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EXPORT PERFORMANCE AND ITS DETERMINANTS: SUPPLY AND DEMAND CONSTRAINTS

by

Marco Fugazza

Associate Economic Affairs Officer
Trade Analysis Branch
Division on International Trade in Goods and Services, and Commodities
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Chief
Trade Analysis Branch
Division on International Trade in Goods and Services, and Commodities
United Nations Conference on Trade and Development
Palais des Nations
CH-1211 Geneva

ABSTRACT

What are the major determinants of export performance? Does the importance of these determinants vary with export performance itself? Using quantile regression techniques this study investigates the contribution towards the performance of the external sector of linkages to international markets relative to internal supply-side conditions. Results indicate that, while trade barriers continue to be of concern, poor supply-side conditions have often been the more important constraint on export performance in various regions, in particular in Africa and the Middle East, despite a generalized deepening of international trade integration. Beside strong linkages to international markets, good transport infrastructures, macroeconomic soundness and good quality institutions appear to be major determinants in the development process of the external sector.

ACKNOWLEDGEMENTS

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NON-TECHNICAL SUMMARY

A strong and performing external sector is found in most country experiences to be the companion of a growing economy. The most striking and well-known example is the East Asian countries experience. Identifying the elements that significantly affect export performance should facilitate the design of policies to improve performance and ultimately overall economic growth. Such policies may also help to contain the negative effects on the trade balance that often occur immediately following trade liberalization.

Determinants of export performance can be split into internal and external components. External factors are related to market access conditions and other factors affecting import demand. Apart from trade barriers and competition factors foreign market access is also determined by transportation costs, which include geography and physical infrastructures. Internal factors refer to supply-side conditions. Supply capacity is also affected by location-related elements, which may for example, affect access to raw materials and other resources. It also depends upon factor costs such aslabour and capital. Beside resource endowment, factor costs are essentially the outcome of economic policy and the institutional environment. Access to technology, which is likely to affect the productivity of the external sector, may also be an important determinant.

In order to examine these issues, an econometric model of bilateral trade flows using gravity techniques, was constructed. This model was tested using data series representing foreign market access and supply capacity for a sample of 84 countries. It is thus possible to decompose export performance and identify the extent to which it has been constrained by its components.

The main findings are as follows: first, in the aggregate, all regions have benefited from the greater integration of the world economy in the 1985-99 period. Access to extra-regional markets in particular has been a key factor explaining export performance. However, intra-regionally-generated foreign market access has also been important in most regions, possibly underscoring the increasing significance of regional trade agreements. However,this is not the case for the Sub-Sahara African countries whose intra-regional trade declined in all periods but 1992-95. In addition, African and Middle Eastern countries appear to have faced severe supply capacity constraints over the last two decades, while their access to foreign markets has remained largely unchanged. East Asian and Pacific countries' export performance has been driven by equal improvements by both supply capacity and foreign market access. The export growth of South Asian countries can mainly be explained by an important increase in their supply capacities.

The impact on export performance of various supply capacity factors controlling for foreign market access is investigated. This analysis used econometric techniques, namely quantile regression techniques that allow the consideration of possible non-linearities in the relationship between export performance, supply capacity factors and foreign market access. It is thus possible to observe relationships between export performance and its components that vary with the level of export performance. It isalso possible to place the analysis in a development process framework, although limited, by considering three successive periods.

It was found that limitations on foreign market access are major contributors to poor export performance. However, good performers in the second half of the 1990s also faced higher external constraints but were able to overcome them.

There is also evidence that exports can be expected to respond less than proportionally to a variation in import demand from abroad, although this not always true. In general theoretically, a rise in exports would tend to increase factors of production prices, which contain exports expansion.

Internal transport infrastructure captured by the percentage of paved roads is an important supply capacity element and is found to have a significant and positive impact in raising performance, as does a good macroeconomic environment. The contribution of foreign direct investment to capital formation is included in order to include a technology-related element, possibly linked to the structure of the external sector. The finding is that FDI is significant and has a positive impact on export performance at all levels.

The empirical results also suggest that foreign market access and the structure of the external sector interact. So as the external sector expands and diversifies, domestic producers make an effort to overcome supply capacity constraints and increase their capacity to meet new market opportunities. The evolving structure of the external sector also makes a difference at all stages of development and could dominate the role of international linkages at an intermediate stage of structural change. However, once a sector has reached structural "maturity", as it seemed to be the case for the best export performers among developed countries in the late 1990s, the significance of foreign market access logically increases. In the present study, the institutional framework is of much less importance than has been suggested in other recent studies in the empirical growth literature.

The general policy implication is that foreign market access and supply capacity have to be considered equally important along the development process of the external sector. Simultaneous efforts to improve both supply capacity and foreign market access enhances the performance of and the structural deepening of the external sector. Important elements of supply capacity at the early stage of development of the external sector are transport infrastructure and macroeconomic stability. FDI is a significant determinant at all levels of export performance.

INTRODUCTION

Despite the worldwide fall in trade barriers that has occurred in the last two decades, export performance has varied substantially across countries. World exports increased by almost 220 per cent in twenty years. The figure jumps to 720 per cent for East Asian and Pacific countries and falls to 80 per cent for Sub-Saharan countries. The exports of "best performers", such as the Republic of Korea, China, Cambodia and Viet Nam, have grown by more than 15 per cent annually over the whole period. "Worst performers", mostly African and Latin American countries, have negative annual growth rate records in at least one decade.

As a result of various trade negotiations and autonomous reforms, access to international markets has improved in the last twenty years. Nonetheless, it is likely that there is still much to gain from further improvements in market access conditions. Concerns have also been raised about the necessity to improve supply conditions. Supply conditions are fundamental in defining the export potential of an economy. For a given level of access to international markets, countries with better supply conditions are expected to export more.

This study investigates factors possibly explaining divergence in export performance. Particular attention is devoted to factors affecting supply conditions after controllingfor access to international markets.

The relevance of such an exercise rests also on the fact that no clear policy implications emerge from economic literature[1] which looks at the relationship between open trade and economic growth. The positive correlation between output growth and export performance is a strongly asserted empirical observation. Thus, a better knowledge of the determinants of export performance should contribute towards a better qualification of the relationship between open trade and growth.

Determinants of export performance can be split into external and internal components. External components include market access/entry conditions and a country's location vis à vis international markets. Internal components are related to supply-side conditions.

Foreign demand is influenced by various elements. Firstly , it is strongly linked to geography (the structural component). Typically, countries at the centre of a fast growing region are more likely to benefit, ceteris paribus, than countries situated outside that region. Second, it is likely to be related to competition and trade policy (the market access/entry component), which could have, in principle, a similar impact on trade than geography. Finally, both the quantity and quality of physical infrastructures (the development component) are expected to play important roles.

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[1] See Harrison (1996) for a review, Yanikkaya (2003) for a comprehensive review and set of estimates and Rodriguez and Rodrik (2000) for a re-examination of the relationship between trade policy and economic growth and a critical review of the literature.

Various elements are expected to affect supply-side conditions significantly. First of all, supply conditions are likely to be strongly related to location and the policy variables. The size of the country, which also determines the size of the internal market, together with the internal geography of the country are the structural variables that could have an effect on the supply capacity of a country. Economic policy could also be expected to affect supply capacity by affecting factor prices. Development variables also have to be taken into consideration. They generally correspond to stock variables that are most often the outcome of previously implemented policies, such as public investment in transport infrastructures. Any measure related to general institutional development could be relevant. Technology could also be seen as part of the development variables set. In fact any variable able to capture prevailing technological conditions must be considered.

Recently Redding and Venables (2004a) investigated the relative contribution towards export performance of international linkages relative to internal geographical factors. They find that most of the differential in export performance of various countries and regions over the last three decades can be due to differences in the evolution of external components. Nevertheless, they find that internal components related to supply capacity such as internal geography and institutional quality also have played a significant role in explaining the observed differential in export performance.

This study builds on the work of Redding and Venables. It uses the same theoretical model of bilateral trade flows and adopt a similar empirical strategy. The latter initially consists of building data series to capture the external components of export performance and, the whole the foreign market access component, using gravity techniques. Then, these series are used to investigate the importance of foreign market access relative to supply capacity components. In other words, the exercise is to identify the possibl main determinants of the supply-side conditions after having controlled for the external elements. However, this study has a different econometric approach from that used by Venables and Redding. Econometric techniques are used to control for unobservable country heterogeneity possibly affecting the real values of countries' exports. Accounting for unobservable heterogeneity should allow the identification of any differences in the effect of and importance of export performance components, which are linked to the degree of development of the external sector itself. In other words, the techniques used here allow for the testing for non-linearities in the relationship between export performance and its components. While dynamic panel techniques would seem to be the most desirable approach, data availability is likely to restrict their implementation. In this context, cross-sectional analysis proves to be a viable alternative. Regression techniques which are able to account for unobserved heterogeneity across countries, namely quantile regressions, are used. Moreover, more emphasis is put on the determination and impact assessment of variables related to supply conditions. This is done with the aim of determining as clearly as possible what are policy implications.[2]

The study reveals important differences across countries and regions when looking at their respective determinants of export performance. External and internal components prove to have played an equal role in determining export performance for Asian countries. Their improvement in the South East and Pacific region appears to be high relative to that observed in any other region. Sub - Saharan African countries owe their export performance to the evolution of external components. The latter were strong enough to more than offset a relative deterioration of their internal production conditions.

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[2] In his comments on Redding and Venables (2004a), Maskus (2003) insists on the necessity to better identify supply conditions variables in order to retrieve specific policy implications.

Further investigation also indicates that good internal conditions are necessary to obtain good export performance. Particular attention should be paid to the macroeconomic dimension. Good infrastructures and non-stringent institutions are also necessary to put the export sector on a durable development path. In addition, there is scope for promoting a dynamic process of diversification across and within sectors. Constant efforts to support diversification are particularly relevant for commodities exporters when a secular downward trend is observed in volatile commodities prices.

The next chapter presents the theoretical context. The empirical strategy adopted in order to estimate exports components is presented in chapter II. Chapter III contains the empirical approach used to assess export performance. Chapter IV presents policy implications and conclusions.

I. THE THEORETICAL CONTEXT

Recently developed models of trade provide possible support for investigating the role of supply capacity in determining the export performance of a country. In particular, the Krugman and Venables (1995) model identifies an empirically assessable decomposition of bilateral trade into market access and supply capacity. The theoretical framework is essentially a standard new trade theory model based on product differentiation derived from a constant elasticity of substitution demand structure.

The economy consists of a number N of countries. Only the manufacturing sector is considered. Firms in that sector operate under increasing returns to scale and produce symmetric differentiated goods, which are used in consumption. Preferences are represented by a CES utility function in which the elasticity of substitution σ between any pair of products is the same. The representative utility function of country j is given by

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

where n_i is the set of varieties produced in country i, and x_{ij} is the consumption in country j of a single product variety from this set.

In that framework, the demand in country j for each variety produced in country i, is a function of country's j total expenditure on differentiated products E_j, the price of the good p_{ij} and the price index P_j defined over the prices of individual varieties produced in i and sold in j. Total expenditure is assumed to be exogenously given. Demand for each variety writes as

$$x_{ij} = p_{ij}^{-\sigma} E_j P_j^{(\sigma-1)} \qquad (2)$$

Where

$$P_j = \left[\sum n_i p_{ij}^{1-\sigma} \right]^{1/(1-\sigma)} \qquad (3)$$

The elasticity of demand is identical across varieties and equal to σ. $E_j P_j^{(\sigma-1)}$ is a scale factor that indicates the position of the demand curve in market j. The producer price p_i is assumed to be the same for all varieties produced in country i. Transport frictions, which reflect the cost of getting a good from country i to country j, are set proportional to producers price. This cost is composed by three elements: the cost of getting the product to and from the border in countries i and j (t_i and t_j respectively) and the cost of getting the product across the border (T_{ij}). Intra-country cost would reflect internal geography and infrastructure. Inter-country cost would reflect external geography and policy barriers. Thus price $p_{ij} = p_i t_i T_{ij} t_j$ and the value of total exports of country i to country j is given by

$$n_i p_i x_{ij} = n_i p_i^{1-\sigma} \left(t_i T_{ij} t_j \right)^{1-\sigma} E_j P_j^{(\sigma-1)} \qquad (4)$$

Equation (4) is taken as the theoretical support for estimation of a gravity trade model. It can be rewritten as

$$n_i p_i x_{ij} = \left[n_i \left(p_i t_i \right)^{1-\sigma} \right] \left[T_{ij}^{1-\sigma} \right] \left[E_j \left(P_i / t_i \right)^{(\sigma-1)} \right] \qquad (4')$$

The first term reflects the supply capacity of the exporting country, thereafter denoted b y sc_i. It is the product of the number of varieties and their price competitiveness, which is measured by the product of the producer price and internal transport costs. The last term measures the trans-border transport costs component. The first term into brackets is the market capacity of country j, thereafter denoted by m_j. It depends positively on total expenditures in j, on country j internal transport costs and, on the number of competing varieties and their prices expressed in the price index.

At the country level, that is looking at the total value of exports of country i, the following is obtained

$$X_i = n_i p_i \sum_{j \neq i} x_{ij} = sc_i \sum_{j \neq i} \left(T_{ij} \right)^{1-\sigma} m_j \qquad (5)$$

The term $\sum_{j \neq i} \left(T_{ij} \right)^{1-\sigma} m_j$ represents country i foreign market access FMA_i or equivalently country i market potential which refers to the concept developed by Harris (1954). It corresponds to the sum of the market capacity of all country i exports destination countries, weighted by bilateral trade costs. Then, the product of supply capacity and foreign market access gives the total value of exports of country.

