t-m+1} - \Gamma_m \Delta Y_{t-m+1} + \epsilon_t \tag{6}$$

where Y is the dependent variable, W is the covariate,[19] t denotes the time period, and m and n are the autoregressive and distributed lag orders, respectively.[20] Due to the presence of the contemporaneous differenced dependent variable on the right hand side, the Bewley transformation requires the use of instrumental variables. Typically, the first lag of the dependent variable, along with level instances of the other exogenous variables on the right hand side are used as instruments for ΔY_t.[21] In our case, the real annual value of exports from each developing country $X^I_{j,real}$ is the dependent variable, while the set of covariates consists of the

[18]We carried out a battery of unit root tests, including the Levin, Lin and Chu test, the Breitung test, the Im, Pesaran and Shin test, the ADF-Fisher test, the PP-Fisher test, and the Hadri test. While the first five tests have the presence of a unit root as the null hypothesis, the latter is based on the null hypothesis of stationarity. The test results, although not reported here, are available from the author on request.

[19]Which in our case would be industrial country expenditures, each developing country's export price relative to industrialized countries, and total volume of exports from each developing country's competitors.

[20]More details of the Bewley transformation are available from the author on request.

[21]See Wickens and Breusch (1987).

variables on the right hand side of equation (1) in levels and first differences. We derived two stage least square (2SLS) estimates using a fixed effects model to account for unobserved country specific heterogeneity. White cross-section standard errors were used to allow for general contemporaneous correlation between residuals.

While our first set of estimates provide a useful benchmark, the estimates are likely to be biased and inconsistent in the presence of the lagged dependent variable term on the right hand side. This is because this term is likely to be correlated with the unobserved heterogeneity component of the contemporaneous error term, leading to potential endogeneity issues. We therefore, derived a second set of estimates following the augmented system Generalized Method of Moments (GMM) approach developed by Arellano and Bover (1995). This dynamic panel data approach uses orthogonal deviations to sweep out the individual country-specific intercepts. All the right hand side variables except for the lagged dependent variable were assumed to be weakly exogenous,[22] an assumption bolstered by diagnostic tests, as discussed below. The second and further lags of real exports and the levels and first lags of all other variables were used as the instruments. The Sargan test for overidentifying restrictions was utilized to validate the appropriateness of the instruments used.

3.3 Sample and data

Our sample spans the period 1984-2002. The industrialized countries in our sample include 13 large importers from developing countries, namely Austria, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, the United Kingdom (UK), and the United States (US). Exports of manufactures to these countries constituted, on average, over half of all exports of manufactures from the developing countries in our sample in 2003.[23] The developing countries include Bangladesh, Brazil, China, Costa Rica, Hungary, India, Indonesia, Jordan, Malaysia, Mauritius, Mexico, Morocco, Pakistan, the Philippines, Poland, South Africa, Sri Lanka, Thailand, Tunisia, and Turkey. All countries were included for which in 2003: (1) annual exports of manufactures were greater than one billion dollars, (2) the proportion of manufactures in total exports was greater than 50 percent, and (3) annual per capita

[22]That is, uncorrelated with future realizations of the error term.
[23]Author's calculations based on data from UNCTAD's COMTRADE database.

GDP was less than 6,000 dollars, (4) data were available for most of the sample period.[24] All exports of manufactured products falling under SITC categories 5-8 (excluding category 68) were included.[25] Given that export price data for most developing countries are available only for aggregate exports, condition (2) reflects our desire to only include developing countries for which changes in aggregate export prices are likely to be predominantly affected by changes in prices of manufactured exports. The average proportion of manufactured products in the total exports from the developing countries in our sample was almost 80 percent in 2003.[26]

In the following section, we present the results of our econometric analysis. The panels represent data at different levels of aggregation. A brief description of each panel follows:

ALL: Includes all the countries.

LT: Includes all the countries for which the proportion of high-technology manufactures in their total exports was less than 10 percent in 2001, according to World Bank figures. High-technology exports are products with high R & D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. The list of such countries includes Bangladesh, Brazil, India, Indonesia, Jordan, Mauritius, Morocco, Pakistan, Poland, South Africa, Sri Lanka, Tunisia, and Turkey.

HT: Includes all the countries for which the proportion of high-tech manufactures in their total exports was greater than one-third in 2001, according to World Bank figures. The list of such countries includes Costa Rica, Malaysia, Philippines, and Thailand.

In addition, since the respective proportions for China (20.6 percent), Hungary (24.1 percent), and Mexico (22 percent), fell in between the two categories, these countries were included in both panels. We also estimated equations for individual SITC manufacturing categories. SITC category 5 (which is the smallest category in terms of the value of exports from our 20 developing countries) includes chemicals and related products, category 6 includes manufactured goods classified chiefly by material, category 7 includes machinery and transport equipment, while category 8 includes miscellaneous manufactured articles. The panel names

[24] Countries that met the first three criteria but had to be excluded due to the data unavailability problem include Belarus, Bulgaria, Cambodia, Croatia, the Czech Republic, Estonia, Latvia, Lebanon, Lithuania, Romania, Slovakia, and Macedonia. Most of these were COMECON members during part of our sample period.

[25] The latter category, which includes non-ferrous metals is often excluded from the category of manufactured products in empirical studies. See Sarkar and Singer (1993) for a discussion.

[26] Author's calculations based on data from UNCTAD's COMTRADE database.

are self-explanatory. Export values for the relevant SITC category products only were used for developing both individual country and competitor real export indexes. Furthermore, we selected a few major SITC categories at the two-digit level of disaggregation. These categories, which include SITC 65 (textile yarn, fabrics, made-up articles, n.e.s., and related products), 75 (office machines and automatic data-processing machines), 77 (electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof), 84 (articles of apparel and clothing accessories), and 85 (footwear), were selected on the basis of their importance in total exports from these developing countries. Almost 58 percent of manufactured exports from the developing countries included in our study fell under these five sub-categories in 2001.[27]

4 Econometric Results

For the reasons mentioned earlier, our estimation strategy consists of two different approaches; (1) Bewley estimates of a transformed ARDL(1,1) model, and (2) dynamic panel data estimates of an ARDL(1,1) model using the GMM approach. To test for a possible simultaneity bias in our estimates, we carried out Hausman tests for the weak exogeneity of competitor exports and the real exchange rate following the method outlined by Davidson and MacKinnon (1993). In almost all the cases, the test statistics indicated that these variables were weakly exogenous.[28] The next two sub-sections present the results.

4.1 The Bewley Estimates

Table 3 displays estimates for various panels derived from the Bewley approach, and covering the entire sample period (1984-2002). First, we should note that most of the estimates are not statistically significant at the conventional levels.[29] Keeping in mind this caveat about the precision of the estimates, the signs of the estimated long-run coefficients of the industrialized country expenditure and real exchange rate variables are consistent with our expectations in

[27] Author's calculations from UNCTAD's COMTRADE database.

[28] Costa Rica, Morocco, Mauritius, and Costa Rica were exceptions. However, exports from these 4 countries constituted, on average, only about 9 percent of total exports from our sample countries over the sample period. Moreover, subsequent Hausman tests showed that the problem disappeared in almost all the cases once we disaggregated data into SITC 5,6,7, and 8 categories.

[29] This changes once we use the GMM approach to address potential endogeneity problems.

all cases, and their magnitudes mostly fall in the expected range. For most of the panels, the fitted model explains a major proportion of the variation in the dependent variable. For the complete panel, the expenditure elasticity of demand is 2.378, while the relative price elasticity with respect to industrialized countries is 1.458. The coefficient of the variable of most interest to us, i.e., exports from other developing countries, has a negative sign, indicating that an increase in exports from other countries results in crowding out or displacement of the average developing country's exports, the magnitude of the displacement effect being approximately 14 percent (i.e., a crowding out elasticity of 0.14). In other words, a doubling of its competitors' exports results, on average, in a 14 percent decline in a developing country's exports.

Turning to the technologically disaggregated long-run estimates, those for HT countries reveal a higher expenditure elasticity of demand compared to the LT countries. The relative price elasticity with respect to industrialized countries is relatively similar between the two panels. However, while the LT panel does not show much of an effect of increased exports from other developing countries, the HT panel indicates a positive effect, suggesting complementarity.

Turning next to the SITC category-wise disaggregated panels, the estimated coefficients indicate that the largest displacement effect in SITC category 6 exports, over the sample period.[30] The other category that suggests (weaker) displacement effects is SITC 7. Not surprisingly, the coefficients of the real exchange rate variable with respect to industrial countries indicate that the degree of substitution between developing country exports and domestic production in industrialized countries is the greatest in SITC category 7.

