Abstract

This paper investigates the determinants of countries' export performance looking in particular at the role of international product market linkages. We begin with a novel decomposition of the growth in countries' exports into the contribution from increases in external demand and from improved internal supply-side conditions. Building on the results of this decomposition, we move on to an econometric analysis of the determinants of export performance. Results include the finding that poor external geography, poor internal geography, and poor institutional quality contribute in approximately equal measure to explaining Sub-Saharan Africa's poor export performance.

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Explaining Cross-Country Export Performance: International Linkages and Internal Geography

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1. Introduction

There have been wide variations in countries' export performance over the last quarter century. E. Asian countries have seen real exports increase by more than 800% since the early 1970s, while those of Sub-Saharan Africa have increased by just 70%. This divergent performance has raised concerns that, while some countries are benefiting from globalisation others are, at best, passed by. This paper investigates some of the determinants of these divergent export performances, looking in particular at the roles of external and internal geography.

Geography might be expected to affect performance in several ways. One is that the strength of international demand linkages varies across countries. Countries in E. Asia have been at the centre of a fast growing region, this creating growing import demand. Given all we know about the importance of distance as a barrier to trade, the export opportunities created by these growing import demands are likely to be geographically concentrated, creating spillover effects between countries in the region. We measure these effects by developing a theoretical model of bilateral trade flows and using gravity techniques to estimate the model's parameters. This enables us to decompose each country's actual export growth into two parts. One is based on the country's location relative to sources of import demands, which we call the country's 'foreign market access'. The other is due to changes within the country, which we call 'supply capacity'. We find that a substantial part of the differential export growth of various countries and regions since 1970 can be attributed to variations in the rate at which their foreign market access has grown.

Changes in countries' foreign market access arise because of changes in aggregate import demand from other countries – particularly countries that are close. There may also be particular regional effects arising, for example, from regional integration agreements. We therefore refine our modelling to allow for the intensity of intra-regional trade to differ from trade as a whole. These effects are positive for Europe and negative for Sub-Saharan Africa. They also exhibit significant changes through time, with increasing intra-regional intensities in North America and in Latin America.

Having separated out the foreign market access and internal supply capacity contributions to export growth, we then investigate the determinants of each country's supply capacity. We develop a simple theoretical structure to show how it depends on countries' internal geography, on measures of their business environment (such as institutional quality) and also – in equilibrium – on their foreign

market access. This provides the basis for econometric estimation of countries' export performance as a function of their foreign market access, internal geography and institutional quality. All three characteristics are significant and quantitatively important determinants of export performance. We use our results to explore the performance of different regions, and show how almost all of Sub-Saharan Africa's poor export performance can be accounted for by poor performance in each of these dimensions.

The paper is organised as follows. The next section outlines a theoretical framework, and Section 3 constructs the measures of foreign market access and domestic supply capacity. The contribution of each of these measures to regions' export performance is reported. So too are inter-regional linkages, giving the contribution of each region to the foreign market access growth of each other region. Section 4 extends the analysis to a more detailed investigation of intra-regional trade, showing how the intensity of this trade has changed through time. Section 5 endogenises each country's supply capacity. A simple theoretical framework is developed and provides the export equation that we econometrically estimate to establish the effects of foreign market access, internal geography and institutions.

2. Theoretical Framework

Gravity models offer an explanation of countries' trade flows in terms of export and importer country characteristics, and 'between country' information, particularly distance. Our main task in this paper is to separate out the contributions of these different forces, and thereby identify the foreign market access and supply capacity of each country. The gravity model is consistent with alternative theoretical underpinnings (see for example Anderson, 1979; Deardorff, 1998 and Eaton and Kortum, 1997) and here we start by developing one of them, namely a trade model based on product differentiation derived from a constant elasticity of substitution demand structure.

The world consists of $i = 1,...R$ countries, each of which can produce a range of symmetric differentiated products. For the moment we take the range of products produced in each country and their prices as exogenous; Section 5 deals with general equilibrium. Product differentiation is modelled in the usual symmetric constant elasticity of substitution way; σ is the elasticity of substitution between

any pair of products, implying a CES utility function of the form,

$$U_j = \left[\sum_i^R n_i x_{ij}^{(\sigma-1)/\sigma}\right]^{\sigma/(\sigma-1)}, \qquad \sigma > 1, \tag{1}$$

where n_i is the set of varieties produced in country i, and x_{ij} is the country j consumption of a single product variety from this set. Dual to this quantity aggregator is a price index in each country, G_j, defined over the prices of individual varieties produced in i and sold in j, p_{ij},

$$G_j = \left[\sum_i^R n_i p_{ij}^{1-\sigma}\right]^{1/(1-\sigma)}. \tag{2}$$

Given country j's total expenditure on differentiated products, E_j, its demand for each variety is, (by Shephard's lemma on the price index),

$$x_{ij} = p_{ij}^{-\sigma} E_j G_j^{(\sigma-1)}. \tag{3}$$

Thus, the own price elasticity of demand is σ, and the term $E_j G_j^{\sigma-1}$ gives the position of the demand curve in market j.

We assume that all country i varieties have the same producer price, p_i, and that the cost of delivery to market j gives price $p_{ij} = p_i\, t_i T_{ij}\, t_j$. t_i and t_j are the ad valorem cost factors in getting the product to and from the border in countries i and j and T_{ij} is the cost of shipping the product between countries. Thus, t_i and t_j capture internal geography, and T_{ij} the external geography of trade flows.

Employing the usual iceberg assumption, the value of total exports of country i to country j is therefore

$$n_i p_i x_{ij} = n_i p_i^{1-\sigma} (t_i T_{ij} t_j)^{1-\sigma} E_j G_j^{\sigma-1}. \tag{4}$$

This equation for bilateral trade flows provides a basis for estimation of a gravity trade model. The right hand side of this equation contains both importer and exporter country characteristics. The term $E_j (G_j/t_j)^{\sigma-1}$ is country j *'market capacity'*; it depends on total expenditure in j, on internal transport costs t_j, and on the number of competing varieties and their prices, this summarised in the price index.

On the supply side, the term $n_i(p_i t_{ij})^{1-\sigma}$ measures what we refer to as the '*supply capacity*' of the exporting country; it is the product of the number of varieties and their price competitiveness, such that doubling supply capacity (given market capacities) doubles the value of sales.[1] We will denote market capacity and supply capacity by m_i and s_i respectively, so

$$m_i = E_i(G_i/t_{ij})^{\sigma-1}, \qquad s_i = n_i(p_i t_{ij})^{1-\sigma}. \tag{5}$$

From (4), bilateral trade flows can be expressed simply as the product of exporter supply capacity, importer market capacity, and the term $(T_{ij})^{1-\sigma}$ which measures bilateral transport costs between them:

$$n_i p_i x_{ij} = s_i (T_{ij})^{1-\sigma} m_j. \tag{6}$$

We are concerned with each country's overall export performance, i.e. its exports to all destinations, $n_i p_i x_i = n_i p_i \sum_{j \neq i} x_{ij}$. This depends on the country's supply capacity and its access to foreign markets. We therefore define country *i*'s '*foreign market access*', F_i, as the sum of the market capacity of all other countries, weighted by the measure of bilateral trade costs in reaching supplier *i*,

$$F_i = \sum_{j \neq i} (T_{ij})^{1-\sigma} m_j \tag{7}$$

This is a theoretically well-founded version of the old concept of 'market potential' (Harris, 1954). It enables the total value of exports of country *i*, V_i, to be expressed as the product of the country's supply capacity and foreign market access:

$$V_i = n_i p_i \sum_{j \neq i} x_{ij} = n_i (p_i t_{ij})^{1-\sigma} \sum_{j \neq i} (T_{ij} t_{ij})^{1-\sigma} E_j G_j^{\sigma-1} = s_i F_i \tag{8}$$

Analogous to foreign market access is the concept of '*foreign supplier access*', H_i, defined as the sum of the supply capacity of all other countries, weighted by the measure of bilateral trade in reaching supplier *i*,

$$H_i = \sum_{j \neq i} (T_{ij})^{1-\sigma} s_j \qquad (9)$$

This measures proximity to sources of export supply, and the total value of imports of country i, Z_i, is the product of its market capacity and foreign supplier access,

$$Z_i = m_i H_i \qquad (10)$$

Equations (7) -(10) relate observed exports and imports, V_i and Z_i, to supply capacity s_i, market capacity m_i, foreign market access F_i, and foreign supplier access, H_i. They provide the basis of the decompositions of the next section.

3. Sources of Export Growth: Decomposition

A key feature of theoretical models of product differentiation and trade costs is the existence of a pecuniary demand effect across countries (when combined with increasing returns to scale, this results in the so-called 'home market effect'). An increase in expenditure on traded goods in one country raises demand for traded goods in other countries and, because of trade costs, the size of this effect is much greater for neighbouring countries than for distant countries. To what extent can countries' differential export performances be accounted for by differences in these demand conditions, and how much by shifting internal supply response?

3.1 Data sources and sample size

Data on the value of bilateral trade flows for 101 countries during the period 1970-97 are obtained from the NBER World Trade Database (Feenstra et al., 1997; Feenstra, 2000). We are concerned with the growth in real value of countries' exports, and the current dollar data in the NBER World Trade Database are therefore deflated by the US GDP deflator to obtain a measure of real trade flows. A

country's market and supplier access depend on its trade with all other countries, and these trade data have the advantage of being available for a large cross-section of countries. We combine the trade data with information on geographical characteristics (eg bilateral distance, existence of a common border) and data on GDP and population from the World Bank. See Appendix A for further details.

It is likely that there are substantial year-on-year fluctuations in bilateral trade flows - particularly for small countries - and we are concerned here with the determinants of long-run real export growth. Therefore, in the empirical analysis that follows, bilateral trade flows are averaged over 4-year periods. With 28 years of data, this yields 7 periods of analysis.