The relative importance and evolution of these components are investigated empirically in the next chapter.

II. THE COMPONENTS OF EXPORT GROWTH

The model presented above postulates that the effect of a rise in expenditure on traded goods in a given country would benefit relatively more than those of its trading partners that are relatively closer (the demand pecuniary effect). In this context, distance has to be interpreted not only as a pure geographical element but also as any element that possibly represents a barrier to trade, such as tariffs, non-tariff barriers, anti-competitive barriers, etc.

The model also suggests that in order to capture fully the demand pecuniary effect just described, favourable supply conditions are expected to play an essential role. In addition, equation (5) shows that access to foreign markets may be reduced by poor supply capacity.

(a) The Dataset

Bilateral trade flows for 84 countries are obtained from the UN COMTRADE database. Data are deflated by the United States GDP deflator in order to obtain real values. The base year for the deflator is 1995. Data on trade flows are combined with geographical characteristics and data on GDP. Sources are detailed in Appendix A.

Some countries do not report all of their trade flows. In that situation, information is completed by using mirror data, that is, data declared by the trade partner. This is likely to be imprecise and, as a consequence it increases possible measurement error. To account for the latter, data are weighted by the product of trade partners' GDP in all regressions based on bilateral trade flows.

As bilateral trade flows are usually characterized by high year-to-year fluctuations and this study is essentially concerned with medium to long-term determinants of export performance, they are averaged over four year periods. It examines export performance over the 1980-99 time spell, which gives five periods of analysis.

Some sensitivity analysis based on different period spells and country samples is presented in section II(c).

(b) Estimation Strategy

In determining the export performance of a given country, it is first necessary to quantify the respective roles of foreign market access and supply capacity. Total export growth can be decomposed into supply capacity and foreign market access growth. The approach consists of estimating a gravity model equation where the dependent variable is exports (logarithm) from country i to country j and the dependent variables are bilateral distance (logarithm), an indicator of the existence of a common border, exporter-country dummies and importer-partner dummies. To account for region specific trade frictions, dummies that indicate whether trade partners belong or not to the same geographical region, are introduced.

$$\underbrace{\ln\!\left(X_{ij}\right)}_{\substack{\textbf{Value of Exports} \\ \textbf{from i to j}}} = \alpha + \underbrace{\lambda partn_j}_{\textbf{Export partner Market Capacity}} + \underbrace{\beta count_i}_{\textbf{Supply Capacity}}$$
$$+ \underbrace{\gamma_1 \ln\!\left(dist_{ij}\right) + \gamma_2 bord_{ij} + \gamma_3 region_{rr}}_{\textbf{Bilateral Trade Costs}} + \underbrace{u_{ij}}_{\textbf{Stochastic error}} \qquad (2)$$

Bilateral distance $dist_{ij}$ and the border dummy $bord_{ij}$ are assumed to capture geographical bilateral trade costs. Namely, geographical bilateral costs or a monotonic transformation of them are estimated through $dist_{ij}^{\hat{\gamma}_1} \exp\!\left(\hat{\gamma}_2 bord_{ij}\right)\prod_r \exp\!\left(\hat{\gamma}_3 region_{rr}\right)$.

Exporters and importer partners fixed effects, $count_i$ and $partn_j$ respectively, are introduced to control for supplier capacity and market capacity. They can also be expected to control for institutions and policy related bilateral trade costs.

The results excluding and including region specific trade friction dummies, are reported in Tables 1 and 2 respectively. Tobit estimation is used to account for zero bilateral trade values. In addition, in order 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.

As expected, the coefficient on "distance" is negative and the one on "border" is positive. A negative coefficient on "distance" indicates that the further away two countries are from each other the less they would tend to trade. The positive coefficient on "border" indicates that the immediate proximity of two countries increases their tendency to trade. Moreover, the introduction of dummies for region specific trade costs logically lowers the impact of distance and amplifies that of the existence of a common border. The within-region trade dummies are jointly statistically significant at the 1 per cent level in all periods. Coefficients on within-region dummies reflect the effect of any element that facilitates trade within the region. Thus, it could coherently be the case that coefficients are negatively signed, the important element being their evolution over time.

Table 1
Bilateral trade equation estimation

Period	1980-83	1984-87	1988-91	1992-95	1996-99
Obs	6972	6972	6972	6972	6972
Ln(X_{ij})	1	2	3	4	5
Ln($dist_{ii}$)	-1.013	-1.007	-0.968	-0.946	-0.941
	0.021	*0.022*	0.016	0.014	0.014
$bord_{ij}$	0.366	0.364	0.46	0.638	0.673
	0.061	*0.066*	0.048	0.043	0.045
Country dummies	Yes	yes	Yes	yes	Yes
Partner dummies	Yes	yes	Yes	yes	Yes
Estimation	Tobit	Tobit	Tobit	Tobit	Tobit
Log Like.	-18882	-18959	-17652	-17756	-18271
LR Chi2	10922	10808	14378	15780	15603
Prob > chi2	0	0	0	0	0
Pseudo R2	0.2243	0.2218	0.2894	0.3077	0.2992

Table 2

Bilateral trade equation estimation with intra-regional trade dummies

Period	1980-83	1984-87	1988-91	1992-95	1996-99
Obs	6972	6972	6972	6972	6972
Uncensored	5943	5841	6062	6357	6455
Ln(X_{ij})	1	2	3	4	5
Ln($dist_{ij}$)	-0.715	-0.800*	-0.764*	-0.783*	-0.840*
	0.038	*0.040*	*0.029*	*0.025*	*0.026*
$bord_{ij}$	0.554	0.464*	0.486*	0.619*	0.616*
	0.065	*0.071*	*0.050*	*0.045*	*0.049*
Country dummies	Yes	Yes	Yes	Yes	Yes
Partner dummies	Yes	Yes	Yes	Yes	Yes
Weap	0.588*	0.114	-0.035	-0.107***	-0.231*
	0.106	*0.113*	*0.076*	*0.065*	*0.067*
Wlac	-0.010	0.121	0.436*	0.473*	0.448*
	0.195	*0.219*	*0.162*	*0.138*	*0.144*
Weca	2.319*	2.054*	1.817*	1.466*	1.191**
	0.784	*0.805*	*0.615*	*0.595*	*0.610*
Wmena	-5.409*	-7.137*	-5.598*	-3.467*	-5.292*
	0.917	*0.966*	*0.685*	*0.568*	*0.582*
Wna	-0.544*	-0.492*	-0.303*	-0.221**	-0.182***
	0.144	*0.152*	*0.109*	*0.097*	*0.102*
Wsa	-0.228	-0.472	-0.463	-0.677	-0.298
	1.292	*1.259*	*0.812*	*0.656*	*0.638*
Wssa	-6.746*	-8.871*	-11.018*	-0.621	0.631
	1378	*1.621*	*1.187*	*1.030*	*1.074*
Wwe	0.898*	0.809*	0.875*	0.796*	0.666*
	0.078	*0.082*	*0.059*	*0.052*	*0.055*
Estimation	Tobit	Tobit	Tobit	Tobit	Tobit
Log Like.	-18743	-18836	-17396	-17544	-18086
LR Chi2	11199	11055	14889	16203	15971
Prob > chi2	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.23	0.2269	0.2997	0.3159	0.3063
Prob> F (dummies)	0.000	0.000	0.000	0.000	0.000

In the case of North America the coefficient on the regional dummy is negative. Nevertheless, the negative impact decreases sharply over the 1988-1995 period suggesting that trade has been eased. This is likely to capture the trade facilitation impact of NAFTA.

The coefficient on the Eastern Asia and Pacific intra-regional trade dummy is initially positive and then becomes negative. This is not an indication of falling intra-regional trade or of a rise in intra-regional trade barriers. Rather, it reflects the impact of rapid growth of trade with partners outside the region.

The coefficient on the Western Europe regional dummy is positive for the all periods considered but shows a general tendency to decrease. More precisely, it first decreases over the 1980-87, period increases over the 1988-91 period and, decreases sharply over the 1992-99 period. The overall fall in the coefficient can be seen as the consequence of on one hand the stabilization of intra-regional trade due to a finalized integration process of the EU countries and, on the other

hand of the growing relative importance of trade with countries outside the region. Part of the fall in the value of the coefficient observed for the 1992-99 period could also be explained by the apparent fall in intra-regional trade due to the introduction in January 1993 of a new system for collecting statistics on trade between EU member States INTRASTAT.[3]

The same downward tendency is observed for Eastern European countries with the sharpest decrease in the coefficient during the period that includes the fall of the Berlin wall. Regressions have also been run with a regional dummy that includes all Western and Eastern European countries. The coefficient on the dummy and its significance both increase, although moderately, over time. This is likely to capture the process of European enlargement and integration and confirms the arguments just mentioned.

Coefficients on the sub-Saharan region dummy are negative and large compared to other regions' coefficients when significant. This very much reflects poor infrastructures and poor geographical factors. For the last two periods, the coefficient turns to be non-significant. This result might reflect an improvement in the trade conditions compared to those prevailing in the 1980s. However, it could also reflect the fact that trade integration has occurred more at a sub-regional level than at a regional level. Trade has intensified radically between countries belonging to the Southern African Development Community over the 1980-99 period compared to other regional economic communities. The share of intra-trade in regional trade jumped from 54 per cent in 1980 to 79 per cent in 1999.[4] An upward trend is observed for most of the regional country groups, which again could indicate that trade has become more sub-region specific than region specific.

The Middle East and North Africa dummy has a negative coefficient, which increases and decreases alternatively. Together with its relatively high value, this is likely to reflect the negative impact of conflicts within the region and the volatility of prices of oil exports to countries outside the region.

(i) Foreign market Access

Following Redding and Venables (2004b) estimates obtained in the first stage of the analysis are used to construct supply capacity and foreign market access series. Because intra-regional trade dummies are not always significant, series for estimations do not include them. However, results obtained with series including intra regional trade dummies are discussed below.

The supply capacity estimate is given by the exponential of exporter country dummy times its coefficient. That is

$$SC_i = \exp\left(\hat{\beta}count_i\right) \tag{3}$$

Foreign market access estimate takes the form[5]

$$FMA_i = \sum_{i \neq j} \exp\left(\hat{\lambda}partn_j\right)dist_{ij}^{\hat{\gamma}_1} \exp\left(\hat{\gamma}_2bord_{ij}\right) \tag{3'}$$

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[3] See the GATT annual report 1994 for a brief description.
[4] See UNCTAD (2002), in particular Table 1.4.
[5] The version with intra regional dummies is

$$FMA_i = \sum_{i \neq j} \exp\left(\hat{\lambda}imp_j\right)dist_{ij}^{\hat{\gamma}_1} \exp\left(\hat{\gamma}_2bord_{ij}\right)\prod_r \exp\left(\hat{\gamma}_3region_{rr}\right)$$

Equations (3) and (3') allow us to decompose the sources of export growth over the last decades, and the results for the 84 countries are summarized in Table 3. Results aggregated to the regional level are graphed in Figure 1. Graphs in Figure 1 report the evolution of foreign market access and supply capacity with respect to the initial level prevailing in each region. Table 4 contains exports and its components growth rates at the regional level. The last row presents the respective growth rates for the whole sample of countries.

Figure 1
Foreign market access and supply capacity
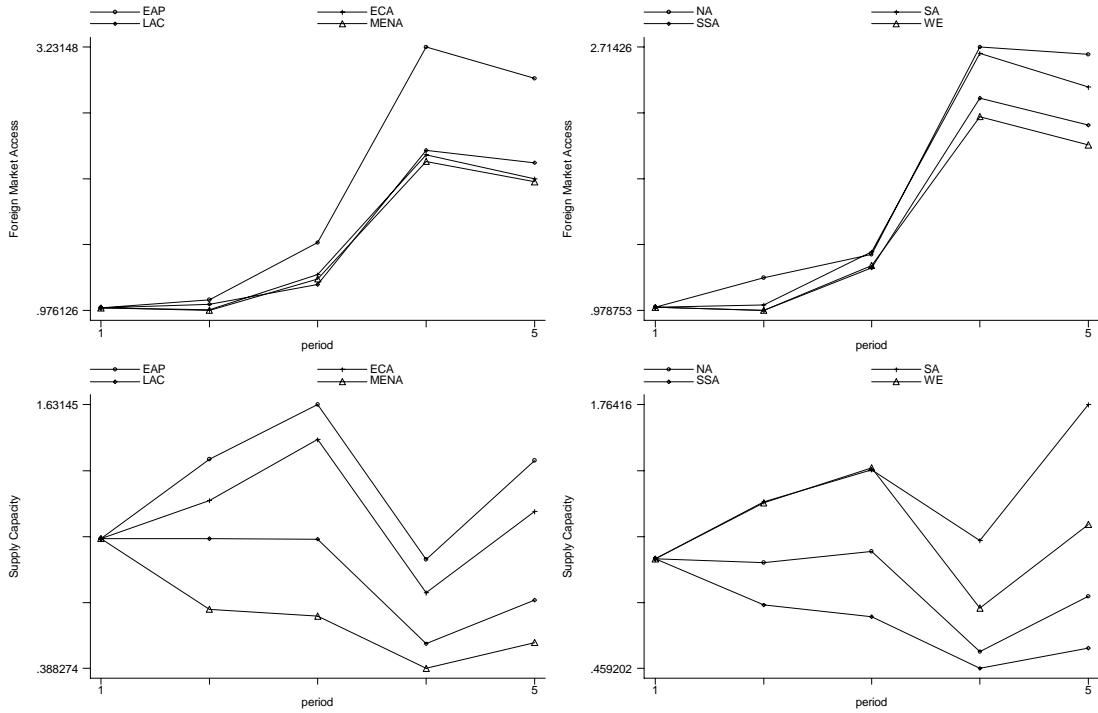
Before turning to the interpretation of these results a further step in the decomposition analysis is taken. Following Redding and Venables (2004a) the geographical sources of the export growth components are examined.