Sample period 1984-1993: Table 4 presents estimates for the sample period 1984-1993. The long-run coefficients of the industrial country expenditures variable and the real exchange rate variable have the expected signs with the exception of SITC 75. This latter coefficient may suggest complementarity between developing country exports of SITC 75 manufactures and industrial country products. SITC categories 5 and 6 indicate non-negligible crowding out

[30] It should be noted here that one of our estimates in this, and a few other estimates in later tables yield a crowding out effect of greater than 100 percent (i.e., crowding out elasticity greater than unity in absolute value). This may seem too large at a first glance. However, a little more consideration suggests otherwise. For example, suppose India's exports constitute 20 units out of a total 100 units exported from the developing countries in our sample in a given year. Suppose also that the following year, competitor exports increase by 10 percent from 80 to 88 units. Then, assuming for simplicity no growth in total developing country exports, Indian exports fall by 40 percent to 12, which implies a crowding out elasticity of 4 (or crowding out magnitude of 400 percent)!

effects, although both these coefficients are statistically insignificant.

At the SITC category-wise disaggregated level, SITC categories 5, 6, and 7 indicate elastic expenditure behavior, although when disaggregated at the two digit level, categories 75, 77, and 85 do so. The relative price coefficients indicate elastic responses only for SITC category 77. None of the SITC categories at the two digit level indicate displacement effects.

Sample period 1993-2002: Table 5 presents estimates for the sample period 1993-2002. The long-run coefficients of the industrial country expenditures variable and the real exchange rate variable have the expected signs with the exception of SITC categories 5, 7, and 75 for which the expenditure elasticity is negative. Moreover, the coefficient of the differenced dependent variable for the SITC 7 panel is positive, suggesting invalid estimates.[31]

The estimated coefficients indicate significant (at the 10 percent level) crowding out effects for the ALL, SITC 65, 84, and 85 panels. Moreover, the displacement coefficients are also negative, although insignificant for the LT, SITC 6, and SITC8 panels. Thus, most of the panels suggest crowding out effects, although some of the estimates are statistically insignificant. The crowding out elasticities range from 0.16 (for SITC 8) to 2.80 (for SITC 84).[32]

In summary, a look at tables 4 and 5 indicates that displacement or crowding out effects were a more major problem in the second period. More specifically, while in the earlier sub-period only SITC category 5 and 6 coefficients indicate a displacement effect, in the latter sub-period, the coefficients for the All, LT, SITC 6, 8, 65, 84 and 85 categories indicate such an effect.

4.2 The GMM Estimates

For reasons noted earlier, the Bewley estimates are likely to be biased and inconsistent. We therefore, now turn to the GMM estimates. In the interest of brevity, we will focus our discussion mainly on the long-run estimates.[33] These estimates reveal a pattern broadly similar to the

[31] More specifically, indicating a long-run multiplier that's either negative or greater than unity.

[32] This, and subsequent estimates indicate that the crowding out elasticity generally increases in absolute magnitude with the degree of disaggregation. This is not surprising since countries are much more likely to be crowded out into switching production patterns across sub-categories under the same broad SITC category, than they are into moving into whole new SITC categories.

[33] The long-run coefficients, α_i were derived from the point estimates using the expression: $\alpha_i = \sum \beta_i/(1-\gamma_i)$, where β_i are the estimated coefficients for the level and lags of the relevant variable and γ is the estimated coefficient of the lagged dependent variable.

Bewley estimates, although with some differences.[34] The GMM estimates, however, are much more precisely estimated.

Sample period 1984-2002: Table 3 presents the estimates for panels that include the entire sample period in the time dimension. The long-run coefficients of the industrial country expenditures variable and the real exchange rate variable have the expected signs. The ALL and LT panels yield long-run expenditure and relative price elasticity estimates of greater than unity, although the expenditure elasticities are higher. Moreover, the short-run elasticities are almost always smaller than the long-run ones.

Turning to the SITC category-wise disaggregated estimates, categories 6 and 7 yielded the highest long-run expenditure elasticity estimates, although when disaggregated at the 2 digit level, only categories 75 and 77 indicated greater than unit elasticity. Also, SITC categories 5, 7, and 8 indicated relative price elastic behavior, while at the two digit level, relative price elasticities were relatively higher for SITC categories 75, 77, and 84, suggesting that these are the categories in which competition with industrial country producers has been the most severe over the sample period.

The long-run estimates indicate a displacement effect for the ALL and SITC category 6 panels only. However, the coefficient is statistically significant at the traditional levels for the SITC 6 panel only. The lagged coefficients of the displacement coefficient are negative across the board, perhaps suggesting lagged displacement effects. For all other panels at various levels of disaggregation, the results indicate either complementarity between developing country exports, or statistically insignificant effects.

Sample period 1984-1993: Table 4 presents estimates for the period 1984-1993. The long-run coefficients of the industrial country expenditures variable and the real exchange rate variable have the expected signs, again with the exception of SITC 75. The ALL and LT panels yield long-run expenditure elasticity estimates of less than one, although the relative price coefficients indicate elastic behavior. Neither of these two panels indicates displacement effects.

At the SITC category-wise disaggregated level, SITC categories 5, 6, and 7 indicate elastic

[34] One major difference is that satisfactory estimates could not be derived for HT group of countries. For the full sample period the adjusted coefficient is close to zero, while that for the first sub-period is negative. Estimates for the second sub-period could not be derived due to singularity issues. Moreover, the Sargan test could not validate the appropriateness of the instruments used in either case.

expenditure behavior, although when disaggregated at the two digit level, only the SITC 77 panel does so. The relative price coefficients indicate elastic responses only for category 77.

The long-run estimates, which are much more precisely estimated than in the case of panels with the full sample period 1984-2002, indicate displacement effects for SITC categories 5 and 6 only. For all other panels, the results indicate complementarity between developing country exports, although the lagged coefficients indicate more widespread lagged displacement effects.

Sample period 1993-2002: Table 5 presents the estimates for the sample period 1993-2002. Again, the long-run coefficients of the industrial country expenditures variable and the real exchange rate variable have the expected signs with the exception of SITC 5 for which the expenditure elasticity is negative. Unlike the previous time period, the expenditure elasticities are higher than the relative price elasticities. The short-run elasticities are almost always lower than the long-run ones.

At the SITC category-wise disaggregated level, both expenditure and relative price elasticities are highest for category 7 at the one digit level. At the two-digit level, categories 75, 77, and 84 yield expenditure- and price-elastic estimates. This pattern suggests that while industrial country demand is most elastic for category 7 manufactures in terms of expenditures, developing country competition with industrial country producers is also sharpest in this category.

The displacement coefficients, which are somewhat less precisely estimated than those for the earlier period indicate statistically significant (at the 10 percent level) crowding out effects for the ALL and LT panels, and for the SITC 6, 8, 77, and 84 panels. Moreover, the displacement coefficient is also negative, although statistically insignificant for the SITC 7, 65, and 85 panels. Thus, almost all the panels with the exception of SITC 5 and SITC 75, suggest crowding out effects, although some of the estimates are statistically insignificant. Moreover, the long-run crowding out elasticities vary from 0.32 (SITC 65) to 1.84 (SITC 84), and the effect appears to be the most significant in SITC categories 84 and 85.

In summary, a look at tables 4 and 5 indicates that displacement or crowding out effects seem to have been a problem in the second time period but not in the earlier one. This combined with a look at the other coefficients indicates that while developing country competed mainly with industrial country producers in the earlier period, intra-developing country competition became quite significant and widespread along a wide range of SITC categories in the second period. Furthermore, increasingly significant crowding out effects coexisted with higher industrial country expenditure elasticities in the second period. Section 4.3 presents an interpretation of these trends.

Robustness Test: As another test of the robustness of our empirical conclusions, we re-estimated the equations using an alternative relative price index, based on the unit value of exports for major developing country exporters of manufactures reported in various issues of UNCTAD's *Handbook of International Trade and Development Statistics.* This index, which is based on the export data from 10 developing countries (Brazil, Hong Kong, Malaysia, Mexico, South Korea, Singapore, Taiwan, Thailand, Turkey, Yugoslavia) shares 6 countries with our dataset. However, it includes Hong Kong, Singapore, South Korea, and Taiwan, which are now high-income countries. Moreover, it excludes several important developing countries including China and India. Nevertheless, the pattern of the displacement or crowding out coefficients is remarkably similar between the two sets of GMM estimates across different time periods, enhancing our confidence in the results.[35]

4.3 Brief Analytical Afterthoughts

Our empirical analysis has assumed the weak exogeneity of relative prices and competitor exports. This scenario was provided some support by our Hausman tests for weak exogeneity. Next, recall some insights emerging from our empirical analysis. As mentioned earlier; (1) expenditure elasticities appear to have increased between the two halves of our sample period, which implies a loosening of potential external demand-side constraints in the quantitative sense, and (2) crowding out effects appear to have become much more widespread across SITC categories during the second half of our sample period. Taken together, (1) and (2) suggest an interesting hypothesis: while demand-side constraints on developing country exports in one sense loosened over the time period under consideration due to relatively more open industrialized country markets, the effect of higher expenditure elasticities was more than offset by the increased supply of manufactured exports from an expanding group of developing countries.