3.2 Export growth decompositions

We start with a mechanical decomposition of the growth in countries' total exports. Given observed values of total exports and imports, V_i and Z_i, and values of bilateral trade costs, $(T_{ij})^{1-\sigma}$, equations (7) - (10) are $4R$ equations in $4R$ unknowns (m_i, s_i, F_i, and H_i for all i). Thus, given values for exports, imports, and bilateral trade costs, this system of equations can be solved to obtain measures of market capacity, supplier capacity, foreign market access, and foreign supplier access for all R countries.[2]

Measures of bilateral trade costs are obtained from gravity equation estimation. Equation (6) in the model implies a relationship between bilateral trade, supplier capacity, and market capacity. We estimate this relationship using bilateral distance and a dummy for whether countries share a common border. Supplier capacity and market capacity are controlled for respectively using an exporter country and importer partner dummy.[3] The estimation results are summarized in Table 1, and we take the predicted values for bilateral trade costs from this equation as our measures of trade costs: thus, $(\hat{T}_{ij})^{1-\sigma} = dist_{ij}^{\hat{\theta}} . \exp[\hat{\gamma} bord_{ij}]$, where $dist_{ij}$ is the distance between a pair of countries i and j, and $bord_{ij}$ is a dummy variable that takes the value one if the two countries share a common border.

These measures of trade costs are then combined with information on countries' total imports and exports to solve the system of simultaneous equations (7) - (10) for all countries' market capacities, supply capacities, foreign market access, and foreign supplier access. This implies, of course, that the product of each country's supply capacity and foreign market access (FMA) exactly equals its actual exports (and analogously on the import side), permitting an exact decomposition of actual export volumes. An alternative approach would be to use the estimates of the exporter country and importer

partner dummies obtained from the gravity equation as measures of market capacity and supply capacity. This alternative approach was used in another context by Redding and Venables (2001) and is adopted here as a robustness test. We find a high degree of correlation between measures of foreign market and supplier capacity constructed from solving the system of equations for all countries total imports and exports and those constructed based on estimates from bilateral trade flows.[4]

The results for 101 countries are reported in Table A1 of the Appendix and, to provide a broader overview of the sources of export growth, we aggregate country results for 9 geographical regions: Eastern Europe; Latin America; Middle East and North Africa; North America; Oceania; South-East Asia; Other Asia; Sub-Saharan Africa; and Western Europe. Thus, R_k denotes the set of countries in region k, and the foreign market access of the region is simply $F_{R_k} = \sum_{i \in R_k} F_i$. The upper two panels of Figure 1 give the evolution of FMA for each of the regions, while the lower two panels graph the time-series of supplier capacity (the sum of the capacities of countries in the region, expressed relative to its initial value).

The initial ranking of regions has East and Western Europe having the highest level of FMA; the Eastern European position is not as surprising as it first seems, because supply capacity captures countries' internal characteristics, and FMA measures where countries are relative to world import demands. These regions are followed by North America. Looking at the upper right panel (and noting the vertical scale) the initial ranking then proceeds as Other Asia, Sub-Saharan Africa, SE Asia and Oceania. The obvious feature of the time trend is the rapid growth of SE Asia (overtaking Africa, Other Asia and Latin America), and the acceleration of Other Asia in the second period.

Turning now to growth, the proportionate growth rates of supply capacity and foreign market access compound to the observed growth of exports.[5] Intuitively, the decomposition of export growth into these two components reveals the extent to which a country's export growth is due to improved supply performance within the country itself or increases in import demand in trade partners. Appendix Table A1 reports the decomposition for each country, and Table 2 of the text gives the regional aggregates. The first rows of Table 2, the benchmark case, report the rate of growth of overall world exports in each period and the growths of supply capacity and market capacity that would be observed if all countries had identical export performance.

A number of results stand out. S.E. Asian countries experience export growth much faster than the benchmark in both periods. In the first period this was driven particularly by supply capacity

growth, and in the second FMA growth becomes relatively more important. Looking at individual countries in S.E. Asia (Appendix Table A1) shows that FMA growth was generally faster in the first period than in the second. For some of the earlier developers supply capacity growth slowed sharply in the second period (eg Japan, Taiwan, Korea) while the later developers experienced a dramatic increase in second period supply capacity growth (eg Philipines, Thailand, Vietnam).[6]

Other Asia experienced below world average export growth in the first period, but this is accounted for by significantly faster than benchmark market access growth coupled with much slower than benchmark supply capacity growth. This is in sharp contrast to the second period where market access growth close to the benchmark was associated with supply capacity growth at twice the benchmark, giving overall export growth of nearly twice the world rate.

Latin America shows a rather opposite picture. Slightly better than benchmark market access growth in both periods was associated with strong supply capacity growth in the first period and weak growth in the second. Results for the Middle East and North Africa aggregate are dominated by oil-exporters, while those for Sub-Saharan Africa elaborate on a familiar story. Taking the two periods together, the contribution of FMA to Sub-Saharan Africa's export growth was nearly 20 percentage points below the benchmark case, suggesting the importance of geographical location in explaining the region's poor export performance. However, supply capacity grew less fast than the benchmark in both periods, and positive export growth in the second period was achieved by market access growth offsetting a reduction in supply capacity.

The main messages from this section are then, that both levels and rates of change of foreign market access vary widely across countries and regions. Foreign market access levels in Western Europe are nearly three times those in Sub-Saharan Africa. Thus, taking as given supplier capacity, FMA plays an important role in accounting for export performance. In general equilibrium, there will typically also be an endogenous response of supplier capacity to external conditions, and we consider this idea further in Section 5. Before doing so, we look in more detail at the regional structure of FMA growth.

3.3. Regional effects

The decomposition of Table 2 looks at each country's FMA growth, but does not divide the sources of this growth geographically. How much FMA growth do countries receive from the performance of other countries in their own region, and how much from, say, a growth in North American market capacity?

A country's foreign market access can be divided according to geographical regions in which the markets are located, and expressed as the sum of the access to markets in each region. Thus, if $F_i^{R_k}$ is the market access derived by country *i* from region *k*, then

$$F_i^{R_k} = \sum_{j \in R_k} (T_{ij})^{1-\sigma} m_j, \quad \text{and} \quad F_i = F_i^{R_1} + F_i^{R_2} + \ldots + F_i^{R_K}. \tag{11}$$

Changes in $F_i^{R_k}$ can be computed for each country, and the final two columns of Appendix Table A1 report, for each country, the contribution to FMA growth of the country's own region and of other regions in aggregate.

We concentrate on results not for individual countries, but for their regional groupings. Thus, $F_{R_\ell}^{R_k}$ is the market access derived by all countries in region R_ℓ from region *k*, given by

$$F_{R_\ell}^{R_k} = \sum_{i \in R_\ell} F_i^{R_k} \quad \text{and} \quad F_{R_\ell} = F_{R_\ell}^{R_1} + F_{R_\ell}^{R_2} + \ldots + F_{R_\ell}^{R_K} \tag{12}$$

The change in the market access of region R_ℓ can be decomposed into the contribution of regions *k* according to,

$$\frac{\Delta F_{R_\ell}}{F_{R_\ell}} = \left(\frac{F_{R_\ell}^{R_1}}{F_{R_\ell}}\right)\left(\frac{\Delta F_{R_\ell}^{R_1}}{F_{R_\ell}^{R_1}}\right) + \ldots + \left(\frac{F_{R_\ell}^{R_K}}{F_{R_\ell}}\right)\left(\frac{\Delta F_{R_\ell}^{R_K}}{F_{R_\ell}^{R_K}}\right) \tag{13}$$

where there are two components to the contribution of each region. Region R_k may make a large contribution to region R_ℓ's FMA growth either because it constitutes a large share of the country's FMA, $\left(F_{R_\ell}^{R_k}/F_{R_\ell}\right)$, or because there is rapid growth in market demand in the countries making up that

region, $\left(\Delta F_{R_1}^{R_1} / F_{R_1}^{R_1} \right)$.

Results are reported in Table 3a, for the period as a whole, and in 3b and 3c, for the two sub periods.[7] Reading across the first row of the tables we see that North America derived virtually all of its FMA growth from itself. This reflects the fact that the Canada's FMA is large relative to that of the United States (FMA captures access to markets *other* than one's own), and the United States constitutes an extremely large share of Canada's FMA. Canada benefits much more from being located close to the USA than the USA benefits from being located close to Canada, and own region FMA growth in Canada thus accounts for over 98% of total FMA growth.

Latin America was much more dependent on FMA growth from outside the region – almost entirely so in the first period. Of these extra-regional sources, North America is far away the most important. Turning to Europe, Western Europe provides the source of FMA growth both for itself and for Eastern Europe.

The striking features of Sub-Saharan Africa are the negative contribution of the own region effect, and the lack of a dominant external source of FMA growth. North America was most important in both periods, followed by Western Europe, and augmented in the first period by FMA growth from the Middle East and North Africa.

The Asian figures illustrate two main points. One is the dominant role of intra-regional linkages with SE Asia, and the other is the growth in the importance of SE Asia for Other Asia. This arises partly from the growing import demands of SE Asia and partly also from the westwards expansion of economic activity in the SE Asia region. It is also interesting to look down the SE Asia column in table 3B, indicating the contribution of this region to FMA growth in other regions; the region now provides a major potential source of demand for African exports.

4. Regional Trade Intensities

In the gravity model used so far trade frictions between countries are measured simply by distance and whether or not the countries share a common border. In this section we present a brief exploration of the importance of regional trading, by allowing the costs of trading within a region to differ from those of trading between regions.

To capture the idea that the costs of trading within a region may differ from those of trading between regions we augment the distance and border effects with dummies for whether two countries lie within the same geographical regions. Thus the measure of bilateral trade costs becomes $(T_{ij})^{1-\sigma} = dist_{ij}^{\phi} \cdot \exp[\gamma\, bord_{ij}] \prod_r \exp(\phi_r\, region_{ir})$ where N_r is the coefficient on the dummy for whether countries *i* and *j* lie within region *r*. This specification allows for differences in trade costs on within-region transactions and between-region transactions in a general way that imposes a minimal degree of structure on the data. At the same time, we are able to analyze how the coefficient on the within-region trade dummy changes over time and relate these changes to explicit policy-based attempts at regional integration, including for example NAFTA and the European Union.

The results of estimating the gravity equation including the within-region trade dummies are reported in Table 4. As shown in the table, the within-region trade dummies are jointly statistically significant at the 10% level in all periods, and their level of joint statistical significance increases markedly over time. The dummies capture anything that affects the ease of trading within the region, and it is not therefore surprising that some of the estimated coefficients are negative, particularly at the beginning of the sample period. Sub-Saharan Africa is a case in point, where a recent literature has emphasized the importance of physical geography and infrastructure in explaining trade and development in Africa (see, for example, Amjadi, Reincke and Yeats, 1996; Gallup et al., 1998 and Limao and Venables, 2001). Africa has few East-West navigable rivers to facilitate water-borne trade within the continent, and there is much evidence of low levels of transport infrastructure investment that may impact particularly severely on within-region trade. International political conflict and patterns of specialization clearly also play a role. For example in the Middle-east, within-region conflict and the importance of petroleum exports to industrialized countries outside the region generate a negative estimated within-region effect.