According to equation (3) foreign market access of country i located in region R_n is given by the sum of the access to markets in each region. That is

$$FMA_i = FMA_i^{R_1} + FMA_i^{R_2} + ... + FMA_i^{R_n}$$

where $FMA_i^{R_n}$ denotes country i market access derived from region n. The change in the market access of country i can be expressed as the sum of the contribution of each region. We have

$$\frac{\Delta FMA_i}{FMA_i} = \frac{FMA_i^{R_1}}{FMA_i} \frac{\Delta FMA_i^{R_1}}{FMA_i^{R_1}} + ... + \frac{FMA_i^{R_n}}{FMA_i} \frac{\Delta FMA_i^{R_n}}{FMA_i^{R_n}} \qquad (4)$$

Table 3

Components of export growth and regional concentration of foreign market access

Country	region	Exports Growth (%)				FMA Growth (%)				Sup. Cap. Growth (%)				FMA Growth IN (%)				FMA Growth OUT(%)			
		8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299
Austria	we	29	61	-10	45	-3	33	82	-8	41	23	-50	62	-5	37	77	-9	3	22	102	-5
Belgium-Luxembourg	we	10	48	-6	4	-2	29	74	-8	17	15	-44	12	-5	31	59	-10	3	25	100	-5
Switzerland	we	24	49	-10	28	-3	34	78	-8	28	16	-51	48	-4	37	74	-8	6	20	96	-6
Cyprus	we	-4	18	-22	-14	-3	26	83	-8	75	-18	-58	13	-6	35	62	-9	0	18	102	-6
Germany	we	25	45	-15	35	-3	32	83	-7	36	11	-50	51	-5	36	77	-8	4	22	99	-5
Denmark	we	17	40	-7	33	-2	32	80	-9	35	0	-46	35	-4	34	76	-10	7	21	96	-6
Spain	we	42	66	5	70	-1	29	75	-7	37	12	-42	71	-5	35	66	-8	6	17	94	-6
Finland	we	19	42	-2	48	-1	28	74	-8	38	15	-39	73	-5	30	63	-9	8	23	97	-6
France	we	13	51	-8	38	-2	32	79	-10	24	19	-49	54	-4	35	76	-11	8	19	95	-6
United kingdom	we	5	36	-10	46	-3	25	66	-9	8	16	-47	63	-6	28	57	-11	9	19	95	-6
Republic of Ireland	we	52	59	5	106	-1	28	78	-7	31	0	-50	35	-4	34	59	-9	3	21	103	-5
Italy	we	28	50	-8	42	0	29	78	-5	77	24	-32	146	-4	34	73	-5	10	18	94	-6
Netherlands	we	12	27	-10	32	-3	31	76	-8	39	18	-47	55	-6	37	67	-9	4	20	97	-6
Norway	we	10	31	-12	47	-2	30	75	-11	23	-2	-46	51	-4	33	71	-12	8	19	95	-6
Sweden	we	20	34	-15	46	-1	27	71	-8	21	19	-47	71	-4	30	61	-8	9	21	95	-6
Greece	we	30	24	-11	29	1	30	76	-6	41	23	-50	52	-4	40	65	-6	8	17	94	-6
Portugal	we	60	83	-6	50	-1	28	75	-7	31	7	-49	66	-5	31	64	-8	8	22	96	-6
Burkina Faso	ssa	5	27	0	38	-9	26	86	-7	40	70	-54	133	-63	0	124	-13	3	28	84	-7
Cote d'Ivoire	ssa	12	-18	-17	35	-2	27	86	-7	11	-53	-44	20	-59	11	156	-11	4	28	84	-7
Ghana	ssa	-16	29	18	-15	-4	26	86	-7	-26	50	2	-41	-58	-8	125	-16	4	28	84	-7
Kenya	ssa	-12	-3	24	16	-1	31	91	-8	-17	-11	-44	5	-47	5	170	-15	3	32	88	-8
Madagascar	ssa	-10	-15	-10	-28	-1	33	95	-8	25	4	-52	-28	-43	9	164	-14	4	34	92	-8
Mali	ssa	-9	82	-38	34	0	26	84	-7	0	82	69	-25	-54	2	138	-15	4	27	82	-7
Mauritania	ssa	8	16	-25	33	2	25	82	-7	115	91	-15	73	-50	7	126	-13	5	26	81	-6
Mauritius	ssa	46	74	-7	36	0	35	96	-8	76	86	-27	51	-45	7	169	-14	4	36	94	-8
Niger	ssa	-24	-4	-67	2	-7	26	83	-7	-25	10	-60	-68	-63	-2	116	-13	3	28	82	-7
Nigeria	ssa	-43	7	-23	4	1	28	85	-7	-74	22	-4	-35	-40	15	174	-14	3	29	83	-7
Rwanda	ssa	36	-17	-68	-34	-2	30	90	-8	-23	17	-90	-98	-45	8	150	-16	3	32	87	-7
Senegal	ssa	-6	22	-37	-34	2	25	83	-6	2	27	-53	-77	-55	5	147	-14	5	25	82	-6
Tanzania	ssa	-33	-1	28	-11	-1	32	92	-8	-61	-2	30	-32	-42	13	150	-15	3	33	89	-8
Uganda	ssa	-13	-41	19	19	-2	30	90	-8	-19	-26	4	-54	-42	9	140	-14	3	32	88	-7
South Africa	ssa	-5	18	-5	19	2	32	91	-7	-2	-10	-41	44	-49	21	91	-14	4	32	91	-7
Zambia	ssa	-53	29	8	-44	-3	30	95	-8	-76	-11	-16	-31	-40	9	162	-12	4	32	89	-7

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Table 3
Components of export growth and regional concentration of foreign market access (cont'd.)

Country	region	Exports Growth (%)				FMA Growth (%)				Sup. Cap. Growth (%)				FMA Growth IN (%)				FMA Growth OUT(%)			
		8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299
Bangladesh	sa	61	39	28	109	-3	27	84	-7	94	32	-28	129	3	5	85	-15	-3	27	84	-7
India	sa	22	47	38	50	3	38	98	-9	23	11	-21	61	-2	14	98	-31	4	39	98	-8
Sri Lanka	sa	16	26	51	51	3	39	98	-9	38	-2	-5	58	3	-1	75	-14	3	41	99	-8
Nepal	sa	47	24	40	43	5	35	101	-8	-21	92	8	34	3	2	101	-9	5	42	101	-8
Pakistan	sa	14	59	2	34	2	32	97	-8	32	17	-39	41	4	1	107	-6	2	38	96	-9
Canada	na	24	22	3	47	24	8	103	-1	-6	6	-50	35	29	4	105	0	-8	43	89	-8
Mexico	na	23	-8	80	120	18	18	105	-2	19	-34	-47	106	-34	12	175	-1	22	18	102	-2
United States	na	1	49	0	46	-1	35	88	-7	-2	7	-48	51	19	20	73	-6	-10	44	95	-7
Algeria	mena	-25	-8	-30	41	-1	28	72	-8	-53	10	-57	41	-26	7	119	-15	0	29	71	-7
Egypt, Arab Rep.	mena	-28	2	3	11	-3	29	89	-8	-42	17	-31	19	-31	10	177	-10	2	31	81	-7
Iran, Islamic Rep.	mena	-13	-1	-15	-54	1	30	87	-8	-37	-33	-60	-62	-26	-14	103	-15	4	33	86	-7
Israel	mena	26	49	6	63	-5	24	85	-8	-12	47	-25	62	-31	-12	118	-10	2	31	81	-7
Jordan	mena	87	23	-29	67	-5	25	83	-8	1145	99	-25	113	-34	-16	105	-19	2	31	81	-7
Kuwait	mena	-64	-96	535	-68	-3	31	86	-9	-61	-97	447	-78	-40	11	108	-28	3	33	85	-8
Morocco	mena	2	45	-18	61	0	27	75	-7	7	35	-45	63	-32	-1	87	-24	2	28	74	-7
Syrian Arab Republic	mena	-37	26	19	19	-4	26	95	-6	-77	396	17	-58	-26	1	160	-6	3	32	83	-6
Tunisia	mena	-12	43	4	44	-3	27	71	-8	-14	-13	-28	61	-31	-2	85	-22	0	29	70	-8
Argentina	lac	-4	38	24	66	-4	26	111	-3	-15	4	-43	55	-39	35	215	5	11	24	84	-7
Bolivia	lac	-32	7	-3	24	-2	21	107	-3	-71	53	11	-7	-40	21	224	4	14	21	82	-6
Brazil	lac	21	17	-6	32	1	22	96	-6	18	-11	-53	34	-46	22	228	-4	11	22	82	-6
Chile	lac	-9	74	11	44	-5	22	107	-5	-8	57	44	58	-49	12	247	2	12	24	84	-7
Colombia	lac	22	28	2	47	5	15	95	-4	18	3	-46	39	-33	10	180	0	17	16	79	-6
Costa Rica	lac	1	23	19	120	8	14	90	-5	-11	27	-27	186	-31	12	164	0	18	14	79	-6
Domican Republic	lac	13	80	-19	54	12	11	83	-5	-1	172	-54	101	-35	11	145	-3	19	11	77	-5
Ecuador	lac	8	-1	10	45	4	16	95	-5	-20	5	-11	71	-35	12	183	-4	16	17	80	-6
Guatemala	lac	-23	-6	18	51	8	16	92	-3	-30	-13	-36	44	-33	37	167	6	19	13	79	-5
Honduras	lac	-6	-31	-5	38	10	14	88	-4	-32	-2	-65	70	-33	24	156	2	19	12	78	-5
Jamaica	lac	-40	36	13	0	13	10	83	-5	-77	151	44	-40	-34	15	149	-1	20	10	77	-5
Nicaragua	lac	-47	-17	51	27	9	14	88	-4	-35	-81	158	13	-31	21	155	2	19	13	79	-5

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Table 3
Components of export growth and regional concentration of foreign market access (concluded)

Country	region	Exports Growth (%) 8087	8491	8895	9299	FMA Growth (%) 8087	8491	8895	9299	Sup. Cap. Growth (%) 8087	8491	8895	9299	FMA Growth IN (%) 8087	8491	8895	9299	FMA Growth OUT(%) 8087	8491	8895	9299
Panama	lac	-8	-3	29	21	8	15	91	-5	-19	115	-66	197	-34	17	173	-4	18	14	79	-6
Peru	lac	-24	12	22	25	3	20	99	-4	-30	-7	-33	30	-36	24	201	1	15	20	81	-6
Paraguay	lac	2	125	-26	39	-8	22	116	-2	-55	129	-53	-30	-45	19	238	6	12	23	83	-6
El Salvador	lac	-4	-36	58	35	8	15	89	-4	-58	-21	33	1	-33	29	155	1	19	13	79	-5
Trinidad and Tobago	lac	-45	-20	-5	24	6	14	86	-5	0	-35	-53	-27	-37	7	142	-4	16	15	79	-6
Uruguay	lac	-9	35	-4	50	-31	19	160	-2	-4	5	-57	42	-59	9	316	2	11	24	84	-7
Venezuela	lac	-30	14	-4	33	9	15	91	-4	-27	-2	-61	0	-33	18	196	2	17	14	79	-6
Bulgaria	eca	-24	6	36	12	5	40	100	-9	-17	-22	-47	24	-2	38	117	10	5	40	100	-9
Hungary	eca	1	31	3	122	-2	28	72	-9	32	23	-55	103	-28	34	114	5	-2	28	71	-9
Poland	eca	-17	43	16	56	-2	32	81	-9	-42	64	-46	35	-8	23	119	6	-2	32	80	-9
Romania	eca	8	-21	-15	42	-2	28	76	-8	23	-21	-68	42	0	28	118	7	-2	28	74	-9
Turkey	eca	97	42	-2	65	-5	29	82	-9	106	48	-48	60	-46	36	122	-3	-4	29	81	-10
Australia	eap	3	53	-7	37	6	38	98	-8	3	18	-56	45	10	64	111	-11	3	21	87	-5
China	eap	58	59	46	83	8	49	96	-9	70	-1	28	115	13	72	104	-11	3	21	82	-6
Hong Kong, China	eap	44	30	-28	1	8	53	103	-8	26	-2	-65	6	13	79	115	-9	3	21	81	-6
Indonesia	eap	-11	13	16	48	6	45	115	-8	5	12	-25	75	10	63	134	-8	1	23	83	-6
Japan	eap	49	31	-2	22	10	45	104	-7	46	5	-54	31	19	88	131	-7	5	20	81	-6
Republic of Korea	eap	96	63	3	60	10	40	87	-11	26	143	-47	70	15	51	90	-12	4	21	80	-6
Malaysia	eap	28	51	49	59	8	53	135	-7	15	27	-13	65	11	66	152	-8	1	22	82	-6
New Zealand	eap	10	31	-2	25	5	32	92	-7	20	-7	-47	36	7	49	96	-11	4	20	88	-5
Philippines	eap	-8	38	25	131	9	50	100	-10	-23	16	-32	111	14	70	110	-11	3	22	82	-6
Singapore	eap	31	79	32	53	-3	46	143	-7	56	35	-35	61	-5	63	174	-7	1	22	83	-6
Thailand	eap	39	122	42	51	5	44	112	-8	62	90	-25	66	8	64	133	-8	1	21	81	-7
Taiwan (Province of China)	eap	87	56	-4	49	9	41	97	-9	62	190	-27	67	12	52	104	-11	3	21	81	-6

Equation (4) indicates that the contribution to country *i* foreign market access growth of a given region is larger the larger the share of this region in country *i* foreign market access or the larger the increase in market demand in the partner's region.