[35]The estimates, although not provided here are available from the author on request.

Let us turn to some simple analytical analysis to illustrate what the data appear to be suggesting. Consider figures 3(a) and 3(b). The case where, for a given degree of substitution between developing country exports and industrial country products, developing country products are highly substitutable with each other is illustrated by figure 3(a). The high degree of substitutability is reflected in the shape of country j's indifference curve, as shown in the top right panel of the figure.

Suppose A is the initial point of consumption. Following standard microeconomic theory, a decline in the relative export price of the competitor developing countries $(1/RPX^L_{COM,real})$, which is depicted by the flatter dash line in the top right panel, leads to; (1) an income effect, shown by the movement from A to C, which translates into greater purchasing power of industrial country consumers, and thus greater potential spending on both developing country j's and its competitors products, and (2) a substitution effect, shown by the movement from A to B, that leads to significant substitution from country j's products to that of its competitors. Assuming that the substitution effects are strong enough, industrial country consumers end up consuming less of country j's exports, and more of its competitors' exports, yielding the downward-sloping but (due to strong substitution effects) relatively flat demand curve for competitor exports shown in the bottom right panel. Competitors' export supply curve is upward-sloping since a decline in competitors' relative export price would lower their profitability in the export sector, resulting in weaker incentives to export. Again, this follows standard microeconomic theory assuming constant returns to scale/increasing costs.

The top left panel shows the supply and demand curves for competitors' exports in the $X^I_{j,real}$-$X^I_{COM,real}$ space. Given country j's small size relative to its competitors, the latter's supply of exports is likely to be independent of j's export volume. In other words, country j faces a given export supply from its competitors. Demand for country j's exports, on the other hand, is an inverse function of its competitors' exports, due to the assumption of high substitutability in consumption.

With this set-up, the effects of an increase in competitors' export supply (say due to simultaneous export promotion policies other than real devaluation) are easily illustrated. Such an increase creates an excess supply of developing country exports at the initial level of country

j's exports (the demand curve shifts rightwards). Competitors' real exchange rate with respect to country j depreciates, boosting demand for its product (due to strong substitution effects) at the same time as its supply declines. Competitors' export volume is greater at the new equilibrium. The greater export volume is realized at the expense of country j's exports as shown in the top left panel.[36] In other words, there is crowding out.

The case where, for a given degree of substitutability between developing country exports and industrial country products, the former are only weakly substitutable with each other is reflected in the shape of country j's indifference curve, as shown in the top right panel of figure 3(b). In this case, the slope of the demand curve is much steeper (see bottom right hand panel), due to the limited substitutability. Moreover, the demand curve for competitors' exports is upward sloping in the top left panel due to the dominance of income effects.[37] The rise in competitor exports coexists, in this case, with a rise in country j's exports; there is no crowding out.

Based on the suggestive evidence from our empirical results, it appears to be the case that although demand for developing country products increased at a relatively rapid clip during the sample period, and that the expenditure elasticity of demand increased between the two periods, the increasing degree of intra-developing country export product substitutability and competition led to greater crowding out effects during the second period. In other words, the world evolved from the picture approximated by figure 3(b) in the 1980s to one more closely captured by figure 3(a). Interestingly enough, this is also the period during which trade in some of the major categories under analysis in this paper, particularly textiles and apparel, became integrated into the General Agreement on Tariffs and Trade (GATT) framework through the Agreement on Textiles and Clothing (ATC). These observations raise some questions about the nature of export-led growth, to which we turn in the concluding section.

[36]The intuition is simple. Excess supply of competitors' exports leads to a decline in their real exchange rate relative to country j. Demand for competitors' exports rises. Increasing exports from the latter crowd out some of the demand for country j's exports.

[37]In other words, the substitution effects are small enough to be more than offset by the income effects.

5 Concluding Remarks

A number of developing countries have geared their developmental policies towards pursuing export-led growth in recent years. The implicit theoretical assumption underlying this strategy generally has been that developing country exporters do not face significant external demand-side constraints, at least as far as manufactures are concerned. Our study should be seen as an attempt to explore the validity of this assumption using a relatively comprehensive dataset consisting of almost all major low- and middle-income exporters of manufactures.

In order to investigate our central question, we developed several weighted measures to better capture the relevant expenditure- and price-based relationships, in addition to an individual developing country weighted index of the volume of competitor exports. We then estimated displacement or crowding out effects of competitor exports for the period 1984-2002 using two different econometric approaches; (i) the Bewley reparametrization of an ARDL model, and (2) the GMM approach. Unlike the few previous econometric studies that explore versions of this question, we estimated effects both at the aggregated and disaggregated levels, the disaggregation being at the one- and two-digit SITC category levels. Our results suggest some interesting patterns both at the disaggregated and aggregated levels. Most importantly:

1. Expenditure elasticities appear to have increased between the two halves of our sample period, which implies a loosening of potential external demand-side constraints in the quantitative sense.

2. Crowding out effects appear to have become much more widespread across SITC categories during the second half of our sample period. Such effects, which were only visible for SITC categories 5 and 6 during the earlier half of our sample period, appeared to occur in almost all our SITC categories at both the one and two digit levels of disaggregation in the latter half. This suggests increasingly crowded markets with substantial competition.

Taken together, (1) and (2) suggest an interesting hypothesis: while in one sense demand-side constraints on developing country exports loosened over the time period under consideration due to relatively more open industrialized country markets, the effect of higher expenditure elasticities was more than offset by the increased supply of exports from the (expanding group of) manufactures-exporting developing countries, putting developing countries in significant competition with each other for limited export opportunities. While we provide some evidence to support this hypothesis, much work needs to be done in order to more precisely establish the order and magnitude of external demand-side constraints on developing country export growth.

Our estimates also suggest that while crowding out effects may have been more pervasive in SITC categories 6, 8, and associated subcategories, and amongst LT countries, these have also begun to appear in SITC category 7, which includes some of the products that, due to their relatively high-tech nature, have traditionally been considered to be relatively immune to cut-throat price competition. This may be explained by two factors. Firstly, the term "high-tech" may be misleading as a substantial proportion of the production falling under these categories consists of labor-intensive assembly operations requiring relatively few skills, and exhibiting relatively low barriers to entry.[38] Secondly, and on a related note, a number of developing countries have established a presence in the sectors classified under SITC 7, owing in no small measure to the vertical disintegration of global production processes. Thus, while SITC category 7 exports constituted the largest share, on average, amongst the four SITC manufacturing categories for only three countries (Malaysia, Mexico, and Jordan) over the period 1984-1993, the number rose to six countries (Hungary, Malaysia, Mexico, the Philippines, Poland, and Thailand), over the period 1993-2002. Combining these two observations suggests that some of the SITC categories traditionally seen as relatively high-tech may not be immune to what Kaplinsky (1993) has called the "commoditization" of manufactures,[39] in the sense that exporters of these products are subject to the kinds of competitive pressures that primary commodity exporters have typically faced. The implications are a cause for concern. A significant proportion of the increase in developing country exports may have come at the expense of other developing countries, especially in the latter part of our sample period. More generally, in a world where a number of developing countries simultaneously pursue export-led growth directed at similar markets, success for some is likely to mean frustration for others. Moreover, this problem is likely to get worse as more developing countries enter the fray, and as the current account deficits run by

[38]See Lall (1998) and Lall (2000) for an insightful discussion.

[39]See also UNCTAD (2004).

the largest global importer (the US) begin to shrink.[40]

Finally, our study suffers from a major limitation, which we plan to address in future work in addition to extending our project in several other directions. We do not take into account developing country exports to other developing countries. Although industrial country markets remain the primary source of demand for developing country manufactures, one could argue that the growth of developing country export "poles" may relieve some of the pressure resulting from crowding out effects in industrial country markets.[41] Secondly we plan to more specifically test for the relevance of the kind of supply and demand schema briefly laid out in section 4.3. The lack of data on supply-side factors such as capacity utilization and wages hinders such work for most developing countries. As data constraints become less binding in the future, we hope to provide more comprehensive analysis to aid in understanding some of the most important issues confronting developing country trade policy-makers.

A Appendix

Data Sources

M^i: Value of industrialized country i's imports of all products from the entire world. Obtained from the United Nation's *COMTRADE* database. Due to missing data, the values for Belgium and Germany were obtained from the OECD's *SourceOECD* database

$P^{M,i}$: Industrialized country i's unit import value. Obtained from the IMF's *International Financial Statistics* database. Due to missing data, the values for Austria, Belgium, France, and Switzerland were obtained from the OECD's *SourceOECD* database.

P^i: Industrialized country i's producer price index. Obtained from the IMF's *International Financial Statistics* database.