Over time, we observe a systematic increase in the estimated values of almost all the within-region effects. This provides evidence of the increasing regionalization of international trade that does not rely on a particular parameterization of the regional integration process. Nonetheless, one important explanation for increasing regionalization is clearly the proliferation of Regional Preferential Trade Agreements. This is particularly clear for North America. Here at the beginning of the sample period, we find a negative within-region effect, which may reflect policies of import substitution in Mexico that particularly restricted within-region trade or the fact that the capital cities of Canada and United States (on which our measures of distance are based) are closer than the true economic centres (taking into

account the whole distribution of economic activity). Nevertheless, over time we observe a rise in the estimated within-region effect that is both large and statistically significant. Thus, the estimated coefficient becomes positive and statistically significant in the period 1990-3 during which NAFTA was signed.

The exception is S.E. Asia where the intra-regional effect diminishes sharply through time. This does not reflect diminishing intra-regional trade, but rather the particularly rapid growth of trade with countries outside the region. Thus, it shows the extent to which the region's trade was becoming more externally rather than internally oriented over the period.

Other examples of the importance of trade policy in shaping regional integration include Western and Eastern Europe. In Western Europe, we again observe a systematic rise in the estimated within-region effect over time. In Eastern Europe, the value of the within-region effect follows an inverted U-shape, rising between the 1970s and 1980s consistent with the policies of COMECON in stimulating trade with the former Soviet bloc and declining markedly in the 1990s following the fall of the Berlin wall and the abandonment of the COMECON system of public procurement and trading preferences.

5. Determinants of Export Performance

We have so far undertaken decompositions based on the identity that a country's exports are the product of its supply capacity, s_i, and foreign market access, F_i. We now turn to the next stage of the analysis, asking the question: what determines supply capacity? We expect that it depends on a number of underlying country characteristics including country size, endowments, and internal geography. It will also depend, in equilibrium, on foreign market access, since this is one of the variables that determines the potential return to exporting. Our objective in this section is to econometrically estimate the importance of these factors. We contribute to a growing literature on the role of geography in determining the ratio of trade to income (see, in particular, Frankel and Romer, 1999; Leamer, 1988 and Wei, 2000).

5.1 Theory

In order to endogenise supply capacity we have to add to the material of Section 2 some general equilibrium structure of the economy. From equations (8) and (5) the quantity of country *i*'s total exports of a single variety, $x_i = \sum_{j \neq i} x_{ij}$, are given by

$$x_i = \left(p_i\right)^{-\sigma}\left(t_i\right)^{1-\sigma} F_i. \tag{13}$$

We summarise the general equilibrium of the economy by assuming a production possibility frontier between exports and other goods. Expanding the volume of exports produced moves the economy around the production possibility frontier, changing the price of exports, as expressed in the following relationship:

$$p_i = c_i w\left(n_i x_i / a_i\right). \tag{14}$$

c_i is a measure of comparative costs in the export sector and a_i is a measure of the size of the economy. Resources used in the export sector are proportional to the volume of its output, $n_i x_i$, and their impact on the economy depends on their magnitude relative to the size of the economy, a_i. The function $w()$, $w' \geq 0$, captures the fact that as the export sector expands it draws resources out of other sectors of the economy – import competing and non-tradeable activities. Drawing resources out of other sectors tends to bid up their prices, raising costs and hence price in the export sector. Logarithmically differentiating (13) and (14) gives,

$$\begin{aligned} \hat{x} &= -\sigma\hat{p} + (1-\sigma)\hat{t} + \hat{F}, \\ \hat{p} &= \omega\left(\hat{n} + \hat{x} - \hat{a}\right) + \hat{c}. \end{aligned} \tag{15}$$

where $\hat{}$ denotes a proportional change and ω is the elasticity of prices in the export sector with respect to the quantity of resources used in the sector. Eliminating the change in price gives

$$\hat{x}(1 + \sigma\omega) + \sigma\omega\hat{n} = \hat{F} - \sigma\hat{c} + (1-\sigma)\hat{t} + \sigma\omega\hat{a}. \tag{16}$$

The total value of exports, $V_i = n_i p_i x_i = s_i F_i$, (equation (8)) therefore varies according to,

$$\hat{V} = \hat{n} + \hat{p} + \hat{x} = (1 + \omega)(\hat{n} + \hat{x}) + \hat{e} - \omega \hat{a}, \qquad (17)$$

where the second equation uses (15). One further step is needed, which is to specify whether export volumes vary through changes in the number of varieties, n, or output per variety, x. Monopolistic competition theory implies that equilibrium output per commodity is a constant, $\hat{x} = 0$, in which case we can use (16) in (17) to give,

$$\hat{V} = \left[(1 + \omega)(\hat{F} + (1 - \sigma)\hat{t}) + \sigma(\omega \hat{a} - \hat{e})\right]/\sigma\omega. \qquad (18)$$

At the other extreme, if the number of varieties that can be produced by a country is fixed, $\hat{n} = 0$, then

$$\hat{V} = \left[(1 + \omega)(\hat{F} + (1 - \sigma)\hat{t}) + (\sigma - 1)(\omega \hat{a} - \hat{e})\right]/(1 + \sigma\omega). \qquad (19)$$

These equations form the basis of the econometric investigation, with variation in terms provided by cross-country observations. Notice that the coefficient on foreign market access in these equations is not generally equal to unity, reflecting the endogeneity of supply capacity. Thus if F is large relative to T (or, in the second equation if $F > 1$ and $T > 0$), then the coefficient on $\hat{F}$ is less than unity. High levels of foreign market access are associated with a less than proportional increase in exports and a lower level of supply capacity (since $V_i = s_i F_i$). This arises because increased demand for exports encounters diminishing returns in the domestic supply response, bidding up p_i. The coefficient on $\hat{F}$ is smaller the larger is T, this measuring a more tightly curved production possibility frontier.

Other terms in the equations are as would be expected. Cross-country variation in internal geography is captured by $\hat{t}$, entering with negative coefficient providing $F > 1$. Domestic size, $\hat{a}$, increases the value of exports, although not necessarily proportionately. And a high cost export sector ($\hat{e}$ reflecting weak comparative advantage) reduces exports.

5.2 Estimation

The empirical counterpart to equations (18) and (19) takes the form:

$$\ln(V_i) = \beta_0 + \beta_1 \ln(GDP_i) + \beta_2 \ln(Popn_i) + \beta_3 \ln(F_i) + \beta_4 \ln(t_i) + \beta_5 c_i + \mu_k + \varepsilon_i \quad (20)$$

The dependent variable is the log of the value of exports. The log of GDP and of population are included as two separate measures of country size, and F_i is foreign market access as calculated in Section 3 above. t_i represents the internal geography of the country, and is measured empirically using the percentage of the population living within 100km of the coast or rivers (see Appendix for sources).

To capture the comparative costs of exporting in each country, c_i, we use a measure of institutional quality, as has been widely used in the cross-country growth literature (see, for example Acemoglu et al., 2001 and Knack and Keefer, 1997). The measure is an index of the risk of expropriation (see Appendix), and a higher value of the index corresponds to better institutional quality.

We also include a full set of dummies for the 9 geographical regions that control for unobserved heterogeneity across regions in the determinants of export performance, including other unobserved institutions, features of technology, and characteristics of regions.

Before presenting estimates of equation (20), a number of points merit discussion. First, the measure of Foreign Market Access (F) included on the right-hand side as a determinant of countries export performance has itself been constructed from the export data. It is constructed from the solution of a system of simultaneous equations for all countries' total exports and total imports, and any individual country's exports enter this system of simultaneous equations as just one out of the $2R$ observations on exports and imports. Furthermore, a country's foreign market access depends on market capacities in all *other* countries, weighted by bilateral trade costs (equation (7)). Nevertheless, to ensure that shocks to an individual country's exports are not driving our measure of foreign market access, we also construct for each country an alternative measure that completely excludes information on the own country's exports. In this alternative measure, F^*, we exclude one country i at a time and solve the system of equations in (7) to (10) for the R - 1 other countries $j \ldots i$ (excluding information on country i's exports to and imports from these other countries). This yields measures of market capacity and supplier capacity in all other countries $j \ldots i$. The alternative foreign market access measure for country

i is then constructed as the trade cost weighted sum of these market capacities. We repeat the analysis for all countries $i \neq R$. This alternative measure provides a robustness check, and the measure turns out to be very highly correlated with the FMA measure of Section 4.

Second, the income term, GDP_i, may itself be endogenous. We consider two approaches to this problem. First, we impose a theoretical restriction that $\beta_1 = 1$, and take as the dependent variable the export to income ratio, V_i/GDP_i. In this specification, we focus on the ability of the explanatory variables to explain variation in the share of exports in GDP. Second, we use lagged values of GDP_i for the independent variable. We estimate equation (20) using the cross-section variation in the data and focus on the final time period 1994/97. Here, the corresponding lagged income variable is 1990-93.

Estimation results are reported in Table 5. The first column gives our base specification, using the lagged GDP variable. As expected the coefficient on GDP is positive and highly significant, although also significantly less than unity, reflecting the fact that large economies are less open than smaller ones. This suggests that working with the ratio of exports to GDP as dependent variable would be inappropriate. The other size measure, population, is insignificant.

We find a positive and statistically significant effect of both external and internal geography in determining exports. The coefficient on $ln(F)$ is significantly less than unity, indicating that an increase in FMA increases exports less than proportionately. This is in line with the theoretical discussion above as the expansion in exports raises costs and prices in the sector, thereby reducing supply capacity This finding is also consistent with the earlier work (Redding and Venables, 2001) which shows that a higher level of FMA is associated with higher wages. The coefficient on the proportion of population within 100km of the coast or a navigable river is also significant and positive, capturing internal geography. Similar results are obtained if the proportion of population is replaced by the proportion of land area. The measure of institutional quality (risk of expropriation) has a positive and statistically significant effect on the trade ratio, consistent with an important role for the protection of property rights in determining countries ability to export.

The second column of Table 5 gives results for the specification with the export ratio taken as independent variable. Coefficients on $ln(F)$ and on internal geography are similar to those in the first column. However, the population term becomes negative and significant, and the coefficient on institutional quality becomes smaller and insignificant. The fact that smaller economies tend to export

less is being captured by the negative coefficient on population, and perhaps also by negative correlation between institutional quality (now with a smaller coefficient) and per capita income.