Graphs in Figure 2 show the evolution of foreign market access related to trade within the region and across regions. Table 3 contains growth rates at the country level. Table 5 reports the latter at the regional level. Benchmark values are presented in the last row.

As to the interpretation of these results, generally speaking, all regions have faced the same upward trend since the beginning of the 1980s in their access to foreign markets as can be observed in the upper graphs of Figure 1, although this trend is partially reversed in the last period. This is equally true for all regions, as indicated in Table 4. Nevertheless, there is an upward overall tendency which denotes the increasing degree of integration in the world trade system.
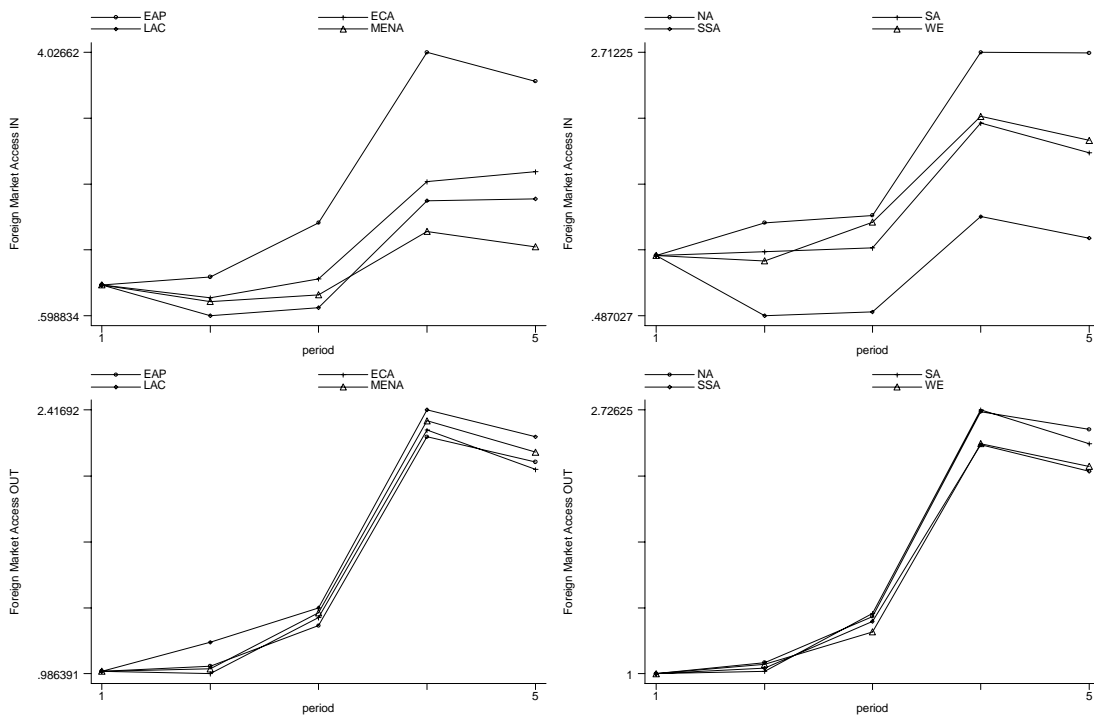
Table 4
Components of regional exports growth

region	Exports Growth				FMA Growth				Supply Capacity Growth			
	8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299
eap	44	44	8	43	7	46	108	-8	42	34	-88	53
eca	9	23	4	66	-2	31	80	-9	7	34	-90	48
lac	-6	21	2	41	3	16	96	-4	-4	3	-95	38
mena	-26	-1	-6	17	-3	28	81	-8	-36	-1	-66	32
na	8	37	5	52	20	13	101	-2	-14	17	-102	43
sa	22	47	30	51	2	34	96	-8	30	19	-48	55
ssa	-23	10	-12	11	-2	29	89	-7	-25	-7	-64	16
we	19	44	-10	38	-2	30	77	-8	26	17	-85	50
Benchmark	17	40	-2	42	1	28	87	-7	20	21	-86	49

Table 5
Geographical composition of regional foreign market access growth

region	Foreign Market Access Growth				FMA Growth Within the Region				FMA Growth Outside the Region			
	8087	8491	8895	9299	8087	8491	8895	9299	8087	8491	8895	9299
eap	7	46	108	-8	10	64	122	-9	3	21	82	-6
eca	-2	31	80	-9	-17	30	117	5	-1	31	79	-9
Lac	3	16	96	-4	-40	18	196	1	16	16	80	-6
mena	-3	28	81	-8	-31	-3	127	-14	1	30	78	-7
na	20	13	101	-2	27	5	104	0	7	28	98	-4
sa	2	34	96	-8	3	3	100	-12	2	37	95	-8
ssa	-2	29	89	-7	-51	6	156	-14	4	30	86	-7
we	-2	30	77	-8	-5	34	70	-9	6	20	97	-6
Benchmark	1	28	87	-7	-6	33	91	-8	6	25	85	-7

Figure 2
Regional origin of foreign market access

The results indicate that the North American countries (in this case the United States Canada and Mexico) saw their foreign market access measure increase exponentially over the 1984-95 period. As reported in Table 4, foreign market access grew by 101 per cent over the 1988-95 period. As can be seen from the upper right graph of Figure 2 and Table 5, this is due to the important relative increase in the intra-regional market access component. This appears to be a clear indication of the positive impact the NAFTA has generated. Nevertheless, North American countries also enjoyed a large increase in foreign market access outside the region. As reported in Table 3, among the three NAFTA countries, Mexico has the highest growth –175 per cent – in foreign market access generated within the region over the 1988-95 period. The corresponding figure is 73 per cent and 103 per cent respectively for the United States and Canada.

East Asian and Pacific countries also benefited from a large increase in foreign market access. As indicated in Table 4, it has been always above the benchmark figures. The latter has been driven essentially by a rise in foreign market access within the region. Those countries that on average enjoyed the highest growth rates are Singapore and Malaysia, as reported in Table 3. Contrary to intra-regional foreign market access, the relative evolution of foreign market access generated outside the region is less than that experienced by other regions. Figures in Table 3 show a very high degree of homogeneity in the evolution of the latter component of foreign market access, which tends to reinforce the view that regional integration has been particularly strong for East Asian and Pacific countries.

Middle Eastern and African countries initially experienced a fall in foreign market access generated within their regions. However, this trend was strongly reversed in the 1990s. Table 5 indicates that over the 1988-95 period foreign market access within the region grew by almost 160

per cent for sub-Saharan countries and 130 per cent for Middle Eastern and North African countries. The highest growth rates are found for East African countries, which are also the best performers in terms of overall foreign market access growth. However, this general tendency was subsequently reversed.

A similar scenario holds for Latin American and Eastern European countries. Intra regional foreign market access grew by almost 200 per cent in Latin America over the 1988-95 period. As reported in Table 3, the higher rates of foreign market growth are found for countries belonging to the MERCOSUR that was effectively launched at the beginning of the 1990s. The positive impact of this regional trade integration process is captured by above sample average growth rates of the intra-regional market access. The best performer in all foreign market access dimensions is Uruguay. Table 3 also shows that these countries also benefited from the high growth of market access from outside their region.

Foreign market access in South Asia is driven by both sources of access, although it appeared to be driven principally by extra regional market access in the second half of the 1980s. Intra-regional trade progression has also been positive although it tended to fall in the second half of the 1990s as suggested by Table 5.

Foreign market access progression for Western European countries remains among the lowest in the period under observation. This reinforces the argument presented above that those countries were already well integrated at the beginning of this period and just followed the general trend. As shown in Table 5, growth rates for the region correspond almost exactly to those of the whole sample. Moreover, Table 3 indicates that this result holds for all countries of the region. Such an homogeneous pattern is likely to reflect a strong degree of integration. Estimates also show fast growth of market access generated outside the region over the 1988-95 period. This probably reflects the EU's growing web of regional agreements with Central and Eastern Europe, the Baltic States and the Euro-Med agreements.

Generally speaking, there is evidence of a positive impact of Regional Trade Agreements on trade between partner countries in particular over the 1984-95 period. Nevertheless, there is also evidence of a strong positive contribution to foreign market access improvements and of better access to non-neighbouring markets as indicated in the two lower panels of Figure 2, particularly in the 1984-95 period. For instance, the measure of foreign market access generated outside the region for Eastern European countries has increased considerably since the mid-1980s reflecting essentially the increasing integration of those countries to the Western European market. For all regions, an increasing upward trend in the mid-1980s can be observed, which corresponds to the beginning of an era of trade openness marked by the extensive unilateral liberalism under World Bank/International Monetary Fund programmes, the implementation of the results of the Tokyo Round and, the growth of Regional Trade Agreements.

(ii) Supply capacity

The relative evolution of supply capacity is slightly more differentiated than that of foreign market access. There is no clear overall trend. However, all regions faced a sharp relative decrease over the first half of the 1990s.

Asian countries show the largest relative increase in their supply capacity in the 1980s and the lowest relative fall at the beginning of the 1990s. The best performers over the two decades

were Taiwan (Province of China) and Singapore. Figures reported in Table 3 indicate that the bulk of the growth in supply capacity occurred in the 1980s. The Chinese and the Philippines' supply capacities grew outstandingly in the 1992-99 period. Asian countries were also the best performers in relative terms over the two decades. There is an almost symmetric evolution between East Asian foreign market access and supply capacity evolution. In particular, the fall in supply capacity in the first half of the 1990s was offset by an upward shift in foreign market access.

The African and the Middle Eastern countries mostly experienced low or even negative growth in their supply capacities over the whole of the1990s as shown in Table 3. As a whole, growth rates turned positive only in the second half of the 1990s as shown in Table 4. This may reflect to a large extent the negative impact of conflicts on infrastructure and related investment.

Table 4 indicates that North and Latin American countries experienced the largest relative fall in supply capacity over the 1988-95 period. Surprisingly enough, Table 3 reports that the largest fall in supply capacity among North American countries was in the United States. However, such observations are theoretically coherent in the context of strong regional integration. As shown in Table 3, a decline in supply capacity was also experienced by most Latin American countries up to the first half of the 1990s. Export performance, if not negative, remained very low in that period, most likely as a result of the impact of economic turmoil that characterized the region.

This is also true to some extent for Western European countries. They faced a severe fall in their supply capacity at the beginning of the 1990s after a decade of improvement. Nonetheless, the trend was reversed again in the second half of the 1990s. Table 3 indicates that except for Cyprus and Norway in the 1984-1991 period all European countries moved together. Together with negative export growth, the fall in supply capacity observed for the 1988-95 period could reflect the negative impact that German reunification had on European economies.

(iii) Export Constraints

In order to identify export performance constraints more closely and to qualify the above arguments, it is necessary to look at the evolution of performance and its components with respect to the country sample values to be able to elicit the policy implications. Ratios of regional values over sample values are computed for each period and then normalized to the ratio prevailing in the first period.[6] This makes it possible to qualify the evolution of export performance for each region across periods and with respect to world export performance for each period. Export performance has been defined theoretically as the product of foreign market access and supply capacity. That is, the exports ratio is equal to the product of the foreign market access and the supply capacity ratios up to an error term related to estimation.

The Asia and Pacific regions are the only regions that have improved their export performance *relative* to the whole sample of countries in all periods (Graph 1). Both regions, and in particular South Asia and the Pacific, have experienced a *relative* improvement in their foreign market access across periods. However, their export performance is driven by an outstanding *relative* improvement in their supply capacity. This is likely to reflect a policy orientation aiming

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[6] For instance the bar plotted in graph 1 for Exports 84-87/80-83 in region *eap* correspond to

(Exports*eap* 84-87/ Exportssample 84-87)/ (Exports*eap* 80-83/ Exportssample 80-83).