P_j: Developing country j's unit export value. Obtained from the IMF's *International Financial Statistics* database. Due to missing data, the values for Bangladesh, Costa Rica, the Philippines, Tunisia, and Turkey were obtained from UNCTAD's *Handbook of International Trade and*

[40] Or, at least grow less rapidly.

[41] However, to the extent that China has emerged as a major importer of primary commodities from low-income developing countries, such relief may ironically be small comfort for countries that have specialized mainly in labor-intensive manufactures.

Development Statistics. The series for China was obtained from the World Bank. Producer price index data for Mexico were obtained from the Bank of Mexico's website.[42]

X^I_j: Value of manufactured exports from developing country j to industrialized countries. Obtained from the United Nation's *COMTRADE* database. Due to missing data, the values for South Africa were obtained from the OECD's *SourceOECD* database.

The Generalized Method of Moments (GMM):

Consider the following panel data equation:

$$y_{i,t} = \alpha y_{i,t-1} + \beta' X_{i,t} + \eta_i + \epsilon_{i,t} \tag{7}$$

where, y is the dependent variable, X is the set of regressors, i denotes individual panel members, t denotes the time period, η is the (unobserved) member-specific effect, and ϵ is the error term. First-differencing both sides eliminates country-specific effects:

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta'(X_{i,t} + X_{i,t-1}) + (\epsilon_{i,t} - \epsilon_{i,t-1}) \tag{8}$$

Instruments are required to address the correlation (that exists by construction) between $\epsilon_{i,t} - \epsilon_{i,t-1}$ and the lagged differenced term $y_{i,t-1} - y_{i,t-2}$, and to deal with potential endogeneity of the explanatory variables. Arellano and Bover (1995) developed a system of regressions in levels and differences based on the assumptions that; (1) the explanatory variables are weakly exogenous, (2) the error term is not serially correlated, and (3) there is no correlation between the *differences* of the right hand side variables and the member-specific effects. The instruments for the regressions in differences are the lagged values of the regressors while the instruments for the regression in levels are the lagged differences of the corresponding variables. The moment conditions can be specified as:

$$E[y_{i,t-s} \cdot (\epsilon_{i,t} - \epsilon_{i,t-1})] = 0; \qquad s \geq 2; t = 3, \ldots T \tag{9}$$

$$E[X_{i,t-s} \cdot (\epsilon_{i,t} - \epsilon_{i,t-1})] = 0; \qquad s \geq 2; t = 3, \ldots T \tag{10}$$

[42]The Bank of Mexico reports an export price index, but this index has several problems. First, until the early nineties, oil was still Mexico's major export, suggesting that Mexico's export price index for the 1980s predominantly reflected changes in oil prices, rather than prices of manufactured products. Second, the Bank of Mexico's export price index exhibits an anomalous increase between 1994 and 1995, in spite of the sharp (roughly 40 percent) depreciation of the peso at that time. We therefore, used the country's non-oil producer price index (PPI) as a proxy for the true price of (the value added in) Mexican manufactured goods. This measure shows a large decline in 1995, reflecting the peso depreciation much more accurately than the officially reported Mexican export price index.

$$E[(y_{i,t-s} - y_{i,t-s-1}) \cdot (\eta_t + \epsilon_{i,t})] = 0; \qquad s = 1 \tag{11}$$

$$E[(X_{i,t-s} - X_{i,t-s-1}) \cdot (\eta_t + \epsilon_{i,t})] = 0; \qquad s = 1 \tag{12}$$

These moment conditions are used with a GMM estimator to generate efficient and consistent estimates. The Sargan test of overidentifying restrictions is generally used to test the validity of the instruments.

References

Ahearne, A., Fernald, J., Loungani, P., and Schindler, J. (2003). China and emerging Asia: Comrades or competitors? International Finance Discussion Papers 789, Board of Governors of the Federal Reserve System, Chicago.

Akamatsu, K. (1935). Wagakuni yomo kogyohin no susei [trend of Japanese trade in woolen goods]. *Shogyo Keizai Ronso [Journal of Nagoya Higher Commercial School]*, **13**.

Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-component models. *Journal of Econometrics*, **68**.

Balassa, B. (1988). The adding-up problem. Background paper for the world development report, The World Bank, Washington, DC.

Bhagwati, J. N. (1958). Immiserizing growth: A geometrical note. *Review of Economic Studies*, pages 201–205.

Davidson, R. and MacKinnon, J. (1993). *Estimation and Inference in Econometrics*. Oxford University Press, Oxford.

Eichengreen, B., Rhee, Y., and Tong, H. (2004). The impact of China on the exports of other Asian countries. Working Paper 10768, National Bureau of Economic Research, Cambridge, MA.

Faini, R., Clavijo, F., and Senhadji-Semlali, A. (1992). The fallacy of composition argument: Is it relevant for LDCs manufactures' exports? *European Economic Review*, **36**(4), 865–82.

Inder, B. (1993). Estimating long-run relationships in economics. *Journal of Econometrics*, **57**, 53–68.

Kaplinsky, R. (1993). Export processing zones in the Dominican Republic: Transforming manufactures into commodities. *World Development*, **21**, 1851–65.

Kasahara, S. (2004). The flying geese paradigm: A critical study of its application to East Asian regional deevelopment. Discussion Paper 169, United Nations Commission on Trade and Development, Geneva.

Lall, S. (1998). Exports of manufactures by developing countries: Emerging patterns of trade and location. *Oxford Review of Economic Policy*, **14**(2), 54–73.

Lall, S. (2000). The technological structure and performance of developing country manufactured exports, 1985-1998. Working Paper 44, Queen Elizabeth House, Oxford.

Maciejewski, E. (1983). 'Real' effective exchange rate indices: A re-examination of the major conceptual and methodological issues. *International Monetary Fund Staff Papers*, **30**, 491–541.

Muscatelli, V. A., Stevenson, A. A., and Montagna, C. (1994). Intra-NIE competition in exports of manufactures. *Journal of International Economics*, **37**(1), 29–47.

Palley, T. (2003). Export-led growth: Evidence of developing country crowding-out. In P. Arestis, M. Baddeley, and J. McCombie, editors, *Globalization, Regionalism, and Economic Activity*. Edward Elgar, Northampton, MA.

Razmi, A. and Blecker, R. (2005). Moving up the ladder to escape the adding up constraint? New evidence on the fallacy of composition. Working Paper 2005-5, University of Massachusetts, Amherst, MA.

Sarkar, P. and Singer, H. (1993). Manufacture-manufacture terms of trade deterioration: A reply. *World Development*, **21**(10), 1617–20.

Spilimbergo, A. and Vamvakidis, A. (2003). Real effective exchange rate and the constant elasticity of substitution assumption. *Journal of International Economics*, **60**, 337–54.

UNCTAD (2002). Trade and Development Report. Technical report, United Nations Commission on Trade and Development, Geneva.

UNCTAD (2004). Trade and Development Report. Technical report, United Nations Commission on Trade and Development, Geneva.

Walmsley, T. and Hertel, T. (2000). China's accession to the WTO: Timing is everything. Working paper, Center for Global Trade Analysis, Purdue University.

Wickens, M. R. and Breusch, T. S. (1987). Dynamic specification, the long-run, and the estimation of transformed regression models. *Economic Journal*, **Conference 1988**, 189–205.

Table 1: Structure of Demand in Selected Developing Countries, 1990 and 2000

	C		G		I		X		M		A	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Bangladesh	86	77	4	5	17	23	6	14	14	20	107	105
Brazil	59	59	19	19	20	18	8	17	7	13	98	96
China	50	40	12	13	35	44	18	34	14	32	97	97
Costa Rica	61	67	18	15	27	20	35	47	41	49	106	102
Hungary	61	67	11	11	25	24	31	65	29	68	97	102
India	66	65	12	13	24	24	7	14	9	16	102	102
Indonesia	59	69	9	9	31	16	25	31	24	26	99	94
Jordan	74	80	25	23	32	23	62	45	93	70	131	126
Malaysia	52	44	14	14	32	21	75	114	72	93	98	79
Mauritius	64	62	13	13	31	23	64	60	71	57	108	98
Mexico	70	69	8	13	23	20	19	28	20	30	101	102
Morocco	65	59	15	21	25	24	26	32	32	36	105	104
Pakistan	74	73	15	12	19	15	16	20	23	20	108	100
The Philippines	72	72	10	11	24	19	28	48	33	51	106	102
Poland	48	70	19	16	26	19	29	21	22	26	93	105
South Africa	57	62	20	19	17	17	24	28	19	26	94	98
Sri Lanka	76	76	10	8	23	22	29	36	38	42	109	106
Thailand	57	57	9	11	41	25	34	66	42	59	107	93
Tunisia	58	62	16	17	32	25	44	43	51	47	106	104
Turkey	69	67	11	14	24	23	13	28	18	31	104	104
Average	63.9	64.9	13.5	13.9	26.4	22.3	29.7	39.6	33.6	40.6	103.8	100.9

Source: World Bank's *World Development Indicators* 2005, Washington, DC, p. 259 - 261
C = household final consumption expenditure, G = general government final consumption expenditure,
I = gross capital formation, X = exports of goods and services,
M = imports of goods and services, A = absorption = C + I + G.
All quantities expressed as percentage of GDP.