Columns 3 and 4 repeat the exercise with the alternative measure of foreign market access discussed above, F^*. Signs and significance levels are unchanged using this alternative variable, although the size of the coefficient on $ln(F^*)$ is somewhat smaller than that on $ln(F)$.

5.3 Effects by region

We use these econometric estimates to shed light on patterns of export performance across the 9 geographical regions. To what extent are the divergent performances of these regions explained by this model, and which of the independent variables are driving the performance of different regions?

The expected value of exports by region k relative to the expected value for the world, $E_{i\in R_k}\ln(V_i) - E_i\ln(V_i)$, can be expressed as a linear function of regional deviations in independent variables times their estimated coefficients. Formally, regression equation (20) implies that,

$$E_{i\in R_k}\ln(V_i) - E_i\ln(V_i) = \mu_k + \alpha_k(a) + \alpha_k(F) + \alpha_k(t) + \alpha_k(c). \qquad (21)$$

where μ_k is the regional dummy of equation (20), and remaining terms are the regional contributions of the independent variables:

$$\begin{aligned}
\alpha_k(a) &= \beta_1(E_{i\in R_k}\ln(GDP_i) - E_i\ln(GDP_i)) + \beta_2(E_{i\in R_k}\ln(Popn_i) - E_i\ln(Popn_i)),\\
\alpha_k(F) &= \beta_3(E_{i\in R_k}\ln(F_i) - E_i\ln(F_i)),\\
\alpha_k(t) &= \beta_4(E_{i\in R_k}\ln(t_i) - E_i\ln(t_i)),\\
\alpha_k(c) &= \beta_5(E_{i\in R_k}c_i - E_ic_i).
\end{aligned} \qquad (22)$$

Thus, $\alpha_k(F) = \beta_3\left(E_{i\in R_k}\ln(F_i) - E_i\ln(F_i)\right)$ is region k's FMA, relative to that of the world, times the estimated coefficient on FMA. Terms $\mu_k(t)$ and $\mu_k(c)$ are the analagous measures for internal geography and institutions, while size effects are combined in $\mu_k(a)$.

We illustrate results for each region in Figure 2, where values are based on the estimates given in the first column of Table 5. The first bar in each of the regional boxes, labelled $\mu_k(V)$, is the region's

export performance relative to the world average once size effects have been conditioned out, $\alpha_k(V) = E_{i \in R_k}\ln(V_i) - E_i\ln(V_i) - \alpha_k(a)$. Remaining bars sum to this first bar, since they divide $\varepsilon_k(V)$ into four components (see equation (21)). Bars three to five give respectively the contributions of foreign market access, F, internal geography, t, and institutions, c. The residual, after controlling for these factors, is the regional dummy δ_k, illustrated as the second bar in each chart.

What do we learn from this decomposition? North America (including Mexico) has high trade relative to the world, given its income and population. This is explained partly by relatively good market access and partly by institutions. It is offset by relatively poor internal geography leaving a substantial unexplained residual. Western Europe's high level of exports is accounted for by a combination of good market access, good internal geography and good institutions, leaving virtually nothing to the residual dummy variable. For Eastern Europe, the benefits of good market access and better than average internal geography and institutions are not fully reflected in the actual level of trade, leaving a large negative regional dummy. This is consistent with the idea that the legacy of communism during the post-war period has had a long-lasting effect on Eastern Europe's exports, captured here in the regional dummy.

Sub-Saharan Africa has low trade volumes given its income level, and these are accounted for by below average performance on all three measures, together with some negative residual. Thus, each of $\varepsilon_k(F)$, $\varepsilon_k(t)$, $\varepsilon_k(c)$ and δ_k account for between 20% and 30% of Sub-Saharan Africa's low value of $\varepsilon_k(V)$. Although we are able to explain some of the above average trade ratios in South-East Asia, there remains a substantial positive residual which in part is likely to be explained by the entrepot activities of Hong Kong and Singapore. The outcome for Oceania combines low market access with good internal geography and institutions.

6. Concluding Comments

The changes in countries' export performance over recent decades is symptomatic, at least, of the extent to which they have succeeded in benefiting from globalization. The real value of world exports doubled between the early 1970s and mid 80s, and doubled again from the mid 80s to late 1990s. In the second of these periods Latin American exports went up by just 54%, Sub-Saharan Africa's went up by 10%,

and those of the Middle-East and North Africa fell by 16%.

This paper takes some steps towards understanding the determinants of cross-country variation in both the levels and growth of exports. There are several main findings. First, geography creates substantial cross-country variation in the ease of access to foreign markets, and this is an important determinant of countries' export performance. For example, once country size factors are controlled for, Sub-Saharan Africa has poor export performance, about one quarter of which is attributable to its poor foreign market access. Furthermore, the growth of foreign market access varied widely across regions during the periods we studied. This accounted for some of the poor performance of regions such as Sub-Saharan Africa, not neighboured by countries with fast growing import demand.

Second, export performance also depends on internal geography, which is measured in this paper by the proportion of the population close to the coast or navigable rivers. Looking at Sub-Saharan Africa again, a further one-quarter of its poor export performance is accounted for by this variable.

Finally, export performance also depends on many other domestic supply side factors. This paper takes a small step towards analysis of these by looking at the role of institutional quality in determining exports. This, it turns out, accounts for a further one-quarter of Sub-Saharan Africa's low export levels. Perhaps the main contribution of this paper is to show to measure and control for the external and internal geographic factors that shape performance. Our hope is that once these are successfully controlled for then research will be better able to identify domestic factors (some of them subject to policy control) that also determine export performance.

Table 1: Bilateral Trade Equation Estimation (Country, Partner Dummies)

$\ln(X_{ij})$	1	2	3	4	5	6	7
Obs	9981	9981	9981	9981	9981	9981	9981
Period	1970/73	1974/77	1978/81	1982/85	1986/90	1990/94	1994/97
$\ln(dist_{ij})$	-0.831	-0.866	-0.882	-0.883	-0.853	-0.866	-0.866
	0.072	*0.062*	*0.059*	*0.061*	*0.05*	*0.05*	*0.046*
$bord_{ij}$	0.532	0.494	0.483	0.449	0.528	0.607	0.688
	0.179	*0.157*	*0.154*	*0.16*	*0.146*	*0.151*	*0.152*
Country dummies	yes	yes	yes	yes	yes	yes	yes
Partner dummies	yes	yes	yes	yes	yes	yes	yes
Estimation	WLS	WLS	WLS	WLS	WLS	WLS	WLS
F(□)	96.56	106.83	124.23	128.43	172	198.71	212.87
Prob > F	0	0	0	0	0	0	0
R-squared	0.863	0.85	0.852	0.844	0.897	0.906	0.898
Root MSE	0.879	0.89	0.891	0.954	0.761	0.7	0.723

Notes: Huber-White Heteroscedasticity robust standard errors in parentheses. $\ln(X_{ij})$ is log bilateral exports from country *i* to partner *j* plus one; $\ln(dist_{ij})$ is bilateral distance between countries *i* and *j*; $bord_{ij}$ is a dummy for whether the two countries share a common border. All specifications include exporting country and importing partner fixed effects. To allow for measurement error in bilateral trade flows that is correlated with the volume of trade, observations are weighted by the product of country and partner GDP.

Table 2: Regional Sources of Export Growth, 1970/73-1994/97, Percentage Rates of Growth

Region	Period	Exports, *V*	Foreign Market Access, *F*	Supplier Capacity, *s*
Benchmark	Periods 1-7 (70/73-94/97)	326.3%	106.5%	106.5%
	Periods 1-4 (70/73-82/85)	104.4%	42.9%	42.9%
	Periods 4-7 (82/85-94/97)	108.5%	44.5%	44.5%
North America	Periods 1-7 (70/73-94/97)	288.99%	166.07%	110.86%
	Periods 1-4 (70/73-82/85)	92.74%	59.42%	54.00%
	Periods 4-7 (82/85-94/97)	101.82%	66.90%	36.92%
Latin America	Periods 1-7 (70/73-94/97)	193.32%	110.82%	48.11%
	Periods 1-4 (70/73-82/85)	90.17%	40.39%	43.45%
	Periods 4-7 (82/85-94/97)	54.24%	50.17%	3.25%
Western Europe	Periods 1-7 (70/73-94/97)	269.37%	94.29%	96.82%
	Periods 1-4 (70/73-82/85)	75.05%	33.02%	34.12%
	Periods 4-7 (82/85-94/97)	111.01%	46.06%	46.75%
Eastern Europe	Periods 1-7 (70/73-94/97)	187.43%	94.84%	39.62%
	Periods 1-4 (70/73-82/85)	44.03%	33.95%	10.95%
	Periods 4-7 (82/85-94/97)	99.56%	45.45%	25.84%
Sub-Saharan Africa	Periods 1-7 (70/73-94/97)	70.38%	86.44%	-7.24%
	Periods 1-4 (70/73-82/85)	54.18%	34.71%	10.80%
	Periods 4-7 (82/85-94/97)	10.50%	38.40%	-16.28%
N Africa and M East	Periods 1-7 (70/73-94/97)	189.77%	102.82%	41.20%
	Periods 1-4 (70/73-82/85)	245.48%	48.38%	135.71%
	Periods 4-7 (82/85-94/97)	-16.13%	36.69%	-40.10%
SE Asia	Periods 1-7 (70/73-94/97)	826.17%	146.35%	238.04%
	Periods 1-4 (70/73-82/85)	233.67%	47.88%	119.01%
	Periods 4-7 (82/85-94/97)	177.57%	66.59%	54.35%
Other Asia	Periods 1-7 (70/73-94/97)	371.95%	117.80%	119.31%
	Periods 1-4 (70/73-82/85)	76.45%	45.74%	21.01%
	Periods 4-7 (82/85-94/97)	167.48%	49.44%	81.23%
Oceania	Periods 1-7 (70/73-94/97)	166.82%	104.30%	29.86%
	Periods 1-4 (70/73-82/85)	48.35%	37.34%	7.89%
	Periods 4-7 (82/85-94/97)	79.85%	48.75%	20.36%

Notes: Regional variables are the sum of those for countries within a region. See Appendix A for the countries included in each region.