Graph 1
Benchmarked export performance and components

84-87/80-83

88-91/80-83

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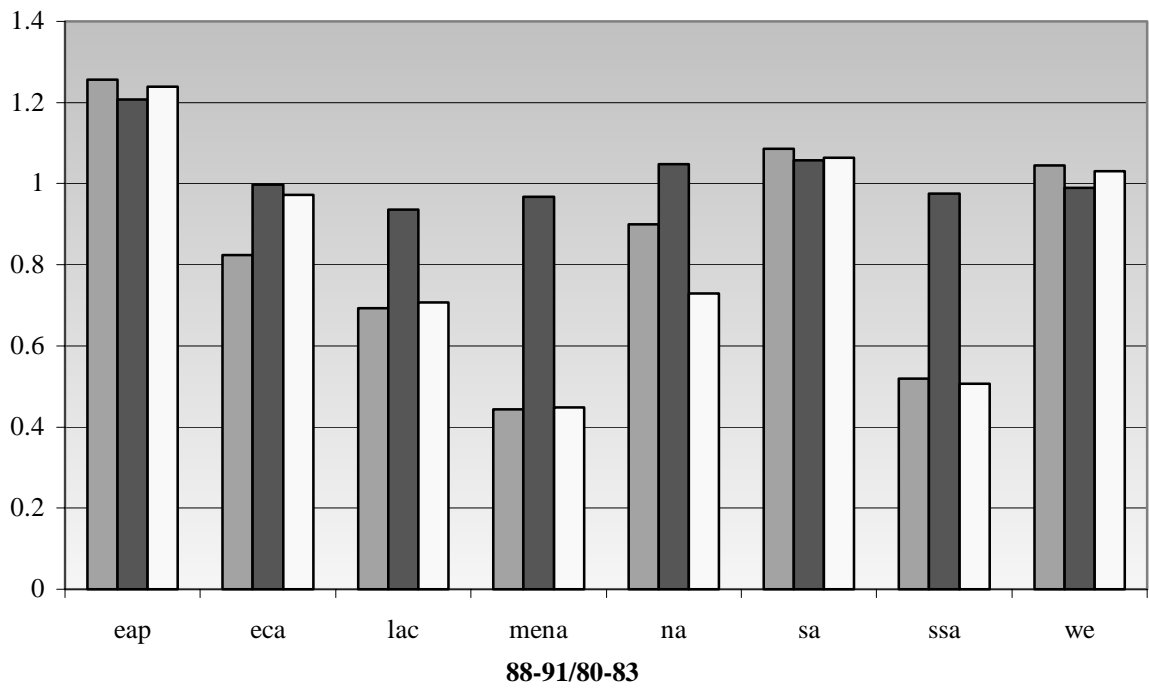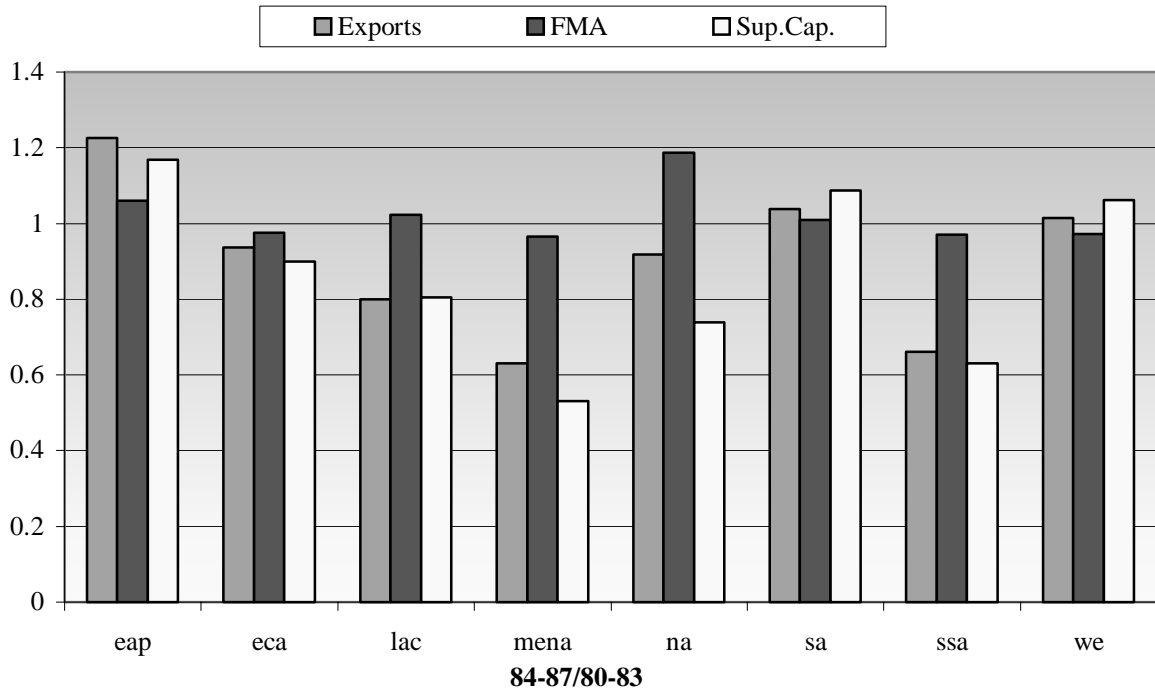
Graph 1 (concluded)
Benchmarked export performance and components

92-95/80-83

96-99/80-83
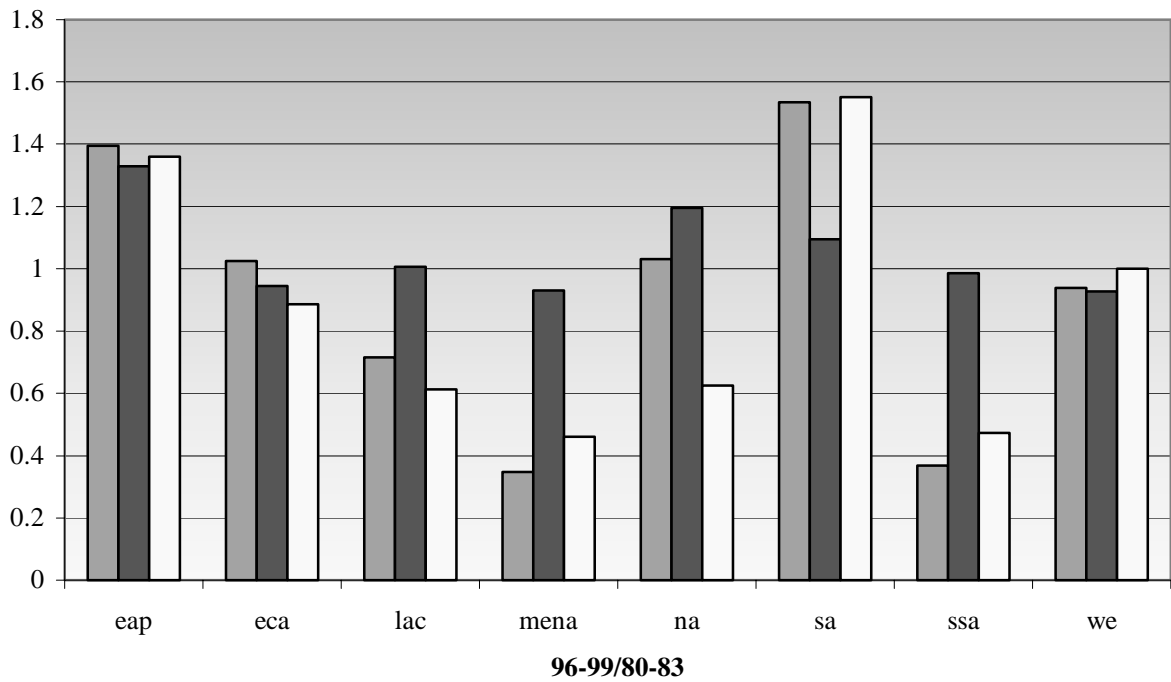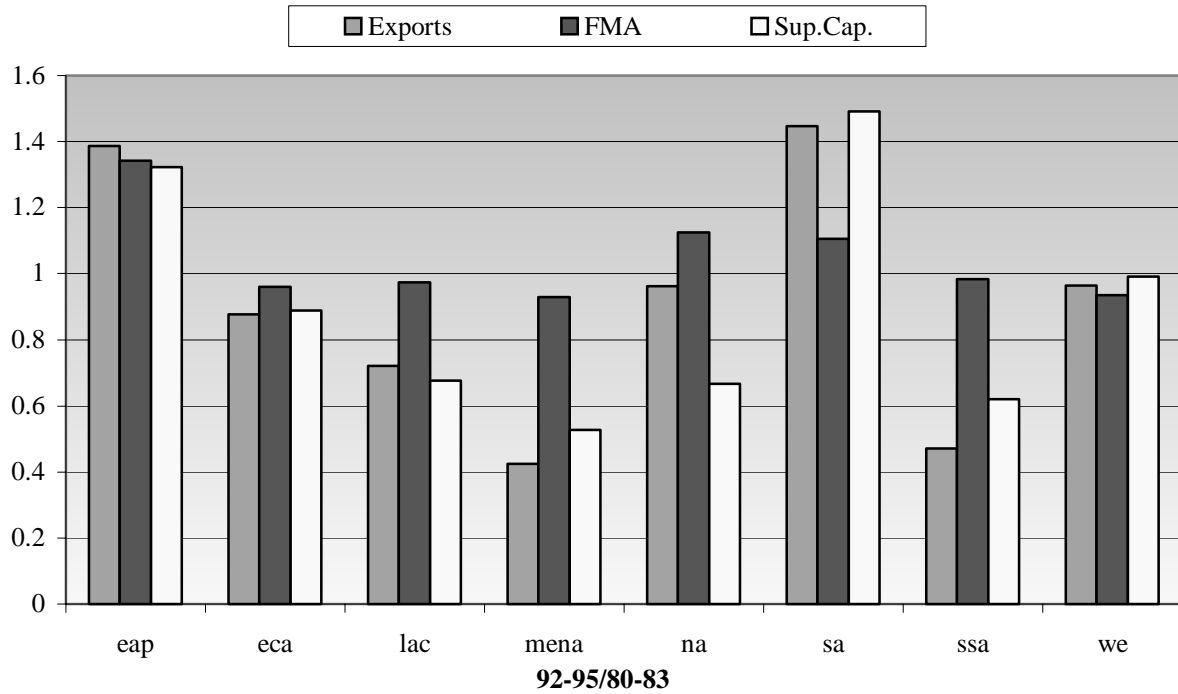
(Benchmark: ratio to 80-83 World Export Performance and Components)

to support and stimulate exporting firms' productive capacities. This policy consisted not only in levelling the playing field for exporters, but in boosting it in their favour by employing interventionist policies[7] such as the coordination of investment plans, directed credits and infant industry protection.

Western European countries behaved in a similar manner as the country sample figures. Their export performance is led to some extent by supply capacity despite its *relative* deterioration over the 1992-1995 period. In fact, foreign market access fell *relatively* in the last two periods. This deterioration with respect to sample levels indicates the strong degree of integration of the region. This is confirmed by the fact that intra-regional trade has been constantly growing and today represents almost three quarters of the total trade of European countries.

The experience of Eastern European countries was similar to that of their Western counterparts, although supply capacity became a binding constraint element in the aftermath of the fall of the Berlin wall. All in all, their *relative* position remained stable over the two decades.

The experience of North American countries is to some extent puzzling, as it might have been expected to be quite similar to that of Western European countries. Instead, their *relative* situation tended to deteriorate across periods, although only slightly, because of a *relative* deterioration of supply capacity conditions. There is clear evidence that their foreign market access position improved, but their performance was constrained by a poor evolution of supply capacity conditions. On the other hand, theoretical insights predict that a negative relationship is likely to appear between the two dimensions. This is what is found when looking at regional growth rates. Supply capacity tends to decrease while foreign market access tends to increase.

With the advent of the NAFTA, some production has been shifted from the United States to northern Mexican regions. This could explain the fall in supply capacity in the United States over the 1988-95 period. Simultaneously, this new productive area bid up salaries, essentially those of skilled workers in Mexico, which may have reduced supply capacity in the country, as predicted by the model previously presented.

The relative situations of the African and Middle Eastern countries' tend to deteriorate over time. There is clear evidence that export performance is led by foreign market access. The latter appears to be stable with respect to sample levels, which indicates that those countries are likely to face constraints in the development of supply capacity.

Regarding Latin American and Caribbean countries, foreign market access drives export performance. However, the latter fell in *relative* terms over the first two periods and stabilized afterwards. Supply capacity tended to deteriorate over the whole period. As in the case of African countries this can be taken as an indication of the existence of supply capacity constraints.

Overall, a careful examination of the results derived from the estimation procedures outlined above indicates that supply capacity constraints seem to represent a significant barrier to the development of the export sector. This is true for both developed and developing countries.

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[7] See The World Bank (1993) for a comprehensive argumentation.

Over the two decades under consideration, export performance has been led essentially by an overall increase in both market access and supply capacity in Asian and Pacific countries. This is true also for European countries although on a much lower scale. North American countries' exports strongly benefited from NAFTA despite a poor evolution in their supply capacity, which can be seen as a by-product of strong production integration. Export performance in Latin American, Caribbean, African and Middle Eastern countries was mainly influenced by foreign market access evolution. There is also evidence of an important impact of regional trade agreements within a general increasing world trade integration tendency.

(c) Sensitivity Analysis

In order to evaluate the robustness of thr results, foreign market access components were estimated using a sample of 149 countries. While the main conclusions are unchanged, there are few differences in the estimates of growth rates but, not enough to change the conclusions.

Five-year periods were also considered. Again, qualitative results remained similar.

Further, using estimates that include dummies for intra-regional trade, the results are very similar both in quantitative and qualitative terms. However, due to the loss of significance of the dummy for the sub-Saharan region in the last two periods, estimates for countries of that region lose some coherence.

Finally, a different estimation strategy was adopted, based on a more structural approach. More precisely, the study estimates the following gravity model

$$\ln(X_{ij}) = \alpha + \lambda \ln(\text{GDP}_i) + \beta \ln(\text{GDP}_j) + \gamma_1 \ln(dist_{ij}) + \gamma_2 bord_{ij} +$$

$$\gamma_3 llock_i + \gamma_4 llock_j + \gamma_5 isl_i + \gamma_6 isl_j + \gamma_7 open_i + \gamma_8 open_j + u_{ij}$$

where GDPi and GDPj stand for country and partner GDP, respectively. They represent country *i* supply capacity and partner *j* demand capacity respectively. Trade costs estimates are augmented by a series of indicators. Dummies *llocki* and *llockj* indicate whether the country and the partner respectively are landlocked. Dummies *isli* and *islj* indicate whether the country and the partner respectively are islands. Indicators *openi* and *openj* correspond to the Sachs and Warner (1995) composite index.[8]

In this case the results remain similar from a qualitative point of view on aggregate, but show some large differences across time. Foreign market access series obtained with the two estimation strategies are highly correlated. However, R-squared values are lower in the second approach than in the first. This implies that estimated values of exports could appear to be significantly different from real ones. As a consequence, the estimated series for foreign market access may not be fully consistent with real export series.