Table 2: Evolution of National Shares in Total Exports of Manufactures to Industrialized Countries

	Year	Bangladesh	Brazil	China	Costa Rica	Hungary	India	Indonesia	Jordan	Malaysia	Mauritius
ALL	1986	0.009	0.163	0.054	0.002	0.026	0.082	0.040	0.001	0.086	0.008
	2002	0.008	0.037	0.295	0.004	0.046	0.039	0.030	0.001	0.069	0.002
SITC 5	1986	0.000	0.170	0.074	0.003	0.089	0.035	0.019	0.008	0.032	0.000
	2002	0.000	0.072	0.331	0.001	0.049	0.107	0.035	0.001	0.049	0.000
SITC 6	1986	0.011	0.169	0.002	0.002	0.025	0.144	0.078	0.000	0.031	0.001
	2002	0.004	0.080	0.262	0.001	0.028	0.111	0.053	0.000	0.024	0.001
SITC 7	1986	0.000	0.176	0.005	0.001	0.015	0.007	0.001	0.001	0.201	0.000
	2002	0.000	0.033	0.239	0.004	0.064	0.007	0.015	0.000	0.104	0.000
SITC 8	1986	0.018	0.139	0.170	0.004	0.022	0.096	0.040	0.001	0.047	0.029
	2002	0.026	0.015	0.411	0.006	0.025	0.045	0.042	0.003	0.032	0.007
SITC 65	1986	0.019	0.078	0.310	0.003	0.016	0.112	0.030	0.000	0.020	0.001
	2002	0.013	0.024	0.304	0.000	0.016	0.148	0.048	0.000	0.012	0.000
SITC 75	1986	0.000	0.262	0.009	0.000	0.004	0.024	0.000	0.000	0.016	0.000
	2002	0.000	0.002	0.357	0.013	0.039	0.003	0.012	0.000	0.204	0.000
SITC 77	1986	0.000	0.039	0.004	0.002	0.022	0.005	0.000	0.000	0.460	0.000
	2002	0.000	0.008	0.216	0.004	0.046	0.008	0.012	0.000	0.125	0.000
SITC 84	1986	0.028	0.019	0.272	0.004	0.017	0.116	0.054	0.000	0.057	0.041
	2002	0.055	0.002	0.319	0.006	0.017	0.065	0.045	0.006	0.025	0.014
SITC 85	1986	0.000	0.680	0.111	0.001	0.019	0.031	0.005	0.000	0.004	0.000
	2002	0.004	0.106	0.637	0.000	0.021	0.033	0.082	0.000	0.003	0.000
	Year	Mexico	Morocco	Pakistan	Philippines	Poland	South Africa	Sri Lanka	Thailand	Tunisia	Turkey
ALL	1986	0.228	0.013	0.033	0.028	0.028	0.083	0.010	0.055	0.012	0.037
	2002	0.249	0.008	0.010	0.036	0.046	0.019	0.006	0.053	0.009	0.035
SITC 5	1986	0.176	0.023	0.000	0.027	0.052	0.214	0.002	0.009	0.038	0.029
	2002	0.165	0.014	0.003	0.005	0.056	0.039	0.001	0.040	0.009	0.024
SITC 6	1986	0.151	0.009	0.062	0.018	0.031	0.155	0.005	0.054	0.004	0.048
	2002	0.147	0.006	0.031	0.006	0.077	0.054	0.006	0.044	0.006	0.059
SITC 7	1986	0.451	0.002	0.005	0.024	0.025	0.026	0.002	0.040	0.003	0.012
	2002	0.343	0.003	0.000	0.055	0.042	0.013	0.000	0.056	0.003	0.018
SITC 8	1986	0.099	0.028	0.035	0.045	0.022	0.014	0.030	0.086	0.025	0.052
	2002	0.148	0.018	0.015	0.024	0.034	0.006	0.016	0.054	0.021	0.052
SITC 65	1986	0.058	0.014	0.145	0.006	0.019	0.030	0.004	0.044	0.007	0.082
	2002	0.106	0.006	0.129	0.008	0.034	0.008	0.004	0.004	0.010	0.124
SITC 75	1986	0.529	0.000	0.000	0.001	0.011	0.035	0.000	0.106	0.001	0.001
	2002	0.210	0.000	0.000	0.091	0.001	0.001	0.000	0.067	0.000	0.000
SITC 77	1986	0.301	0.002	0.000	0.058	0.012	0.005	0.000	0.077	0.004	0.009
	2002	0.317	0.012	0.000	0.118	0.032	0.002	0.000	0.076	0.010	0.012
SITC 84	1986	0.028	0.039	0.041	0.032	0.015	0.008	0.045	0.070	0.037	0.077
	2002	0.108	0.035	0.028	0.033	0.022	0.004	0.033	0.046	0.038	0.100
SITC 85	1986	0.023	0.017	0.004	0.014	0.035	0.002	0.002	0.044	0.004	0.005
	2002	0.022	0.010	0.002	0.003	0.007	0.000	0.002	0.050	0.015	0.003

Table 3: Bewley Estimation of Export Equations (1984-2002)

	All	LT	HT	SITC 5	SITC6	SITC 7	SITC 8	SITC 65	SITC 75	SITC 77	SITC 84	SITC 85
Observations	18	18	18	18	18	18	18	18	18	18	18	18
Cross-sections	20	16	7	20	20	20	20	20	20	20	20	20
Total pooled obs.	346	282	116	344	346	344	346	346	339	344	346	339
Constant	-42.227	-32.071	-45.402	-23.929	-62.636	-74.522	-7.121	-2.489	-37.28	-35.890	-0.455	0.786
	(0.166)	(0.395)	(0.054)	(0.556)	(0.155)	(0,018)	(0.466)	(0.741)	(0.221)	(0.025)	(0.962)	(0.935)
M^I_{real}	2.378	1.816	2.160	1.082	4.849	3.663	0.335	0.154	1.477	1.785	-0.148	-0.062
	(0.181)	(0.406)	(0.138)	(0.727)	(0.174)	(0.039)	(0.578)	(0.780)	(0.356)	(0.031)	(0.791)	(0.923)
RPX^I_j	1.458	1.464	1.521	2.361	0.583	1.969	1.152	0.437	1.471	0.653	0.675	0.368
	(0.000)	(0.001)	(0.001)	(0.000)	(0.005)	(0.011)	(0.009)	(0.001)	(0.140)	(0.102)	(0.002)	(0.398)
$X^I_{com,real}$	-0.140	0.006	0.275	0.087	-1.976	-0.277	0.537	0.399	0.107	-0.389	0.931	0.578
	(0.803)	(0.993)	(0.567)	(0.959)	(0.331)	(0.594)	(0.014)	(0.651)	(0.881)	(0.515)	(0.041)	(0.343)
ΔM^I_{real}	-0.289	-0.695	-0.094	-2.243	-2.019	-2.575	-1.747	-0.479	0.204	-0.026	0.173	0.997
	(0.845)	(0.709)	(0.948)	(0.124)	(0.343)	(0.229)	(0.104)	(0.501)	(0.910)	(0.982)	(0.849)	(0.547)
ΔRPX^I_j	3.384	3.440	2.006	2.037	1.941	2.737	2.558	0.788	-0.746	1.503	0.936	0.661
	(0.004)	(0.023)	(0.082)	(0.081)	(0.117)	(0.114)	(0.029)	(0.097)	(0.575)	(0.040)	(0.250)	(0.212)
$\Delta X^I_{com,real}$	1.158	1.289	0.087	2.135	1.029	1.325	1.293	1.164	1.475	0.647	1.666	2.447
	(0.084)	(0.148)	(0.877)	(0.013)	(0.263)	(0.055)	(0.053)	(0.201)	(0.245)	(0.453)	(0.313)	(0.167)
$\Delta X^I_{j,real}$	-4.184	-4.400	-0.002	-2.346	-1.339	-2.874	-3.794	-2.952	-3.483	-3.429	-3.928	-3.194
	(0.000)	(0.003)	(0.062)	(0.000)	(0.187)	(0.015)	(0.002)	(0.019)	(0.000)	(0.003)	(0.082)	(0.015)
R^2	0.527	0.526	0.864	0.655	0.828	0.450	0.421	0.716	-0.171	0.526	0.097	0.440
Adjusted R^2	0.489	0.485	0.846	0.627	0.814	0.404	0.373	0.693	-0.269	0.488	0.023	0.394
F-stat (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Second-stage SSR	16.939	12.977	6.953	61.838	47.039	91.618	23.113	4.895	56.090	15.084	7.815	15.993

All variables in logs. p-values in parenthesis. White cross-section standard errors and covariance.