Table 3a: Percentage Growth Contributions of Partner Regions to the Growth of Foreign Market Access of Each Exporting Region Periods 1-7 (1970/73-1994/7)

	FMA	North America	Latin America	Western Europe	Eastern Europe	Sub Saharan Africa	MENA	South East Asia	Other Asia	Oceania
North America	166.07%	141.42%	3.22%	9.53%	0.29%	-0.43%	1.30%	9.82%	0.33%	0.59%
Latin America	110.82%	59.11%	19.32%	13.99%	0.42%	-0.86%	2.18%	14.93%	0.55%	1.19%
Western Europe	94.29%	15.49%	1.45%	61.91%	2.01%	-0.53%	2.90%	10.15%	0.50%	0.41%
Eastern Europe	94.84%	14.38%	1.44%	60.67%	2.99%	-0.57%	3.66%	11.21%	0.60%	0.45%
Sub-Saharan Africa	86.44%	27.24%	4.57%	23.79%	0.75%	-2.44%	6.00%	23.84%	1.36%	1.34%
N Africa and M East	102.82%	20.36%	2.35%	33.04%	1.08%	-1.08%	23.91%	20.67%	1.65%	0.83%
South-East Asia	146.35%	19.10%	2.18%	13.04%	0.46%	-0.72%	3.40%	104.67%	1.88%	2.34%
Other Asia	117.80%	21.29%	2.56%	19.43%	0.71%	-1.02%	7.67%	58.39%	7.10%	1.67%
Oceania	104.30%	29.99%	5.13%	13.18%	0.44%	-1.02%	3.22%	46.60%	1.26%	5.49%

Notes: a region's Foreign Market Access (FMA) is the sum of the values of FMA for all countries within that region. Regional FMA growth is decomposed into the percentage contributions of each partner region using equations (12) and (13). The exporting region is reported in the rows of the table and the importing partner in the columns.

Table 3b: Percentage Growth Contributions of Partner Regions to the Growth of Foreign Market Access of Each Exporting Region Periods 1-4 (1970/73-1994/7)

	FMA	North America	Latin America	Western Europe	Eastern Europe	Sub Saharan Africa	MENA	South East Asia	Other Asia	Oceania
North America	59.42%	51.56%	0.35%	2.36%	-0.11%	-0.22%	1.84%	3.22%	0.25%	0.18%
Latin America	40.39%	27.89%	1.42%	3.17%	-0.17%	-0.48%	3.07%	4.72%	0.41%	0.36%
Western Europe	33.02%	7.42%	0.01%	18.07%	-0.27%	-0.17%	4.20%	3.24%	0.40%	0.12%
Eastern Europe	33.95%	6.81%	-0.00%	18.28%	-0.35%	-0.17%	5.22%	3.57%	0.48%	0.13%
Sub-Saharan Africa	34.71%	12.55%	-0.06%	6.20%	-0.25%	-1.03%	8.58%	7.23%	1.08%	0.41%
N Africa and M East	48.38%	9.50%	-0.03%	10.32%	-0.24%	-0.32%	21.09%	6.45%	1.37%	0.25%
South-East Asia	47.88%	8.54%	-0.12%	2.88%	-0.19%	-0.49%	4.82%	30.18%	1.39%	0.86%
Other Asia	45.74%	9.62%	-0.12%	4.81%	-0.25%	-0.59%	10.73%	16.86%	4.13%	0.55%
Oceania	37.34%	13.10%	-0.24%	2.32%	-0.22%	-0.81%	4.51%	15.30%	0.95%	2.43%

Notes: a region's Foreign Market Access (FMA) is the sum of the values of FMA for all countries within that region. Regional FMA growth is decomposed into the percentage contributions of each partner region using equations (12) and (13). The exporting region is reported in the rows of the table and the importing partner in the columns.

Table 3c: Percentage Growth Contributions of Partner Regions to the Growth of Foreign Market Access of Each Exporting Region Periods 4-7 (1982/85-1994/97)

	FMA	North America	Latin America	Western Europe	Eastern Europe	Sub Saharan Africa	MENA	South - East Asia	Other Asia	Oceania
North America	66.90%	56.37%	1.81%	4.50%	0.25%	-0.13%	-0.34%	4.14%	0.05%	0.26%
Latin America	50.17%	22.23%	12.75%	7.71%	0.42%	-0.27%	-0.64%	7.27%	0.10%	0.59%
Western Europe	46.06%	6.07%	1.08%	32.96%	1.71%	-0.27%	-0.98%	5.19%	0.08%	0.22%
Eastern Europe	45.45%	5.65%	1.08%	31.65%	2.50%	-0.30%	-1.16%	5.71%	0.09%	0.24%
Sub-Saharan Africa	38.40%	10.90%	3.44%	13.06%	0.75%	-1.05%	-1.91%	12.33%	0.21%	0.69%
N Africa and M East	36.69%	7.32%	1.60%	15.31%	0.89%	-0.51%	1.91%	9.59%	0.19%	0.39%
South-East Asia	66.59%	7.14%	1.56%	6.87%	0.43%	-0.16%	-0.96%	50.37%	0.33%	1.00%
Other Asia	49.44%	8.01%	1.84%	10.03%	0.66%	-0.29%	-2.10%	28.50%	2.04%	0.77%
Oceania	48.75%	12.30%	3.91%	7.91%	0.48%	-0.15%	-0.94%	22.79%	0.23%	2.23%

Notes: a region's Foreign Market Access (FMA) is the sum of the values of FMA for all countries within that region. Regional FMA growth is decomposed into the percentage contributions of each partner region using equations (12) and (13). The exporting region is reported in the rows of the table and the importing partner in the columns.

Table 4: Bilateral Trade Equation Estimation and Within-Region Trade Costs (Country, Partner Dummies)

$\ln(X_{ij})$	1	2	3	4	5	6	7
Obs	9981	9981	9981	9981	9981	9981	9981
Period	1970/73	1974/77	1978/81	1982/85	1986/89	1990/93	1994/97
$\ln(dist_{ij})$	-0.669	-0.69	-0.71	-0.779	-0.704	-0.688	-0.74
	0.089	*0.077*	*0.076*	*0.081*	*0.071*	*0.075*	*0.086*
$bord_{ij}$	0.778	0.659	0.578	0.526	0.488	0.416	0.401
	0.145	*0.124*	*0.119*	*0.12*	*0.112*	*0.113*	*0.118*
Within N America	-0.467	-0.277	-0.205	-0.333	-0.019	0.417	0.543
	0.289	*0.271*	*0.281*	*0.278*	*0.273*	*0.327*	*0.335*
Within L America	-0.531	-0.278	-0.168	-0.013	0.313	0.626	0.58
	0.233	*0.202*	*0.201*	*0.209*	*0.191*	*0.201*	*0.24*
Within W Europe	0.565	0.642	0.732	0.657	0.811	0.876	0.802
	0.161	*0.14*	*0.135*	*0.142*	*0.13*	*0.142*	*0.172*
Within E Europe	1.038	-0.274	3.424	4.139	4.014	2.409	1.817
	1.452	*1.75*	*0.305*	*0.28*	*0.261*	*0.212*	*0.256*
Within Sub-Sahar. Africa	-3.913	-4.067	-4.849	-5.615	-5.2	-1.485	-1.334
	0.586	*0.609*	*0.609*	*0.525*	*0.449*	*0.316*	*0.322*
Within N Africa & ME	-2.972	-4.225	-4.903	-4.257	-4.073	-3.631	-3.381
	0.658	*0.595*	*0.704*	*0.664*	*0.683*	*0.804*	*0.853*
Within SE Asia	0.852	0.638	0.225	-0.174	-0.217	-0.232	-0.382
	0.297	*0.272*	*0.265*	*0.293*	*0.223*	*0.219*	*0.23*
Within Other Asia	-4.65	-0.715	-0.422	-0.574	-0.86	-0.356	-1.278
	1.637	*0.751*	*0.962*	*0.773*	*0.788*	*0.634*	*0.789*
Within Oceania	0.929	1.09	1.214	0.965	1.177	1.483	1.591
	0.525	*0.429*	*0.431*	*0.339*	*0.289*	*0.29*	*0.39*
Country dummies	yes	yes	yes	yes	yes	yes	yes
Partner dummies	yes	yes	yes	yes	yes	yes	yes
Estimation	WLS	WLS	WLS	WLS	WLS	WLS	WLS
Prob > F(dummies)	0.077	0.011	0.005	0.004	0.000	0.000	0.000
Prob > F(□)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.868	0.856	0.859	0.853	0.903	0.912	0.904
Root MSE	0.864	0.873	0.869	0.933	0.736	0.677	0.701

Notes: Huber-White Heteroscedasticity robust standard errors in parentheses. $\ln(X_{ij})$ is log bilateral exports from country *i* to partner *j* plus one; $\ln(dist_{ij})$ is bilateral distance between countries *i* and *j*; $bord_{ij}$ is a dummy for whether the two countries share a common border. All specifications include exporting country and importing partner fixed effects. Within N America is a dummy that takes the value 1 if *both* trade partners lie within North America and zero otherwise. The other within-region dummies are defined analogously. Prob > F(dummies) is the p-value for an F-test of the null hypothesis that the coefficients on the regional dummies are jointly equal to zero. Prob > F (□) is the p-value for an F-test of the null hypothesis that all coefficients are jointly equal to zero. Since the within-region dummies exploit bilateral information they are separately identified from the country and partner fixed effects. To allow for measurement error in bilateral trade flows that is correlated with the volume of trade, observations are weighted by the product of country and partner GDP. To capture the effects of NAFTA, Mexico is included in the definition of North America.

Table 5: The Role of Internal Geography, External Geography, and Institutions in Determining Export Performance, 1994-97

Dependent Variable	ln(*V*)	ln(*V/GDP*)	ln(*V*)	ln(*V/GDP*)
Period	1994/97	1994/97	1994/97	1994/97
Observations	95	95	95	95
ln(GDP(1991-93))	0.734		0.73	
	0.052		*0.051*	
ln(population)	-0.038	-0.262	-0.025	-0.256
	0.057	*0.043*	*0.057*	*0.043*
ln(*F*)	0.46	0.479	0.342	0.298
	0.195	*0.205*	*0.119*	*0.127*
% Pop within 100km coast & rivers	0.581	0.416	0.596	0.441
	0.191	*0.061*	*0.187*	*0.199*
institutional quality	0.202	0.023	0.198	0.016
	0.062	*0.387*	*0.061*	*0.061*
Region Effects	yes	yes	yes	yes
Estimation	OLS	OLS	OLS	OLS
	F(13,81)= 137.6	F(12,82)= 7.732	F(13,81)= 142.2	F(12,82)= 7.747
Prob > F	0	0	0	0
R^2	0.957	0.531	0.958	0.531

Notes: Standard errors in parentheses. Columns 1 and 2, FMA as computed in Section 3. Columns 3 and 4 FMA computed omitting own country, *F**.