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[8] The latter establishes according to five criteria – tariffs, quotas coverage, black market premium, social organization and the existence of export marketing boards – whether a country runs or not an open trade policy.

III. EXPORT PERFORMANCE AND ITS DETERMINANTS

This chapter attempts to clarify further the key components of supply capacity. It also attempts to account for non-linearities in the process of development of the external sector. For that reason econometric techniques able to deal with unobservable heterogeneity are used.

(a) An Extended Theoretical Framework

In the theoretical framework presented previously, supply capacity, as indicated in equation (4'), is a function of the size of the export sector measured by the number of varieties produced, producer prices and internal transport costs. A country's GDP and its population are measures of country size. Country size reflects the home market and is likely to be linked to the size of the external sector and export prices. The latter directly reflect comparative costs of exporting which are also linked for instance to institutions or real exchange rates.

Supply capacity is also expected to depend on foreign market access. Better access to international markets would imply higher expected returns from export activities. As a consequence, the external sector would tend to expand with some impact on supply capacity. The relation between foreign market access and supply capacity is thus made endogenous. In order to qualify the consequences of such a relationship, some general equilibrium features needs to be added to the theoretical framework.

Redding and Venables (2004a) consider a production possibility frontier between exports and other goods. In that context the model predicts a negative relationship between foreign market access and supply capacity. High levels of foreign market access are expected to be associated with a less than proportional increase in exports and a lower level of supply capacity. An expansion of the export sector increases the cost of factors by increasing demand pressure and thus leads to higher producer prices, which are negatively related to supply capacity. However, the sign of the relationship could be arguable. Better foreign market access could also draw production resources from abroad via foreign direct investment or labour migration. In that case, factor demand pressure could be eased and the sign of the relationship could become uncertain at least to a certain extent.

Empirically, if the first effect (factor prices) dominates the second (factors supply) an estimate of the elasticity of export performance with respect to foreign market access, which is less than one would be obtained. In other words, export performance would be expected to grow less than proportionally than foreign market access. On the contrary, if the elasticity of export performance with respect to foreign market access is greater than one, then exports would growth proportionally more than foreign market access.

(b) The Data

Sources of data on the variables described in the next chapter are presented in Appendix A. Data availability is a major constraint and in order to keep analytical relevance and statistical coherence, empirical investigations are run for the three 4-year periods covering 1988-1999. In

the core set of regressions, information remains available for all countries belonging to the sample used for foreign market access empirical estimations. Chapter III(d) contains only the most statistically significant results. Some sensitivity analysis contemplating various sets of possible dependent variables is presented in chapter III(e).

(c) Estimation

The empirical counterpart of the extended framework takes the form:

$$\ln(X_i) = \alpha + \lambda \ln(GDP_i) + \beta \ln(POPU_i) + \gamma \ln(FMA_i) + \delta \ln(t_i) + \chi COMP_i + u_i$$

where POP_i is population, t_i is internal transport costs and related features and $COMPi$ is a variable, or set of variables affecting export sector competitiveness, either directly or indirectly.

It is usually argued that, in such empirical models, GDP is likely to be endogenous. This issue is dealt with by considering one-period lagged GDP values.

Variables used to control for the competitiveness environment are assumed to be related to the institutional and macroeconomic frameworks. Two indicators are used for institutional quality. The first is the widely used index from the International Country Risk Guide database. It measures the risk of expropriation, which is associated with institutional quality. A higher value of the index is associated with better institutional quality. The second indicator is specific to labour market institutions and as such is expected to reflect more precisely the labour cost dimension. Nevertheless, it remains a qualitative measure. The indicator is built using Forteza and Rama (2001) data and methodology. The index compiles four dimensions of the labour market: the ratio of minimum wages to average labour costs in large manufacturing firms, the percentage of salaries that employers and employees have to contribute to the social security administration, membership of the labour movement measured as a percentage of the labour force and, employment in the general government as a fraction of the labour force. A higher value of the indicator corresponds to a less flexible market. Macroeconomic conditions are proxied by the real exchange rate.

The technological environment is captured possibly, by the contribution of FDI, in percentage, to capital formation. Equivalently, the latter could represent a measure of production development in the export sector. As argued and illustrated for instance in UNCTAD (1995, 2002b), FDI can be expected to contribute to the enhancing of a country's competitiveness on international markets by increasing the technological content of exports.[9] FDI could be directed towards either higher-value-added activities in newly targeted industries or higher-productivity, higher-technology and knowledge-based activities within already targeted industries.

To account for possible endogeneity issues similar to those encountered with GDPe both current and lagged values are used. Estimation results revealed no significant difference and results are presented with current values.

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[9] See UNCTAD (2002c) for a discussion of the role of FDI in a sustained development context.

Internal transport frictions are introduced via the percentage of paved roads in total road networks. Transport structure variables are likely to capture internal transport frictions more precisely than exclusively geographical variables. In order to deal with possible endogeneity issues (the development of infrastructures could be fostered by higher export growth) again current and lagged values are used. In the event, results are similar in both cases, and only regressions using current values are presented.

Taking into consideration the fact that unobserved heterogeneity might play an important role in determining export performance, but the set of available variables and indicators does not allow to control for it, quantile regression techniques are used,[10] following the seminal work of Koenker and Bassett (1978). Quantile techniques permit the study to allow for the existence of unobservable heterogeneity not only through differences in the constant term, as is the case when introducing dummies, but also through differences in coefficients. The strength of the estimation relies very much on the fact that these differences are obtained within the same sample and not across samples. Quantile regression allows the characterization of an entire conditional distribution rather than only the mean of that distribution as in the case of standard OLS. In that sense, quantile regression is robust even in the presence of outliers, which is not the case for traditional conditional mean estimation procedures.

In the present context, the distribution of the real value of countries' total exports are dealt with. Quantile regression allows the identification of different responses of exports value to FMA and supply capacity variables associated with different points on exports value conditional distribution. Nonetheless, quantile regression coefficients measure the determinants of export performance for under and over performing countries only in terms of export performance. As estimation could modify the position of a given country, it may become hazardous to attribute export performance determinants to over and under performing countries per se. Quantile regression results represent the basis for policy-oriented experiments aiming at qualifying possible export performance constraints.

(d) Results and Interpretation

Table 6 reports OLS regressions estimates and Tables 7 to 9 quantile regressions estimates. Standard errors reported in italics are computed from 1000 bootstrap samples.[11] Five conditional quantiles are considered: 10th (Q10), 25th (Q25), the median (Q50), 75th (Q75), and 90th (Q90).

The first observation is that some form of error heteroskedasticity seems to exist since the estimated coefficients vary with the quantiles. This confirms inference from OLS residuals plotting. Thus, quantile techniques seem to be appropriate for identifying the determinants of export performance at different levels of the latter. Again, the usefulness of quantile regressions rests first on the fact that they allow the identificationof possible elements that explain over- and under-performance with respect to mean. Second, put in a time perspective, it may give useful insights into the very process of export sector development.

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[10] A brief technical presentation of the quantile approach and its estimation techniques are presented in appendix C. Buchinsky (1998) provides a survey and general discussion.

[11] Almost identical results both in terms of coefficient values and standard errors values are obtained with 500 bootstrap samples.

Table 6
OLS regressions

Dependent Variable : Ln(X)			# Observations :84			
	1988-91		1992-95		1996-99	
Ln(GDPt-1)	0.838*	0.115	0.975*	0.085	0.967*	0.104
Ln(POPU)	0.043	0.137	-0.101	0.103	-0.024	0.132
Ln(FMA)	0.622*	0.211	0.546*	0.207	1.010*	0.210
Institutions	-0.016	0.058	0.092***	0.049	0.003	0.057
FDI in capital formation %	4.535*	0.972	3.643*	0.949	2.573*	0.748
Paved roads %	0.696**	0.324	0.737**	0.332	0.533	0.376
ln(Real Exchange rate)	0.055**	0.024	0.033	0.022	0.03	0.024
Constant	-12.530*	4.744	-12.751*	5.040	-22.871*	5.038
Regions Dummies	Yes		Yes		Yes	
R-squared	0.9398		0.9457		0.9377	
Prob>F	0		0		0	
Ln(GDPt-1)	0.876*	0.077	0.916*	0.079	0.991*	0.082
Ln(POPU)	0.028	0.103	-0.009	0.086	-0.032	0.097
Ln(FMA)	0.636*	0.207	0.647*	0.209	1.027*	0.208
Lab. Institutions	-0.87	0.645	-0.529	0.445	-0.775	0.607
FDI in capital formation %	4.533*	0.920	3.487*	1.082	2.601*	0.741
Paved roads %	0.619***	0.334	0.600***	0.343	0.476	0.377
ln(Real Exchange rate)	0.057**	0.024	0.029	0.021	0.032	0.024
Constant	-13.215*	4.791	-14.418*	5.075	-23.429*	5.013
Regions Dummies	Yes		Yes		Yes	
R-squared	0.9419		0.9433		0.9372	
Prob>F	0		0		0	
ln(GDPt-1)	0.857*	0.100	0.982*	0.086	0.990*	0.093
ln(POPU)	0.046	0.127	-0.1	0.103	-0.031	0.122
ln(FMA)	0.646*	0.213	0.560*	0.205	1.028*	0.211
Lab. Institutions	-0.889	0.656	-0.379	0.437	-0.776	0.621
Institutions	-0.022	0.056	0.087***	0.049	-0.001	0.056
FDI in capital formation %	4.438*	0.935	3.638*	0.952	0.025*	0.007
Paved roads %	0.055**	0.023	0.033	0.022	0.032	0.024
ln(Real Exchange rate)	0.605***	0.321	0.688**	0.342	0.474	0.372
Constant	-13.139*	4.888	-13.090*	5.029	-23.440*	5.099
Regions Dummies	Yes		Yes		Yes	
R-squared	0.9421		0.946		0.9392	
Prob>F	0		0		0	

Table 7
Quantile regressions with institutions and paved roads

	Dependent Variable: Ln(X)		**# Observations :84**			
10		1988-91		1992-95		1996-99
	Ln(GDPt-1)	0.743*	0.175	0.751*	0.203	0.785*	0.190
	Ln(POPU)	0.175	0.180	0.205	0.230	0.167	0.195
	Ln(FMA)	0.845**	0.366	0.802**	0.392	0.936**	0.470
	Institutions	0.103	0.093	-0.054	0.108	-0.016	0.093
	FDI in capital formation %	5.361*	1.991	3.525**	1.619	2.894*	1.196
	Paved roads %	0.799	0.566	0.645	0.602	1.209***	0.707
	ln(Real Exchange rate)	0.075***	0.044	0.059	0.039	0.116**	0.049
	Constant	-17.143**	8.100	-17.987**	8.924	-21.143**	10.215
25						
	Ln(GDPt-1)	0.798*	0.162	1.015*	0.156	0.846*	0.163
	Ln(POPU)	0.093	0.175	-0.076	0.172	0.118	0.181
	Ln(FMA)	0.850**	0.358	0.773**	0.402	0.817***	0.427
	Institutions	-0.035	0.086	0.048	0.080	-0.034	0.085
	FDI in capital formation %	5.135*	1.775	3.337**	1.493	1.744***	1.016
	Paved roads %	0.925***	0.500	0.156	0.566	0.46	0.579
	ln(Real Exchange rate)	0.093**	0.040	0.028	0.037	0.049	0.041
	Constant	-17.624**	8.022	-18.898**	9.443	-18.132***	9.981
50						
	ln(GDPt-1)	0.821*	0.137	1.074*	0.157	0.832*	0.162
	ln(POPU)	0.044	0.161	-0.208	0.177	0.013	0.183
	ln(FMA)	0.551	0.389	0.699****	0.404	0.612	0.445
	Institutions	0.002	0.065	0.115	0.085	-0.003	0.092
	FDI in capital formation %	4.490*	1.640	3.102***	1.622	2.547*	1.006
	Paved roads %	0.720***	0.453	0.185	0.536	0.165	0.592
	ln(Real Exchange rate)	0.048	0.033	0.037	0.038	0.027	0.043
	Constant	-10.723	8.925	-16.680***	9.641	-11.401	10.484
75						
	ln(GDPt-1)	0.774*	0.140	0.936*	0.147	0.977*	0.149
	ln(POPU)	0.054	0.169	-0.162	0.165	-0.18	0.175
	ln(FMA)	0.177	0.408	0.305	0.420	0.951**	0.448
	Institutions	0.021	0.066	0.109	0.073	0.036	0.081
	FDI in capital formation %	4.143**	2.028	3.590**	1.614	1.939***	1.082
	Paved roads %	0.992***	0.524	0.859***	0.446	0.482	0.533
	ln(Real Exchange rate)	0.054	0.035	0.018	0.035	0.045	0.038
	Constant	-2.114	9.092	-5.444	9.414	-19.059***	10.442
90						
	ln(GDPt-1)	0.798*	0.154	0.970*	0.144	0.983*	0.162
	ln(POPU)	-0.044	0.189	-0.178	0.172	-0.128	0.177
	ln(FMA)	0.21	0.365	0.165	0.439	1.138**	0.454
	Institutions	0.063	0.073	0.154**	0.070	0.01	0.085
	FDI in capital formation %	5.117**	2.164	5.080*	1.561	1.63	1.129
	Paved roads %	0.4	0.575	0.964**	0.466	0.238	0.528
	ln(Real Exchange rate)	0.042	0.039	0.048	0.039	0	0.043
	Constant	-1.551	8.174	-3.148	9.636	-23.673*	10.364
	Regions Dummies	Yes		Yes		Yes	