Table 4: Bewley Estimation of Export Equations (1984-1993)

	All	LT	HT	SITC 5	SITC6	SITC 7	SITC 8	SITC 65	SITC 75	SITC 77	SITC 84	SITC 85
Observations	9	9	9	9	9	9	9	9	9	9	9	9
Cross-sections	20	16	7	20	20	20	20	20	20	20	20	20
Total pooled obs.	175	141	59	173	175	173	175	175	168	173	175	169
Constant	-33.817	-28.517	-31.332	-34.360	-78.415	-61.788	-4.996	-8.518	-19.280	-45.471	-4.900	-29.004
	(0.133)	(0.260)	(0.086)	(0.484)	(0.044)	(0.108)	(0.671)	(0.102)	(0.411)	(0.041)	(0.422)	(0.030)
M^I_{real}	1.587	1.187	1.488	2.425	5.160	3.072	0.181	0.252	1.019	1.974	0.029	1.254
	(0.156)	(0.354)	(0.224)	(0.500)	(0.064)	(0.136)	(0.723)	(0.475)	(0.345)	(0.048)	(0.914)	(0.028)
RPX^I_j	1.263	1.449	0.451	1.289	1.439	1.074	0.625	0.382	-0.676	1.057	0.445	0.403
	(0.027)	(0.056)	(0.224)	(0.011)	(0.000)	(0.225)	(0.298)	(0.038)	(0.572)	(0.314)	(0.127)	(0.418)
$X^I_{com,real}$	0.394	0.549	0.595	-0.829	-1.741	-0.010	0.723	0.902	0.443	0.047	1.084	0.457
	(0.229)	(0.189)	(0.036)	(0.666)	(0.226)	(0.987)	(0.000)	(0.024)	(0.318)	(0.946)	(0.000)	(0.444)
ΔM^I_{real}	0.345	0.875	-0.748	-2.661	-1.515	-2.886	-1.074	-0.295	0.471	-0.277	0.370	0.207
	(0.748)	(0.516)	(0.454)	(0.030)	(0.418)	(0.137)	(0.217)	(0.161)	(0.694)	(0.808)	(0.264)	(0.840)
ΔRPX^I_j	1.996	1.957	2.505	2.534	2.292	3.581	1.050	0.317	-0.420	1.690	0.107	0.163
	(0.036)	(0.071)	(0.009)	(0.021)	(0.134)	(0.102)	(0.001)	(0.475)	(0.756)	(0.090)	(0.329)	(0.830)
$\Delta X^I_{com,real}$	0.195	0.141	-0.265	1.713	0.827	0.881	0.480	0.964	0.177	-0.427	0.075	-1.305
	(0.603)	(0.782)	(0.353)	(0.063)	(0.265)	(0.230)	(0.321)	(0.278)	(0.847)	(0.570)	(0.892)	(0.636)
$\Delta X^I_{j,real}$	-1.792	-1.771	-0.679	-1.225	-0.655	-2.053	-1.439	-1.309	-1.855	-2.687	-0.953	-1.663
	(0.016)	(0.033)	(0.167)	(0.026)	(0.356)	(0.015)	(0.000)	(0.193)	(0.023)	(0.019)	(0.133)	(0.033)
R^2	0.824	0.805	0.932	0.809	0.867	0.689	0.810	0.870	0.519	0.558	0.865	0.764
Adjusted R^2	0.793	0.767	0.913	0.775	0.844	0.633	0.776	0.847	0.431	0.479	0.841	0.721
F-stat (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Second-stage SSR	8.012	7.112	0.548	38.582	36.359	30.922	11.726	3.306	21.980	8.560	3.410	7.587

All variables in logs. p-values in parenthesis. White cross-section standard errors and covariance.

Table 5: Bewley Estimation of Export Equations (1993-2002)

	All	LT	HT	SITC 5	SITC6	SITC 7	SITC 8	SITC 65	SITC 75	SITC 77	SITC 84	SITC 85
Observations	10	10	10	10	10	10	10	10	10	10	10	10
Cross-sections	20	16	7	20	20	20	20	20	20	20	20	20
Total pooled obs.	191	157	64	191	191	191	191	191	191	191	191	190
Constant	-70.946	-47.404	-34.760	26.219	-12.655	16.512	-15.570	-5.421	-1.823	-8.314	-25.177	4.703
	(0.007)	(0.015)	(0.405)	(0.394)	(0.008)	(0.836)	(0.377)	(0.181)	(0.958)	(0.559)	(0.015)	(0.308)
M^I_{real}	4.857	3.353	1.528	-2.538	1.129	-1.957	1.117	0.980	-0.417	0.124	2.194	0.455
	(0.010)	(0.021)	(0.626)	(0.317)	(0.002)	(0.687)	(0.376)	(0.002)	(0.812)	(0.887)	(0.016)	(0.070)
RPX^I_j	1.943	1.855	2.115	1.938	1.205	3.442	2.044	1.056	1.712	1.106	0.941	0.487
	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)	(0.000)	(0.017)
$X^I_{com,real}$	-1.644	-1.059	0.342	2.137	-0.184	1.441	-0.157	-2.036	1.126	0.754	-2.800	-1.520
	(0.063)	(0.118)	(0.812)	(0.153)	(0.329)	(0.377)	(0.794)	(0.000)	(0.177)	(0.321)	(0.036)	(0.012)
ΔM^I_{real}	-2.113	-2.248	4.911	0.812	-0.055	4.635	-0.369	0.064	-0.946	1.488	-1.532	0.749
	(0.211)	(0.200)	(0.178)	(0.814)	(0.950)	(0.398)	(0.822)	(0.954)	(0.580)	(0.058)	(0.155)	(0.632)
ΔRPX^I_j	1.100	0.657	1.240	0.276	0.059	-0.885	1.845	0.450	-0.402	-0.231	0.557	0.051
	(0.266)	(0.386)	(0.488)	(0.600)	(0.782)	(0.105)	(0.471)	(0.350)	(0.557)	(0.137)	(0.576)	(0.870)
$\Delta X^I_{com,real}$	0.629	0.436	0.012	0.227	0.510	0.291	0.465	1.481	2.062	0.373	0.298	0.439
	(0.201)	(0.128)	(0.989)	(0.756)	(0.001)	(0.818)	(0.205)	(0.038)	(0.140)	(0.400)	(0.672)	(0.509)
$\Delta X^I_{j,real}$	-2.368	-2.080	-1.604	-1.418	-0.605	0.000	-3.286	-2.635	-1.454	-0.733	-2.541	-0.863
	(0.025)	(0.036)	(0.297)	(0.080)	(0.001)	(0.088)	(0.230)	(0.014)	(0.010)	(0.051)	(0.235)	(0.004)
R^2	0.843	0.902	0.887	0.904	0.990	0.869	0.619	0.891	0.691	0.955	0.553	0.919
Adjusted R^2	0.818	0.885	0.858	0.889	0.988	0.848	0.559	0.874	0.642	0.948	0.482	0.906
F-stat (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Second-stage SSR	7.210	4.557	2.845	17.223	2.864	50.818	9.168	1.104	28.360	4.993	3.431	6.732

All variables in logs. p-values in parenthesis. White cross-section standard errors and covariance.

Table 6: GMM Estimation of Export Equations (1984-2002)