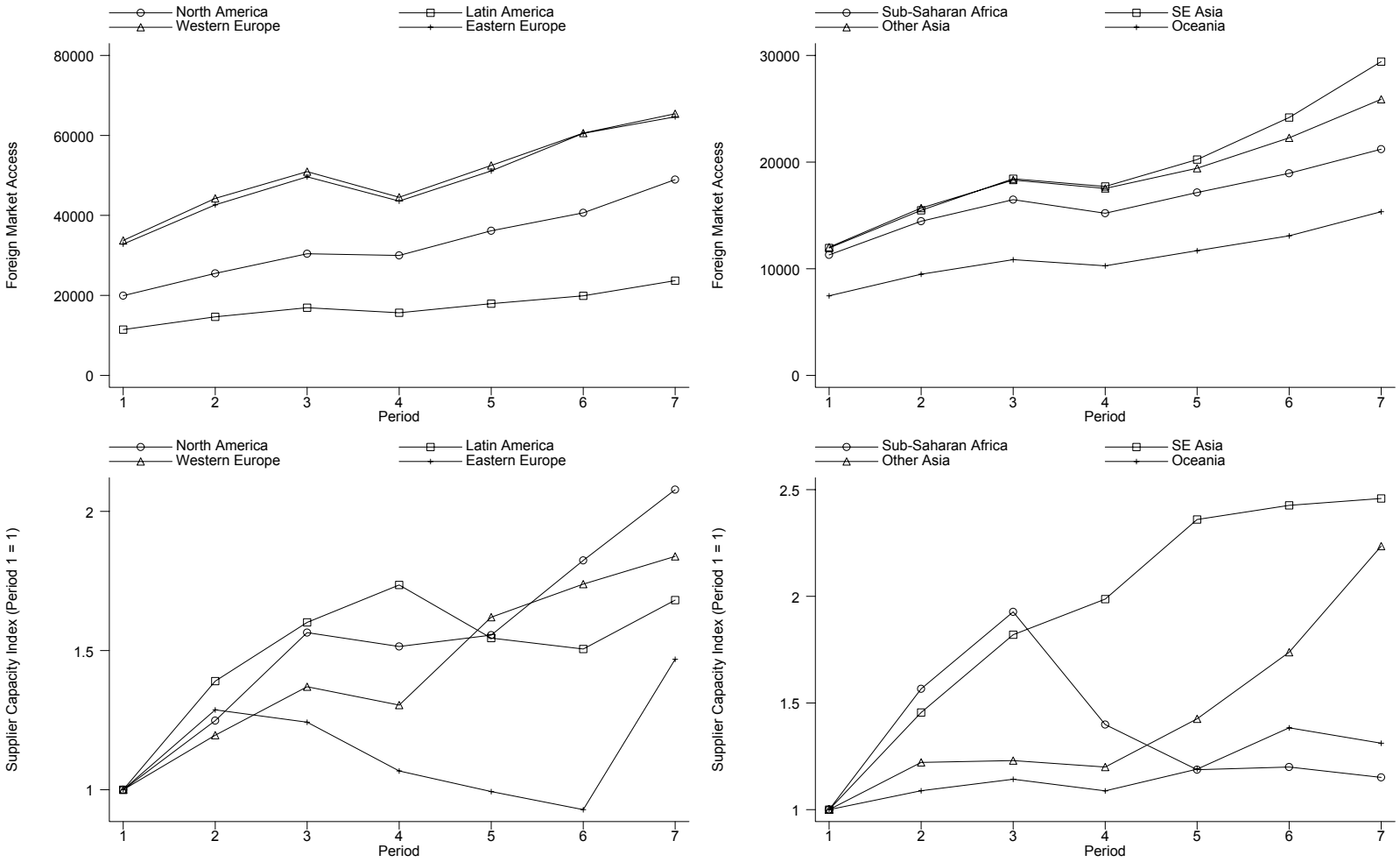

Figure 1 : Regional FMA and Supplier Capacity

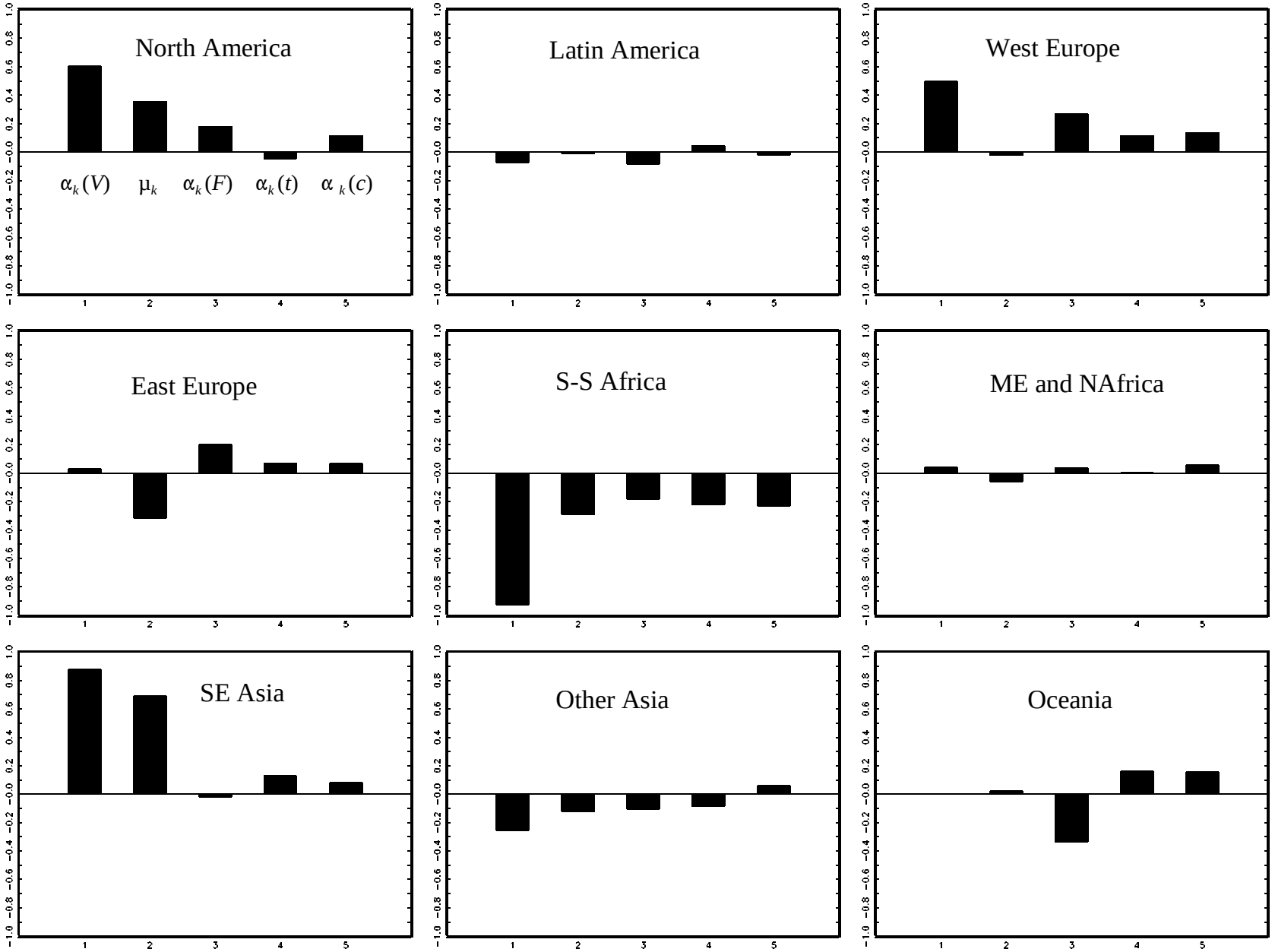

Figure 2: Regional export performance, 1994-97

Appendix

Data:

Bilateral Trade: data on bilateral trade flows are from the World Bank COMTRADE database.

GDP per capita: data on current price (US dollars) GDP and on population are from the World Bank. Deflated by US GDP deflator

Geographical variables: data on bilateral distance, existence of a common border from the World Bank.

Physical Geography and Institutional, Social, and Political Characteristics: data on proportion of land and population close to coast or navigable rivers from Gallup, Sachs, and Mellinger (1998). The data can be downloaded from http://www2.cid.harvard.edu/ciddata.

Institutions: Expropriation risk from International Country Risk Guide database.

Regional groupings:

North America: Canada, USA, Mexico.

Latin America and the Caribbean: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Peru, Trinidad and Tobago, Uruguay, and Venezuela..

Western Europe: Austria, Belgium (incl Luxembourg), Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom.

Eastern Europe: Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania.

Sub-Saharan Africa: Angola, Benin, Cameroon, Cote d'Ivoire, Cameroon, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritius, Mozambique, Morocco, Nigeria, Senegal, South Africa, Sudan, Tanzania, Uganda, Zaire, Zambia, and Zimbabwe.

Middle-East and North Africa: Algeria, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Saudi Arabia, Syria, Tunisia, United Arab Emirates.

South East Asia: Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Papua New Guinea, Philippines, Singapore, Taiwan, Thailand.

Other Asia: Bangladesh, India, Sri Lanka,Nepal, and Pakistan.

Oceania: Australia, New Zealand.