.1 Pseudo R2=.7868   .1 Pseudo R2=.7883   .1 Pseudo R2=.7893

.25 Pseudo R2=.7782   .25 Pseudo R2=.7834   .25 Pseudo R2=.7807

.5 Pseudo R2=.7875   .5 Pseudo R2=.7884   .5 Pseudo R2=.7756

.75 Pseudo R2=.7897   .75 Pseudo R2=.8002   .75 Pseudo R2=.7857

.9 Pseudo R2=.8210   .9 Pseudo R2=.8215   .9 Pseudo R2=.7950

Table 8
Quantile regressions with Lab institutions and paved roads

	Dependent Variable: Ln(X)		# Observations :84			
10		1988-91		1992-95		1996-99
ln(GDPt-1)	0.913*	0.138	0.784*	0.154	0.887*	0.185
ln(POPU)	0.058	0.144	0.217	0.165	0.133	0.181
ln(FMA)	1.109*	0.344	0.839**	0.382	0.983**	0.437
Lab Institutions	-1.690**	0.877	-0.783	0.929	-1.223	0.976
FDI in capital formation %	5.302*	1.734	3.313**	1.584	3.269*	1.234
Paved roads %	0.81	0.653	0.746	0.592	1.217***	0.702
ln(Real Exchange rate)	0.072***	0.039	0.051	0.039	0.114**	0.049
Constant	-24.659*	7.670	-19.500**	8.922	-23.767**	9.812
25						
ln(GDPt-1)	0.829*	0.134	0.898*	0.144	0.908*	0.165
ln(POPU)	0.097	0.149	0.101	0.149	0.113	0.173
ln(FMA)	0.786**	0.353	0.815**	0.374	0.777***	0.432
Lab Institutions	-0.674	0.915	-1.048	0.745	-1.138	0.748
FDI in capital formation %	5.376*	1.550	2.818	1.516	2.800*	0.998
Paved roads %	1.042***	0.569	0.382	0.516	0.718	0.564
ln(Real Exchange rate)	0.086**	0.036	0.025	0.035	0.06	0.038
Constant	-16.967**	7.981	-19.417**	9.066	-18.820***	9.887
50						
ln(GDPt-1)	0.867*	0.120	0.879*	0.147	0.898*	0.148
ln(POPU)	-0.013	0.137	0.021	0.145	0.044	0.163
ln(FMA)	0.571	0.381	0.674***	0.409	0.658	0.428
Lab Institutions	-0.854	0.722	-0.688	0.760	-0.838	0.894
FDI in capital formation %	4.101*	1.547	2.885***	1.772	2.553*	0.963
Paved roads %	0.493	0.486	0.511	0.493	0.19	0.602
ln(Real Exchange rate)	0.04	0.032	0.011	0.035	0.01	0.041
Constant	-10.879	8.784	-14.24	9.855	-14.232	10.069
75						
ln(GDPt-1)	0.817*	0.122	0.911*	0.132	0.960*	0.134
ln(POPU)	-0.021	0.145	-0.103	0.136	-0.158	0.158
ln(FMA)	0.297	0.382	0.546	0.418	0.993**	0.453
Lab Institutions	-0.527	0.685	-0.608	0.761	0.175	0.969
FDI in capital formation %	3.511***	1.911	4.044*	1.610	2.174***	1.130
Paved roads %	0.846	0.547	0.465	0.505	0.502	0.531
ln(Real Exchange rate)	0.042	0.034	0.014	0.035	0.041	0.037
Constant	-3.991	8.429	-10.233	9.662	-19.934***	10.635
90						
ln(GDPt-1)	0.762*	0.150	0.972*	0.142	1.064*	0.146
ln(POPU)	0.01	0.171	-0.146	0.157	-0.176	0.158
ln(FMA)	0.104	0.356	0.411	0.434	1.099**	0.467
Lab Institutions	-0.086	0.846	-1.500***	0.839	0.1	0.955
FDI in capital formation %	5.672*	1.967	3.136***	1.638	1.424	1.162
Paved roads %	0.375	0.595	0.054	0.581	0.104	0.536
ln(Real Exchange rate)	0.055	0.038	0.022	0.042	-0.023	0.043
Constant	1.084	7.812	-7.246	9.925	-23.885	10.813
Regions Dummies	Yes		Yes		Yes	
	.1 Pseudo R2=.7921 .25 Pseudo R2=.7847 .5 Pseudo R2=.7932 .75 Pseudo R2=.7913 .9 Pseudo R2=.8162		.1 Pseudo R2=.7918 .25 Pseudo R2=.7903 .5 Pseudo R2=.7888 .75 Pseudo R2=.7947 .9 Pseudo R2=.8073		.1 Pseudo R2=.7910 .25 Pseudo R2=.7885 .5 Pseudo R2=.7786 .75 Pseudo R2=.7829 .9 Pseudo R2=.7934	

Table 9
Quantile regressions with institutions, Lab institutions and paved roads

	Dependent Variable: Ln(X)			**# Observations :84**			
10			1988-91		1992-95		1996-99
	ln(GDPt-1)	0.754*	0.155	0.755*	0.193	0.869*	0.201
	ln(POPU)	0.228	0.163	0.27	0.226	0.154	0.198
	ln(FMA)	0.985*	0.341	0.848**	0.402	0.983***	0.526
	Lab Institutions	-1.709**	0.884	-0.886	0.936	-1.306	0.897
	Institutions	0.136***	0.082	-0.033	0.106	-0.024	0.090
	FDI in capital formation %	4.130**	1.909	3.154***	1.674	3.269*	1.298
	ln(Real Exchange rate)	0.043	0.044	0.045	0.040	0.129*	0.050
	Paved roads %	0.886	0.634	0.673	0.604	1.214***	0.710
	Constant	-20.274*	7.723	-19.638**	9.094	-23.721**	11.881
25							
	ln(GDPt-1)	0.831*	0.155	0.904*	0.161	0.930*	0.160
	ln(POPU)	0.097	0.174	0.108	0.178	0.081	0.166
	ln(FMA)	0.807**	0.359	0.862**	0.372	0.762***	0.450
	Lab Institutions	-0.726	0.931	-1.038	0.753	-1.084	0.721
	Institutions	-0.007	0.076	-0.013	0.085	-0.035	0.078
	FDI in capital formation %	5.359*	1.708	2.857	1.541	2.672*	1.036
	ln(Real Exchange rate)	0.086**	0.038	0.029	0.038	0.066***	0.041
	Paved roads %	1.004***	0.571	0.391	0.561	0.603	0.657
	Constant	-17.369**	8.147	-20.704**	8.988	-18.410***	10.405
50							
	ln(GDPt-1)	0.865*	0.138	1.014*	0.155	0.870*	0.152
	ln(POPU)	-0.013	0.166	-0.141	0.174	0.078	0.186
	ln(FMA)	0.573	0.408	0.6	0.395	0.66	0.440
	Lab Institutions	-0.82	0.845	-0.885	0.755	-0.921	0.880
	Institutions	0.001	0.068	0.097	0.082	-0.036	0.090
	FDI in capital formation %	4.123*	1.660	3.725**	1.705	2.597*	0.962
	ln(Real Exchange rate)	0.04	0.034	0.033	0.036	0.023	0.042
	Paved roads %	0.483	0.521	0.321	0.540	0.295	0.625
	Constant	-10.901	9.323	-13.856	9.302	-14.098	10.286
75							
	ln(GDPt-1)	0.825*	0.138	0.975*	0.140	0.977*	0.156
	ln(POPU)	-0.023	0.165	-0.192	0.161	-0.181	0.192
	ln(FMA)	0.241	0.403	0.436	0.421	0.980**	0.433
	Lab Institutions	-0.455	0.776	-0.568	0.827	0.127	0.976
	Institutions	0.016	0.068	0.114	0.078	0.033	0.085
	FDI in capital formation %	4.094**	2.095	3.533**	1.505	1.973***	1.106
	ln(Real Exchange rate)	0.048	0.036	0.021	0.034	0.043	0.039
	Paved roads %	0.879***	0.538	0.771	0.499	0.511	0.524
	Constant	-3.133	8.893	-8.593	9.325	-19.720**	10.110
90							
	ln(GDPt-1)	0.784*	0.152	1.020*	0.136	0.996*	0.161
	ln(POPU)	-0.021	0.186	-0.224	0.165	-0.149	0.186
	ln(FMA)	0.325	0.362	0.207	0.424	0.774***	0.440
	Lab Institutions	-0.396	0.833	-0.863	0.907	0.718	1.027
	Institutions	0.073	0.075	0.122***	0.073	0.042	0.09
	FDI in capital formation %	4.768**	2.144	4.508*	1.339	1.697	1.147
	Paved roads %	0.049	0.04	0.041	0.039	0.001	0.044
	ln(Real Exchange rate)	0.537	0.575	0.659	0.529	0.292	0.527
	Constant	-3.999	7.98	-3.89	9.162	-16.088	10.038
	Regions Dummies	Yes		Yes		Yes	
		.1 Pseudo R2=.7981		.1 Pseudo R2=.7925		.1 Pseudo R2=.7915	
		.25 Pseudo R2=.7848		.25 Pseudo R2=.7904		.25 Pseudo R2=.7899	
		.5 Pseudo R2=.7932		.5 Pseudo R2=.7946		.5 Pseudo R2=.7790	
		.75 Pseudo R2=.7919		.75 Pseudo R2=.8047		.75 Pseudo R2=.7857	
		.9 Pseudo R2=.8229		.9 Pseudo R2=.8276		.9 Pseudo R2=.7978	

(i) General Considerations

OLS estimates can be used as a benchmark. All coefficients are signed accordingly with theoretical anticipations. All variables but labour institutions and ln(Population) appear to be significant in some period. A positive relationship is always obtained between larger domestic output, better foreign market access and export performance. Transport infrastructures, measured by the log of percentage of paved roads in the total road network, are likely to play a positive role in determining export performance. A positive impact is also expected from FDI's contribution to capital formation. The log of the real exchange rate is found to have a positive impact in various estimations. In other words, devaluation could be expected to stimulate exports. Better institutions are also found to affect positively export performance. For the 1996-99 period only log of lagged GDP values, foreign market access and FDI contribution to capital formation are significant, although at the one per cent level.

In all estimation exercises using quantile techniques, the sign of coefficients when significant are in line with theoretical expectations and OLS estimates. Namely, higher GDP, better access to foreign markets, better institutions, a more competitive macroeconomic framework, less internal transport frictions lead to higher export performance. Larger countries, with a larger population, are found to be less open. It was also found that FDI contribution to capital formation has a positive impact on export performance. This could first pinpoint the existence of technological transfer from foreign companies and underline its positive impact on export performance.

(ii) GDP and Population

In all regressions, a recurrent result is the high significance of log GDP (lagged). This remains true across periods and across quantiles. The coefficient on the log of GDP is found to be less than one in a majority of cases. This reinforces the result that larger countries are less open. That is, larger countries will tend to export relatively less, although large countries are also those whose exports volumes tend to be larger. On the other hand, total population never proves to have any significant effect on export performance. The quality of regressions does not vary dramatically with the institutional indicator used. In addition, general results remain qualitatively identical. However, coefficients on ln(GDP), ln(POPU) can vary importantly and generally not in a monotonic fashion. In general, for a given institutional indicator, qualitative results remain identical.

(iii) Internal Transport Frictions

The importance and significance of internal transport frictions varies from period to period and from quantile to quantile. It appears that internal transport costs had a significant negative impact on export performance over the 1988-91 period among the weakest performers, that is, for those in the first fourth of the distribution. Internal transport facilitation played an important role across all quantiles in the 1992-95 time frame. Its significance appears to increase substantially for those exporters that are above the median of the sample. This remains true to a large extent over the 1996-99 period although the percentage of paved roads is found to be significant at the 10 per cent level for the first quantile only.

In other words, transport infrastructures are likely to play an important role at the early stage of export sector development.[12] The percentage of paved roads appears to be more significant and its impact to be larger in lower quantiles. As shown in Tables 10 and 11, most African countries, which are characterized by poor transport infrastructure are found in all periods in the left part of the distribution of export performance. This is likely to indicate that African countries could do much to raise their supply capacity by investing in transport infrastructure (Limão and Venables, 2001) present some empirical analysis indicating that levels of trade flows observed for African countries are *relatively* low essentially because of poor transport infrastructures). The fact that this sort of investment has not occurred in a significant manner in the last two decades could explain the very low upward mobility of African countries in export performance.

(iv) The Macroeconomic Environment

The real exchange rate proves to have a significant effect on export performance in the lowest quantile. This is verified for all periods and on average a 1 per cent real depreciation could increase exports by 6 to 10 per cent.

Results indicate that an overvalued currency is detrimental to export performance. An overvalued currency translates into a direct loss of price competitiveness for exporting firms. This is of particular importance for commodities and manufactured products that are labour intensive. Both types of goods are essential components of under export performers explaining the significance of the coefficient on the log of the real exchange rate at low quantiles. Good export performers, on the other hand, may rely on more capital-intensive production relative to weak performers. The former may suffer less than the latter from export price competitiveness, measured by the real exchange rate, while exporters in more labour-intensive activities may suffer less from high capital rents.