	All	LT	HT	SITC 5	SITC6	SITC 7	SITC 8	SITC65	SITC 75	SITC 77	SITC 84	SITC 85
Cross-sections	20	16	7	20	20	20	20	20	20	20	20	20
Total pooled obs.	326	266	109	324	326	324	326	326	319	324	326	319
$X^I_{j,-1}$	0.814	0.816	-0.334	0.685	0.622	0.672	0.779	0.798	0.666	0.638	0.738	0.724
	(0.000)	(0.000)	(0.637)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
M^I_{real}	0.394	0.145	0.612	-0.538	1.130	0.266	-0.149	-0.043	0.567	0.558	0.110	0.218
	(0.002)	(0.391)	(0.574)	(0.085)	(0.000)	(0.246)	(0.312)	(0.358)	(0.037)	(0.002)	(0.156)	(0.000)
RPX^I_j	0.895	0.669	5.998	1.258	0.990	1.274	0.764	0.303	-0.219	0.622	0.325	0.199
	(0.000)	(0.001)	(0.107)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.335)	(0.000)	(0.000)	(0.000)
$X^I_{com,real}$	0.202	0.298	-0.099	0.705	-0.294	0.345	0.394	0.359	0.204	0.130	0.519	0.635
	(0.000)	(0.000)	(0.753)	(0.000)	(0.005)	(0.000)	(0.000)	(0.001)	(0.040)	(0.000)	(0.000)	(0.000)
$M^I_{real,-1}$	0.052	0.147	1.186	0.855	0.689	0.533	0.340	0.077	-0.136	-0.090	-0.052	-0.191
	(0.222)	(0.049)	(0.648)	(0.000)	(0.000)	(0.000)	(0.000)	(0.416)	(0.707)	(0.533)	(0.047)	(0.000)
$RPX^I_{j,-1}$	-0.633	-0.433	-0.578	-0.614	-0.805	-0.665	-0.505	-0.228	0.493	-0.284	-0.154	-0.118
	(0.000)	(0.020)	(0.178)	(0.000)	(0.000)	(0.019)	(0.000)	(0.000)	(0.045)	(0.000)	(0.000)	(0.002)
$X^I_{com,real,-1}$	-0.229	-0.275	0.793	-0.681	-0.441	-0.331	-0.306	-0.304	-0.137	-0.109	-0.334	-0.511
	(0.000)	(0.000)	(0.501)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.277)	(0.017)	(0.000)	(0.000)
Adjusted R^2	0.836	0.839	0.035	0.602	0.578	0.705	0.823	0.703	0.679	0.779	0.759	0.661
J-stat	18.463	13.830	0.000	14.021	18.463	13.644	16.235	16.686	14.452	12.289	14.895	13.456
Sargan test	0.135	0.129	N/A	0.372	0.141	0.399	0.237	0.214	0.343	0.504	0.314	0.413
Long-Run Coefficients												
M^I_{real}	2.398	1.587	1.348	1.006	4.812	2.436	0.864	0.168	1.290	1.293	0.221	-0.692
	(0.000)	(0.003)	(0.327)	(0.102)	(0.000)	(0.000)	(0.085)	(0.558)	(0.000)	(0.000)	(0.311)	(0.506)
RPX^I_j	1.409	1.283	4.063	2.044	0.489	1.857	1.172	0.371	0.820	0.934	0.653	0.293
	(0.000)	(0.001)	(0.165)	(0.000)	(0.128)	(0.061)	(0.000)	(0.002)	(0.246)	(0.000)	(0.000)	(0.017)
$X^I_{com,real}$	-0.145	0.125	0.520	0.076	-1.944	0.043	0.398	0.272	0.201	0.058	0.706	0.449
	(0.382)	(0.608)	(0.429)	(0.780)	(0.000)	(0.888)	(0.024)	(0.481)	(0.279)	(0.640)	(0.000)	(0.003)

All variables in logs. p-values in parenthesis.
The Sargan test was used to verify the validity of the instruments. White period (n-step) GMM weights used.
LT countries: Bangladesh, Brazil, China, Hungary, India, Indonesia, Jordan, Mauritius, Mexico, Morocco, Pakistan, Poland, South Africa, Sri Lanka, Tunisia, and Turkey.
HT countries: China, Costa Rica, Hungary, Malaysia, Mexico, Philippines, and Thailand.
The Wald test statistic for the long-run coefficients is the p-value for the joint exclusion of the excluded variables.

Table 7: GMM Estimation of Export Equations (1984-1993)

	All	LT	HT	SITC 5	SITC6	SITC 7	SITC 8	SITC65	SITC 75	SITC 77	SITC 84	SITC 85
Cross-sections	20	16	7	20	20	20	20	20	20	20	20	20
Total pooled obs.	155	125	52	153	155	153	155	155	148	153	155	149
$X^I_{j,-1}$	0.577	0.523	-0.391	0.501	0.324	0.539	0.555	0.582	0.654	0.516	0.428	0.542
	(0.000)	(0.000)	(0.537)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
M^I_{real}	0.453	0.303	0.730	-1.067	1.932	-0.258	-0.345	0.025	0.920	0.371	0.234	0.261
	(0.004)	(0.309)	(0.515)	(0.048)	(0.000)	(0.658)	(0.049)	(0.563)	(0.011)	(0.063)	(0.000)	(0.009)
RPX^I_j	1.055	1.009	6.303	1.243	2.297	1.557	0.626	0.294	-0.518	0.892	0.302	0.173
	(0.000)	(0.000)	(0.094)	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.039)	(0.000)	(0.000)	(0.000)
$X^I_{com,real}$	0.259	0.374	0.051	0.423	-0.564	0.369	0.471	0.851	0.018	0.091	0.590	-0.074
	(0.000)	(0.000)	(0.718)	(0.074)	(0.000)	(0.000)	(0.000)	(0.000)	(0.857)	(0.168)	(0.000)	(0.562)
$M^I_{real,-1}$	-0.077	-0.164	-0.095	2.680	1.383	1.197	0.573	0.088	-0.581	0.223	-0.198	0.182
	(0.250)	(0.146)	(0.973)	(0.000)	(0.001)	(0.006)	(0.000)	(0.303)	(0.020)	(0.228)	(0.000)	(0.079)
$RPX^I_{j,-1}$	-0.538	-0.298	-1.237	-0.893	-1.267	-0.938	-0.333	-0.145	0.340	-0.245	-0.029	0.046
	(0.000)	(0.226)	(0.003)	(0.003)	(0.000)	(0.052)	(0.058)	(0.014)	(0.073)	(0.036)	(0.041)	(0.341)
$X^I_{com,real,-1}$	-0.001	0.021	1.286	-1.295	-0.573	-0.230	-0.228	-0.471	0.170	0.194	0.027	0.242
	(0.985)	(0.755)	(0.338)	(0.000)	(0.087)	(0.000)	(0.003)	(0.006)	(0.081)	(0.000)	(0.426)	(0.140)
Adjusted R^2	0.622	0.577	-0.414	0.351	0.360	0.515	0.535	0.339	0.430	0.539	0.422	0.296
J-stat	15.125	12.285	0.000	13.705	18.008	14.588	13.636	15.796	12.696	15.284	9.345	14.221
Sargan test	0.300	0.198	N/A	0.395	0.157	0.333	0.400	0.260	0.472	0.290	0.746	0.358
Long-Run Coefficients												
M^I_{real}	0.889	0.291	0.457	3.232	4.904	2.037	0.512	0.270	0.980	1.227	0.063	0.967
	(0.000)	(0.458)	(0.722)	(0.000)	(0.000)	(0.000)	(0.118)	(0.041)	(0.197)	(0.000)	(0.368)	(0.000)
RPX^I_j	1.222	1.491	3.642	0.701	1.524	1.343	0.658	0.356	-0.514	1.337	0.477	0.478
	(0.000)	(0.000)	(0.203)	(0.196)	(0.000)	(0.003)	(0.059)	(0.000)	(0.334)	(0.001)	(0.000)	(0.000)
$X^I_{com,real}$	0.610	0.828	0.961	-1.747	-1.682	0.302	0.546	0.909	0.543	0.589	1.079	0.367
	(0.000)	(0.002)	(0.291)	(0.001)	(0.000)	(0.058)	(0.000)	(0.000)	(0.065)	(0.002)	(0.000)	(0.000)

All variables in logs. p-values in parenthesis.
The Sargan test was used to verify the validity of the instruments. White period (n-step) GMM weights used.
LT countries: Bangladesh, Brazil, China, Hungary, India, Indonesia, Jordan, Mauritius, Mexico, Morocco, Pakistan, Poland, South Africa, Sri Lanka, Tunisia, and Turkey.
HT countries: China, Costa Rica, Hungary, Malaysia, Mexico, Philippines, and Thailand.
The Wald test statistic for the long-run coefficients is the p-value for the joint exclusion of the excluded variables.

Table 8: GMM Estimation of Export Equations (1993-2002)