Table A1: Country Sources of Export Growth and the Regional Concentration of Foreign Market Access Growth, Panel A; Growth Rates

Country	Period	Supply capacity	Foreign market access	Exports	Own Region FMA	Other Region FMA
Canada	70/73-82/85	2.71%	73.91%	78.62%	69.4%	4.5%
	82/85-94/97	2.46%	70.61%	74.81%	65.3%	5.3%
Mexico	70/73-82/85	307.49%	46.72%	497.87%	36.3%	10.4%
	82/85-94/97	56.81%	65.22%	159.09%	48.8%	16.4%
United States	70/73-82/85	52.56%	20.65%	84.06%	3.3%	17.3%
	82/85-94/97	37.90%	49.10%	105.61%	19.4%	29.7%
Argentina	70/73-82/85	3.96%	29.04%	34.15%	0.5%	28.5%
	82/85-94/97	41.04%	63.79%	131.01%	30.3%	33.5%
Bolivia	70/73-82/85	13.40%	29.65%	47.02%	-1.6%	31.2%
	82/85-94/97	-35.03%	59.35%	3.53%	24.8%	34.6%
Brazil	70/73-82/85	105.77%	31.49%	170.58%	-1.6%	33.1%
	82/85-94/97	-6.65%	51.21%	41.16%	14.1%	37.1%
Chile	70/73-82/85	18.58%	28.77%	52.70%	-2.0%	30.8%
	82/85-94/97	83.77%	56.08%	186.83%	19.9%	36.2%
Colombia	70/73-82/85	23.71%	40.40%	73.69%	3.3%	37.1%
	82/85-94/97	53.89%	46.69%	125.74%	11.7%	35.0%
Costa Rica	70/73-82/85	4.72%	45.78%	52.65%	5.1%	40.7%
	82/85-94/97	62.72%	45.46%	136.68%	8.3%	37.2%
Dominican Republic	70/73-82/85	-10.00%	49.76%	34.78%	2.7%	47.1%
	82/85-94/97	108.67%	40.72%	193.64%	3.3%	37.4%
Ecuador	70/73-82/85	151.37%	39.19%	249.88%	2.0%	37.2%
	82/85-94/97	-8.07%	48.06%	36.11%	11.1%	37.0%
El Salvador	70/73-82/85	-28.01%	44.20%	3.81%	2.2%	42.0%
	82/85-94/97	-18.40%	48.24%	20.97%	8.6%	39.6%
Guatemala	70/73-82/85	-0.24%	45.09%	44.75%	2.2%	42.9%
	82/85-94/97	-16.50%	56.30%	30.51%	7.3%	49.0%
Haiti	70/73-82/85	180.97%	48.56%	317.41%	2.2%	46.3%
	82/85-94/97	-81.19%	43.96%	-72.92%	6.8%	37.2%
Honduras	70/73-82/85	6.25%	44.23%	53.24%	2.1%	42.1%
	82/85-94/97	-36.84%	46.62%	-7.40%	7.7%	38.9%
Jamaica	70/73-82/85	-43.36%	50.44%	-14.79%	2.9%	47.6%
	82/85-94/97	3.69%	42.64%	47.90%	4.4%	38.3%
Nicaragua	70/73-82/85	-51.99%	44.38%	-30.69%	2.7%	41.7%
	82/85-94/97	-24.25%	47.62%	11.82%	9.1%	38.6%
Panama	70/73-82/85	-14.80%	42.78%	21.64%	1.8%	41.0%
	82/85-94/97	6.19%	47.03%	56.12%	9.4%	37.7%
Peru	70/73-82/85	-10.25%	35.59%	21.69%	1.2%	34.4%
	82/85-94/97	-1.93%	53.90%	50.92%	17.7%	36.2%
Trinidad and Tobago	70/73-82/85	40.46%	44.13%	102.44%	3.0%	41.2%
	82/85-94/97	-52.42%	41.09%	-32.87%	4.6%	36.5%
Uruguay	70/73-82/85	52.02%	15.49%	75.57%	-6.4%	21.9%
	82/85-94/97	-7.14%	87.22%	73.85%	58.5%	28.7%
Venezuela	70/73-82/85	39.69%	43.63%	100.63%	1.9%	41.8%
	82/85-94/97	-32.04%	47.58%	0.30%	10.6%	37.0%

Table A1: Country Sources of Export Growth and the Regional Concentration of Foreign Market Access Growth, Panel B

Country	Period	Supply capacity	Foreign market access	Exports	Own Region FMA	Other Region FMA
Austria	70/73-82/85	44.54%	28.48%	85.71%	16.8%	11.7%
	82/85-94/97	58.77%	54.54%	145.37%	39.8%	14.7%
Belgium	70/73-82/85	11.74%	33.90%	49.62%	24.9%	9.0%
(incl Luxembourg)	82/85-94/97	45.43%	48.24%	115.58%	40.5%	7.8%
Denmark	70/73-82/85	22.67%	31.32%	61.09%	19.6%	11.7%
	82/85-94/97	34.43%	50.51%	102.34%	39.6%	10.9%
Finland	70/73-82/85	37.30%	30.62%	79.33%	12.0%	18.6%
	82/85-94/97	77.39%	40.70%	149.60%	23.6%	17.1%
France	70/73-82/85	27.92%	29.60%	65.79%	18.0%	11.6%
	82/85-94/97	43.09%	52.71%	118.51%	42.6%	10.1%
Germany	70/73-82/85	27.51%	28.29%	63.59%	14.5%	13.8%
	82/85-94/97	37.36%	49.64%	105.55%	32.3%	17.3%
Greece	70/73-82/85	65.23%	40.26%	131.76%	15.4%	24.9%
	82/85-94/97	20.21%	39.84%	68.11%	23.5%	16.4%
Ireland	70/73-82/85	102.15%	34.20%	171.28%	18.6%	15.6%
	82/85-94/97	133.79%	45.39%	239.91%	32.1%	13.3%
Italy	70/73-82/85	40.84%	34.67%	89.67%	15.2%	19.5%
	82/85-94/97	61.49%	43.50%	131.74%	28.5%	15.0%
Netherlands	70/73-82/85	32.22%	32.16%	74.74%	21.5%	10.7%
	82/85-94/97	19.07%	46.99%	75.02%	37.5%	9.5%
Norway	70/73-82/85	93.16%	31.80%	154.59%	15.0%	16.8%
	82/85-94/97	22.67%	40.04%	71.79%	24.8%	15.2%
Portugal	70/73-82/85	21.12%	38.31%	67.52%	16.1%	22.2%
	82/85-94/97	125.85%	49.78%	238.28%	32.5%	17.3%
Spain	70/73-82/85	100.36%	35.68%	171.84%	15.1%	20.5%
	82/85-94/97	116.11%	41.68%	206.18%	26.2%	15.5%
Sweden	70/73-82/85	5.65%	33.87%	41.43%	16.0%	17.9%
	82/85-94/97	39.53%	40.54%	96.10%	24.3%	16.2%
Switzerland	70/73-82/85	33.72%	31.84%	76.30%	20.5%	11.4%
	82/85-94/97	43.52%	51.53%	117.47%	41.7%	9.8%
Turkey	70/73-82/85	129.06%	36.75%	213.24%	11.8%	24.9%
	82/85-94/97	87.06%	35.69%	153.82%	19.2%	16.5%
United Kingdom	70/73-82/85	36.68%	38.55%	89.38%	22.7%	15.8%
	82/85-94/97	36.49%	35.09%	84.38%	22.0%	13.1%

Table A1: Country Sources of Export Growth and the Regional Concentration of Foreign Market Access Growth, Panel C

Country	Period	Supply capacity	Foreign market access	Exports	Own Region FMA	Other Region FMA
Albania	70/73-82/85	84.57%	36.57%	152.07%	0.0%	36.5%
	82/85-94/97	-43.46%	37.34%	-22.35%	1.3%	36.0%
Bulgaria	70/73-82/85	27.01%	35.56%	72.17%	-0.7%	36.3%
	82/85-94/97	-9.33%	43.17%	29.81%	3.0%	40.2%
Czechosolvakia	70/73-82/85	2.86%	31.08%	34.83%	-0.5%	31.6%
	82/85-94/97	77.54%	54.48%	174.26%	2.9%	51.6%
Hungary	70/73-82/85	-11.31%	34.92%	19.66%	-0.6%	35.5%
	82/85-94/97	44.67%	41.52%	104.73%	3.3%	38.2%
Poland	70/73-82/85	-0.44%	31.34%	30.76%	-0.2%	31.5%
	82/85-94/97	57.83%	49.69%	136.25%	1.8%	47.8%
Romania	70/73-82/85	47.75%	37.74%	103.52%	0.1%	37.6%
	82/85-94/97	-28.69%	38.34%	-1.36%	2.4%	35.9%
Angola	70/73-82/85	14.67%	30.48%	49.62%	-2.8%	33.3%
	82/85-94/97	13.81%	37.95%	57.01%	-1.9%	39.9%
Benin	70/73-82/85	4.81%	36.35%	42.91%	3.1%	33.2%
	82/85-94/97	-5.98%	32.10%	24.21%	-4.9%	37.0%
Cameroon	70/73-82/85	154.00%	37.41%	249.03%	3.7%	33.7%
	82/85-94/97	-53.45%	31.61%	-38.73%	-5.1%	36.7%
Cote d'Ivoire '	70/73-82/85	30.17%	32.94%	73.04%	-1.5%	34.5%
	82/85-94/97	-22.83%	39.04%	7.30%	-1.1%	40.1%
Ethiopia	70/73-82/85	-33.83%	41.87%	-6.12%	-0.8%	42.7%
	82/85-94/97	-29.71%	35.62%	-4.68%	-0.9%	36.5%
Gabon	70/73-82/85	169.54%	35.08%	264.10%	0.9%	34.2%
	82/85-94/97	-16.34%	34.97%	12.92%	-3.5%	38.4%
Ghana	70/73-82/85	-51.31%	35.75%	-33.90%	1.5%	34.2%
	82/85-94/97	35.02%	35.38%	82.80%	-3.3%	38.6%
Guinea	70/73-82/85	134.95%	33.49%	213.63%	-1.9%	35.4%
	82/85-94/97	-23.31%	39.84%	7.25%	-1.2%	41.0%
Kenya	70/73-82/85	29.93%	36.42%	77.24%	-1.8%	38.2%
	82/85-94/97	-12.85%	38.40%	20.61%	-0.5%	38.9%
Madagascar	70/73-82/85	-37.96%	35.22%	-16.11%	-1.5%	36.7%
	82/85-94/97	-50.35%	42.61	-29.19%	0.0%	42.6%
Malawi	70/73-82/85	20.67%	30.46%	57.43%	-3.6%	34.0%
	82/85-94/97	-18.21%	40.66%	15.05%	0.3%	40.4%
Mali	70/73-82/85	-88.27%	36.63%	-83.97%	0.5%	36.1%
	82/85-94/97	-12.42%	38.54%	21.33%	-1.3%	39.9%
Mauritius	70/73-82/85	37.04%	36.29%	86.77%	-1.5%	37.7%
	82/85-94/97	97.37%	43.71%	183.63%	-0.5%	44.2%
Mozambique	70/73-82/85	-75.03%	27.47%	-68.17%	-3.5%	30.9%
	82/85-94/97	-56.84%	43.73%	-37.96%	4.1%	39.6%
Nigeria	70/73-82/85	122.31%	35.22%	200.60%	-1.0%	36.2%
	82/85-94/97	-49.43%	39.04%	-29.69%	-0.7%	39.7%
Senegal	70/73-82/85	-13.97%	35.84%	16.87%	-1.3%	37.1%
	82/85-94/97	-48.02%	40.77%	-26.83%	-0.9%	41.6%