	All	LT	HT	SITC 5	SITC6	SITC 7	SITC 8	SITC65	SITC 75	SITC 77	SITC 84	SITC 85
Cross-sections	20	16	7	20	20	20	20	20	20	20	20	20
Total pooled obs.	191	157	64	191	191	191	191	191	191	191	191	190
$X^I_{j,-1}$	0.461	0.584	N/A	0.535	0.371	0.469	0.699	0.309	0.507	0.427	0.689	0.328
	(0.000)	(0.000)	N/A	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
M^I_{real}	1.132	0.684	N/A	-1.061	1.302	1.373	0.117	0.267	-0.271	0.814	0.147	1.991
	(0.000)	(0.001)	N/A	(0.394)	(0.000)	(0.010)	(0.368)	(0.000)	(0.826)	(0.000)	(0.682)	(0.233)
RPX^I_j	0.891	0.895	N/A	0.331	0.768	1.304	0.885	0.146	0.557	0.924	0.468	0.396
	(0.000)	(0.000)	N/A	(0.433)	(0.000)	(0.000)	(0.000)	(0.157)	(0.072)	(0.000)	(0.000)	(0.000)
$X^I_{com,real}$	-0.150	-0.172	N/A	0.681	-0.388	-0.236	0.017	0.134	1.507	-0.821	-0.410	-0.325
	(0.007)	(0.078)	N/A	(0.735)	(0.113)	(0.736)	(0.768)	(0.533)	(0.285)	(0.044)	(0.001)	(0.086)
$M^I_{real,-1}$	0.149	0.290	N/A	-0.415	-0.438	0.921	0.358	-0.019	0.978	0.122	0.302	-1.465
	(0.110)	(0.018)	N/A	(0.744)	(0.001)	(0.139)	(0.001)	(0.767)	(0.043)	(0.621)	(0.019)	(0.181)
$RPX^I_{j,-1}$	-0.016	-0.180	N/A	1.044	0.246	-0.034	-0.349	0.209	0.181	-0.235	-0.130	-0.182
	(0.900)	(0.268)	N/A	(0.074)	(0.073)	(0.945)	(0.000)	(0.020)	(0.658)	(0.348)	(0.299)	(0.307)
$X^I_{com,real,-1}$	-0.090	-0.123	N/A	0.402	0.121	-0.151	-0.147	-0.354	-1.461	0.354	-0.163	-0.699
	(0.043)	(0.057)	N/A	(0.644)	(0.579)	(0.709)	(0.001)	(0.000	(0.397)	(0.132)	(0.636)	(0.415)
Adjusted R^2	0.685	0.678	N/A	0.446	0.662	0.456	0.632	0.500	0.519	0.507	0.560	0.176
J-stat	14.534	9.801	N/A	14.944	11.072	13.002	15.180	11.238	13.137	12.122	8.388	13.158
Sargan test	0.337	0.367	N/A	0.311	0.605	0.448	0.296	0.591	0.437	0.518	0.817	0.437
Long-Run Coefficients												
M^I_{real}	2.377	2.341	N/A	-3.174	1.374	4.320	1.578	0.359	1.434	1.634	1.444	0.783
	(0.000)	(0.000)	N/A	(0.555)	(0.424)	(0.007)	(0.000)	(0.022)	(0.589)	(0.000)	(0.063)	(0.359)
RPX^I_j	1.623	1.719	N/A	2.957	1.612	2.392	1.781	0.514	1.497	1.202	1.087	0.318
	(0.000)	(0.000)	N/A	(0.000)	(0.032)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.021)	(0.089)
$X^I_{com,real}$	-0.445	-0.709	N/A	2.329	-0.424	-0.729	-0.432	-0.318	0.093	-0.815	-1.842	-1.524
	(0.000)	(0.007)	N/A	(0.264)	(0.076)	(0.296)	(0.023)	(0.396)	(0.940)	(0.022)	(0.033)	(0.323)

All variables in logs. p-values in parenthesis.
The Sargan test was used to verify the validity of the instruments. White period (n-step) GMM weights used.
LT countries: Bangladesh, Brazil, China, Hungary, India, Indonesia, Jordan, Mauritius, Mexico, Morocco, Pakistan, Poland, South Africa, Sri Lanka, Tunisia, and Turkey.
HT countries: China, Costa Rica, Hungary, Malaysia, Mexico, Philippines, and Thailand.
The Wald test statistic for the long-run coefficients is the p-value for the joint exclusion of the excluded variables.

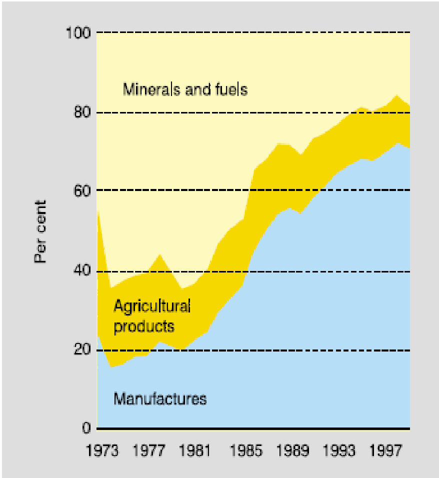
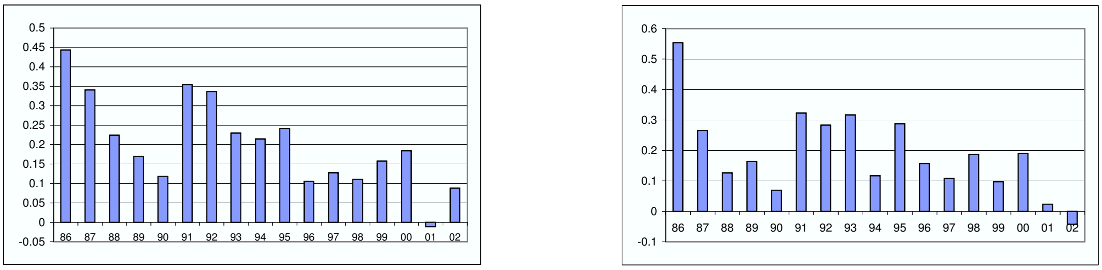


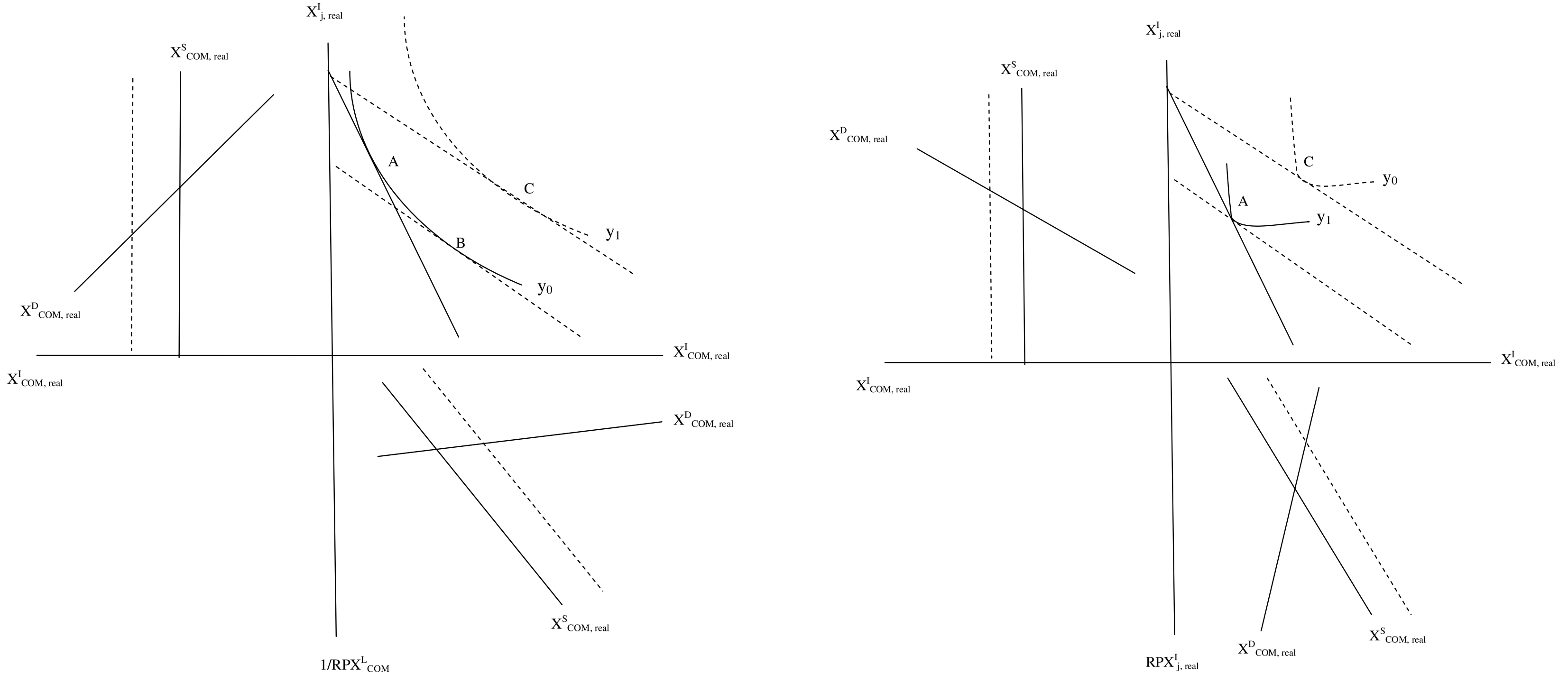
Figure 1: Composition of Merchandise Exports from Developing Countries by Major Product Group, 1973 - 1999 (Source: UNCTAD, 2002)



(a) Nominal Growth Rates

(b) Real Growth Rates

Figure 2: Growth Rates of Manufactured Exports from Selected Developing Countries. Source: Author's Calculations from the United Nation's *COMTRADE* database.



(a) High substitutability between developing country manufactured exports.

(b) Low substitutability between developing country manufactured exports.

Figure 3: Crowding-Out Versus Crowding-In