Table A1: Country Sources of Export Growth and the Regional Concentration of Foreign Market Access Growth, Panel D

Country	Period	Supply capacity	Foreign market access	Exports	Own Region FMA	Other Region FMA
South Africa	70/73-82/85	-6.22%	34.18%	25.83%	-1.2%	35.4%
	82/85-94/97	33.19%	44.56%	92.54%	-0.5%	45.1%
Sudan	70/73-82/85	-42.06%	43.21%	-17.02%	-0.8%	44.1%
	82/85-94/97	-67.13%	34.88%	-55.67%	-0.5%	35.4%
Tanzania	70/73-82/85	-48.49%	34.51%	-30.72%	-2.3%	36.8%
	82/85-94/97	-29.50%	39.75%	-1.48%	0.0%	39.7%
Uganda	70/73-82/85	-48.21%	35.19%	-29.98%	-1.8%	37.0%
	82/85-94/97	-27.45%	37.45%	-0.28%	-0.6%	39.0%
Zaire	70/73-82/85	-34.05%	33.43%	-12.00%	-0.9%	34.3%
	82/85-94/97	-54.51%	37.86%	-36.87%	-1.3%	39.2%
Zambia	70/73-82/85	-67.90%	33.14%	-57.26%	-0.8%	33.9%
	82/85-94/97	-49.35%	41.39%	-28.38%	1.6%	39.8%
Zimbabwe	70/73-82/85	341.18%	24.27%	448.27%	-6.8%	31.1%
	82/85-94/97	19.76%	41.05%	68.92%	1.7%	39.3%
Algeria	70/73-82/85	203.95%	37.06%	316.59%	5.7%	31.4%
	82/85-94/97	-51.74%	40.67%	-32.12%	0.4%	40.3%
Egypt	70/73-82/85	85.79%	40.23%	160.54%	13.8%	26.4%
	82/85-94/97	-36.75%	40.37%	-11.21%	0.4%	36.2%
Iran	70/73-82/85	131.64%	48.88%	244.86%	18.8%	30.0%
	82/85-94/97	-50.45%	37.76%	-31.74%	-2.9%	40.7%
Israel	70/73-82/85	30.83%	59.69%	108.92%	34.2%	25.5%
	82/85-94/97	130.86%	23.37%	184.80%	-7.5%	30.9%
Jordan	70/73-82/85	312.61%	46.86%	505.96%	26.9%	20.0%
	82/85-94/97	-20.10%	50.75%	20.46%	24.4%	26.4%
Kuwait	70/73-82/85	-5.83%	72.11%	62.07%	44.9%	27.2%
	82/85-94/97	-60.10%	22.24%	-51.23%	-8.8%	31.0%
Lebanon	70/73-82/85	-42.87%	51.98%	-13.17%	27.6%	24.4%
	82/85-94/97	-41.90%	35.03%	-21.45%	4.0%	31.1%
Morocco	70/73-82/85	8.57%	38.31%	50.16%	6.6%	31.8%
	82/85-94/97	17.92%	40.40%	65.56%	-1.9%	42.3%
Oman	70/73-82/85	153.43%	63.84%	315.21%	33.8%	30.0%
	82/85-94/97	-18.49%	37.80%	12.32%	3.0%	34.8%
Saudi Arabia	70/73-82/85	181.50%	42.94%	302.39%	15.1%	27.8%
	82/85-94/97	-55.62%	42.06%	-36.96%	3.7%	38.3%
Syria	70/73-82/85	107.20%	41.39%	192.95%	18.5%	22.9%
	82/85-94/97	8.35%	42.70%	54.62%	9.6%	33.1%
Tunisia	70/73-82/85	134.51%	38.48%	224.75%	7.8%	30.7%
	82/85-94/97	59.91%	34.60%	115.24%	-2.3%	36.9%
United Arab Emirates	70/73-82/85	510.10%	63.88%	899.83%	34.9%	29.0%
	82/85-94/97	-27.55%	26.40%	-8.42%	-7.8%	34.2%

Table A1: Country Sources of Export Growth and the Regional Concentration of Foreign Market Access Growth, Panel E

Country	Period	Supply capacity	Foreign market access	Exports	Own Region FMA	Other Region FMA
Cambodia	70/73-82/85	-95.59%	38.73%	-93.89%	22.4%	16.4%
	82/85-94/97	3187.36%	85.00%	5981.78%	69.7%	15.3%
China	70/73-82/85	149.75%	47.05%	267.26%	31.3%	15.7%
	82/85-94/97	208.31%	62.89%	402.20%	48.0%	14.9%
Hong Kong	70/73-82/85	127.59%	47.08%	234.75%	29.3%	17.8%
	82/85-94/97	184.02%	67.31%	375.21% %	51.2%	16.1%
Indonesia	70/73-82/85	291.97%	45.78%	471.92%	27.1%	18.7%
	82/85-94/97	-4.76%	63.79%	55.99%	46.0%	17.8%
Japan	70/73-82/85	91.49%	45.33%	178.30%	19.4%	26.0%
	82/85-94/97	10.83%	70.04%	88.46%	44.9%	25.2%
Korea, Republic	70/73-82/85	361.86%	50.83%	596.65%	35.3%	15.6%
	82/85-94/97	113.44%	44.47%	208.37%	30.4%	14.1%
Malaysia	70/73-82/85	97.90%	62.23%	221.05%	47.0%	15.3%
	82/85-94/97	85.98%	87.44%	248.59%	75.1%	12.3%
Papua New Guinea	70/73-82/85	83.12%	40.37%	157.04%	20.0%	20.4%
	82/85-94/97	37.54%	50.31%	106.73%	28.2%	22.1%
Philippines	70/73-82/85	24.96%	47.43%	84.24%	30.2%	17.2%
	82/85-94/97	64.21%	60.92%	164.25%	44.8%	16.2%
Singapore	70/73-82/85	201.65%	45.31%	338.34%	27.9%	17.5%
	82/85-94/97	123.47%	74.01%	288.86%	58.0%	16.0%
Taiwan	70/73-82/85	201.47%	53.89%	363.93%	37.2%	16.7%
	82/85-94/97	85.18%	64.30%	204.26%	49.5%	14.8%
Thailand	70/73-82/85	111.71%	44.20%	205.30%	24.3%	19.9%
	82/85-94/97	230.18%	60.93%	431.34%	43.6%	17.3%
Viet Nam	70/73-82/85	3.95%	48.86%	54.74%	31.0%	17.9%
	82/85-94/97	844.27%	70.77%	1512.52%	55.0%	15.7%
Bangladesh	70/73-82/85	132.16%	45.29%	237.32%	3.7%	41.6%
	82/85-94/97	114.21%	53.24%	228.26%	2.1%	51.2%
India	70/73-82/85	20.29%	45.17%	74.61%	2.7%	42.5%
	82/85-94/97	89.57%	48.34%	181.20%	1.1%	47.2%
Nepal	70/73-82/85	-2.75%	45.52%	41.52%	4.6%	40.9%
	82/85-94/97	114.41%	53.92%	230.02%	2.5%	51.4%
Pakistan	70/73-82/85	13.46%	48.16%	68.10%	5.8%	42.4%
	82/85-94/97	55.26%	43.67%	123.07%	3.6%	40.1%
Sri Lanka	70/73-82/85	7.04%	44.18%	54.34%	3.6%	40.6%
	82/85-94/97	52.39%	48.27%	125.94%	0.5%	47.7%
Australia	70/73-82/85	9.21%	37.74%	50.43%	0.6%	37.1%
	82/85-94/97	20.59%	49.90%	80.77%	0.6%	49.3%
New Zealand	70/73-82/85	2.81%	36.97%	40.81%	4.2%	32.8%
	82/85-94/97	19.38%	47.66%	76.29%	3.8%	43.9%

Notes: columns (3)-(5) of the table are based on equation (8). Column (3) is the rate of growth of supplier capacity (s); Column (4) is the rate of growth of foreign market access (FMA); Column (5) is the rate of growth of exports. The rates of growth of supplier capacity and foreign market access compound to the rate of growth of total exports. Columns (6) and (7) are based on equation (11). Column (6) reports the contribution of a country's own region FMA growth, while Column (7) gives the corresponding contribution of other region FMA growth.

Endnotes

1. For further discussion of the concepts of market and supply capacity, and the related concepts of market and supplier access introduced below, see Redding and Venables (2001).

2. Beginning from initial values for m_i, s_i, F_i, and H_i we repeatedly solve the system of four equations in (7)-(8) for all R countries. Irrespective of initial conditions, the system rapidly converges to unique equilibrium values of m_i, s_i, F_i, and H_i.

3. This specification is more general than the standard gravity model, in which country and partner dummies are replaced by income and other country characteristics. In particular, the importer partner dummy capture variation in the manufacturing price index G that is a determinant of market capacity m, and this specification thus controls for what Anderson and van Wincoop (2001) term 'multilateral resistance.'

4. The correlation across countries and over time between the measure of foreign market access constructed from solving the system of equations for total exports/total imports and the measure based on estimated exporter and importer dummies from the gravity equation is 0.99. The corresponding correlations for market capacity and supplier capacity are 0.98.

5. Since $V_i = s_i F_i$, $(1 + g_t^{V_i}) = (1 + g_t^{s_i})(1 + g_t^{F_i})$ where g is a proportional growth rate. When we aggregate to the regional level, this decomposition is no longer exact since $\sum_{i \in R_k} V_i = \sum_{i \in R_k} s_i F_i \neq \sum_{i \in R_k} s_i \sum_{i \in R_k} F_i$.

6. For a discussion of the commodity structure of East Asian export growth and its relationship to factor endowments and non-neutral technology differences, see Noland (1997).

7. Note that this decomposition of the growth in FMA shares features with the literature concerned with a shift-share analysis countries export growth (see for example Richardson 1971), although it uses our theoretically based measures.

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