In other words, good export performers are more likely to have a strong position in more capital-intensive products markets and may face less aggressive competitors than exporters in more labour intensive product markets. As a consequence, their competitiveness would not rely too much on the real exchange rate but on the technological content of their product and thus to a large extent on capital. This is not likely to be the case for producers exporting low skill products, which are highly substitutable and whose demand is very volatile and price sensitive. Real interest ratesare found to affect significantly export performance of good performers with high rates increasing producer costs and hence impacting negatively on export competitiveness.

(v) Foreign Direct Investment

The quantile regression results indicate that FDI is likely to affect export performance positively. This is true for most levels of export performance and for every period under consideration. The experience in a number of countries suggests that FDI strongly contributes to the transformation of the composition of exports. For instance, it has been well documented that FDI inflows into Singapore or, more recently China, have helped to increase significantly the technological content of exports by supporting strongly the development of knowledge-based industries.

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[12] A comparable argument is documented in Limão and Venables (2001).

Consistent with these experiences, a positive and significant relationship between export performance and FDI contribution to capital formation is found at all levels of export performance in this analysis. In all periods but 1988-91, the strongest impact is obtained at the lowest two quantiles. In the first two periods, the impact of FDI contribution to capital formation is non-linear. Coefficients indicate a U-shaped relationship between export performance and the FDI variable.

Assuming that FDI does contribute to the technological upgrading and structural evolution of the export sector, these results indicate that the structure of the sector is an important ingredient of export performance both at the early stage of development of the export sector and, at its latest. A possible qualification of the argument would be to say that export performance is positively affected by inter-sectoral diversification at the bottom of the distribution and intra-sectoral diversification at the top of the distribution. "Best"-performers, essentially industrialized countries and some emerging economies as shown in Tables 10 and 11, are characterized by an already high degree of inter-sectoral diversification.[13] FDI could then be expected to be directed towards innovative activities within an already existing sector and, in that sense to stimulate essentially intra-sectoral rather than inter-sectoral diversification. Results for the last period only indicate a decreasing pattern of the impact of FDI across quantiles. This could simply indicate that good performers in earlier periods have a maturity turning point in intra-sectoral development.

As a consequence, supply capacity constraints could also be relaxed by improving the technological content of the export sector as indicated by the positive influence of FDI contribution to capital formation on export performance.

(vi) Institutions

Both measures considered in the estimations are only rarely strongly significant. It appears that this is essentially the case in the 1992-95 period and, it is particularly true for the general measure of the quality of the institutional framework. In that case, the significance increases slightly with quantiles. In the other periods, the significance of the coefficient on the labour institutions indicator is higher for low export performers. The reverse is true when the measure of institutional quality is considered. This remains true when both institutions are taken into consideration for estimation. In the latter case, it is observed that estimates are not affected in a monotic manner. The results however, are only slightly affected and the general analysis remains valid.

A significant role for institutional quality could have been expected at an early stage of export sector development, but in the results this is the case only for the 1988-91 period. This might be due to the existence of some collinearity between FDI contribution to capital formation, institutions and the macroeconomic environment. However, simple correlation analysis does not show any strong relationship among the variables considered for estimation. Higher correlation coefficients are only found when FDI net flows are considered. This result reinforces the relevance of interpreting FDI contribution to capital formation as an indicator of technological and innovative transfer.

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[13] See UNCTAD (2002) Table 8.2A.

Table 10
Countries exports real value position in sample distribution

	region	Quant8083	Quant8487	Quant8891	Quant9295	Quant9699
France	*we*	6	6	6	6	6
United kingdom	*we*	6	6	6	6	6
Norway	*we*	6	6	6	6	6
Germany	*we*	6	6	6	6	6
Netherlands	*we*	6	6	6	6	6
Switzerland	*we*	5	5	5	5	5
Denmark	*we*	5	5	5	4	4
Benelux	*we*	5	5	6	6	5
Spain	*we*	5	5	5	5	5
Sweden	*we*	5	5	5	4	4
Portugal	*we*	5	5	5	5	5
Austria	*we*	4	5	5	5	5
Italy	*we*	4	4	4	4	5
Finland	*we*	4	4	4	4	4
Greece	*we*	4	4	4	4	4
Republic of Ireland	*we*	3	4	4	3	4
Cyprus	*we*	1	1	2	1	1
Nigeria	*ssa*	5	4	4	4	4
South Africa	*ssa*	4	4	4	4	4
Cote d'Ivoire	*ssa*	3	3	3	3	3
Kenya	*ssa*	3	3	2	3	3
Zambia	*ssa*	3	3	3	3	2
Gana	*ssa*	2	2	3	2	2
Mauritania	*ssa*	2	2	2	2	2
Niger	*ssa*	2	1	2	1	1
Senegal	*ssa*	2	2	2	2	1
Tanzania	*ssa*	2	2	2	2	2
Uganda	*ssa*	2	2	1	1	2
Madagascar	*ssa*	2	2	1	1	1
Mauritius	*ssa*	2	2	3	2	3
Burkina Faso	*ssa*	1	1	1	1	1
Mali	*ssa*	1	1	1	1	1
Rwanda	*ssa*	1	1	1	1	1
India	*sa*	4	4	4	4	4
Pakistan	*sa*	3	3	3	3	3
Sri Lanka	*sa*	3	3	3	3	3
Bangladesh	*sa*	2	3	3	3	3
Nepal	*sa*	1	1	1	1	1
Canada	*na*	6	6	6	6	6
United States	*na*	6	6	6	6	6
Mexico	*na*	5	5	4	5	5
Algeria	*mena*	4	4	4	4	4
Israel	*mena*	4	4	4	4	4
Iran, Islamic rep.	*mena*	4	4	4	4	3
Kuwait	*mena*	4	4	1	3	2
Tunisia	*mena*	3	3	3	3	3
Egypt, Arab rep.	*mena*	3	3	3	3	3
Morocco	*mena*	3	3	3	3	3
Syrian Arab republic	*mena*	3	3	3	3	3
Jordan	*mena*	1	2	2	2	2

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Table 10 (concluded)
Table 10 (concluded)
Countries exports real value position in sample distribution

	region	Quant8083	Quant8487	Quant8891	Quant9295	Quant9699
Brazil	*lac*	5	5	5	5	5
Venezuela	*lac*	4	4	4	4	4
Argentina	*lac*	4	4	4	4	4
Chile	*lac*	4	3	4	4	4
Costa Rica	*lac*	3	3	3	3	3
Guatemala	*lac*	3	3	3	3	3
Jamaica	*lac*	3	2	2	2	3
Trinidad and Tobago	*lac*	3	3	3	3	3
Colombia	*lac*	3	3	3	4	4
Ecuador	*lac*	3	3	3	3	3
Uruguay	*lac*	3	3	3	3	3
Bolivia	*lac*	3	2	2	2	2
Peru	*lac*	3	3	3	3	3
Dominican Republic	*lac*	2	3	3	3	3
Honduras	*lac*	2	2	2	2	2
Nicaragua	*lac*	2	1	1	2	2
El Salvador	*lac*	2	2	2	2	2
Panama	*lac*	1	1	2	2	2
Paraguay	*lac*	1	2	2	2	2
Hungary	*eca*	4	3	4	4	4
Poland	*eca*	4	4	4	4	4
Romania	*eca*	4	4	3	3	3
Turkey	*eca*	3	4	4	4	4
Bulgaria	*eca*	3	3	3	3	3
Japan	*eap*	6	6	6	6	6
Republic of Korea	*eap*	5	5	5	5	5
Singapore	*eap*	5	5	5	5	5
Indonesia	*eap*	5	5	4	4	4
Australia	*eap*	5	4	5	5	4
Malaysia	*eap*	4	4	5	5	5
China	*eap*	4	5	5	5	6
Thailand	*eap*	4	4	4	5	5
Philippines	*eap*	4	4	4	4	4
New Zealand	*eap*	4	4	4	4	4

Table 11
Countries position in sample exports real value distribution

	1980-83	1984-87	1988-91	1992-95	1996-99
Q6	France	France	France	France	France
	United Kingdom	United Kingdom	United Kingdom	United Kingdom	United Kingdom
	Norway	Norway	Norway	Norway	Norway
	Germany	Germany	Germany	Germany	Germany
	Netherlands	Netherlands	Netherlands	Netherlands	Netherlands
	Canada	Canada	Canada	Canada	Canada
	United States	United States	United States	United States	United States
	Japan	Japan	Japan	Japan	Japan
Q5	Switzerland	Switzerland	Switzerland	Switzerland	Indonesia
	Denmark	Denmark	Denmark	Denmark	Switzerland
	Benelux	Benelux	Benelux	Spain	Denmark
	Spain	Spain	Spain	Portugal	Spain
	Sweden	Sweden	Sweden	Brazil	Portugal
	Portugal	Portugal	Portugal	Rep. of Korea	Brazil
	Nigeria	Mexico	Brazil	Singapore	Rep. of Korea
	Mexico	Brazil	Rep. of Korea	Austria	Singapore
	Brazil	Rep. of Korea	Singapore	Indonesia	Austria
	Rep. of Korea	Singapore	Austria	Malaysia	China
	Singapore	Australia	Indonesia	China	Mexico
	Australia	Austria	Malaysia	Mexico	Thailand
	Malaysia	Indonesia	China	Thailand	Italy
Q4	Austria	Nigeria	Mexico	Benelux	Malaysia
	Italy	Malaysia	Australia	Sweden	Benelux
	Finland	Italy	Nigeria	Australia	Sweden
	Greece	Finland	Italy	Nigeria	Australia
	South Africa	Greece	Finland	Italy	Nigeria
	India	South Africa	Greece	Finland	Finland
	Algeria	India	South Africa	Greece	Greece
	Israel	Algeria	India	South Africa	South Africa
	Iran, Islamic rep.	Israel	Algeria	India	India
	Kuwait	Iran, Islamic rep.	Israel	Algeria	Algeria
	Venezuela	Kuwait	Iran, Islamic rep.	Israel	Israel
	Argentina	Venezuela	Venezuela	Iran, Islamic rep.	Venezuela
	Chile	Argentina	Argentina	Venezuela	Argentina
	Hungary	Hungary	Hungary	Argentina	Hungary
	Romania	Romania	Thailand	Hungary	Philippines
	Turkey	China	Philippines	Philippines	New Zealand
	Indonesia	Thailand	New Zealand	New Zealand	Poland
	China	Philippines	Ireland	Poland	Chile
	Thailand	New Zealand	Poland	Chile	Turkey
	Philippines	Rep. of Ireland	Chile	Turkey	Trinidad and Tobago
	New Zealand	Poland	Turkey	Trinidad and Tobago	Ireland

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	1980-83	1984-87	1988-91	1992-95	1996-99
Q3	Rep. of Ireland	Chile	Romania	Rep. of Ireland	Iran, Islamic rep.
	Cote d Ivoire	Turkey	Cote d Ivoire	Romania	Romania
	Kenya	Cote d Ivoire	Kenya	Cote d Ivoire	Cote d Ivoire
	Zambia	Kenya	Pakistan	Kenya	Pakistan
	Pakistan	Zambia	Sri Lanka	Pakistan	Sri Lanka
	Sri Lanka	Pakistan	Tunisia	Sri Lanka	Tunisia
	Tunisia	Sri Lanka	Egypt, Arab rep.	Tunisia	Egypt, Arab rep.
	Egypt, Arab rep.	Tunisia	Morocco	Egypt, Arab rep.	Morocco
	Morocco	Egypt, Arab rep.	Syrian Arab republic	Morocco	Syrian Arab republic
	Syrian Arab republic	Morocco	Costa Rica	Syrian Arab republic	Costa Rica
	Costa Rica	Syrian Arab republic	Guatemala	Costa Rica	Guatemala
	Guatemala	Costa Rica	Jamaica	Guatemala	Jamaica
	Jamaica	Guatemala	Trinidad and Tobago	Jamaica	Colombia
	Trinidad and Tobago	Jamaica	Colombia	Colombia	Ecuador
	Colombia	Trinidad and Tobago	Ecuador	Ecuador	Uruguay
	Ecuador	Colombia	Uruguay	Uruguay	Bulgaria
	Uruguay	Ecuador	Bulgaria	Bulgaria	Bangladesh
	Peru	Uruguay	Bangladesh	Bangladesh	Bolivia
	Domican Republic	Bulgaria	Bolivia	Bolivia	Zambia
	Poland	Bangladesh	Ghana	Zambia	Mauritania
	Bulgaria	Bolivia	Mauritania	Kuwait	Peru
Q2	Ghana	Peru	Zambia	Ghana	Kenya
	Mauritania	Domican Republic	Peru	Mauritania	Kuwait
	Niger	Ghana	Domican Republic	Peru	Ghana
	Senegal	Mauritania	Niger	Domican Republic	Domican Republic
	Tanzania	Niger	Senegal	Niger	Niger
	Uganda	Senegal	Tanzania	Senegal	Tanzania
	Madagascar	Tanzania	Honduras	Tanzania	Honduras
	Mauritius	Uganda	Nicaragua	Honduras	Nicaragua
	Bangladesh	Madagascar	Jordan	Nicaragua	Jordan
	Bolivia	Honduras	El Salvador	Jordan	El Salvador
	Honduras	Nicaragua	Mauritius	El Salvador	Panama
	Nicaragua	Jordan	Cyprus	Panama	Paraguay
	Paraguay	El Salvador	Panama	Paraguay	Uganda
Q1	Cyprus	Mauritius	Kuwait	Mauritius	Senegal
	Burkina Faso	Paraguay	Uganda	Cyprus	Mauritius
	Mali	Cyprus	Madagascar	Uganda	Cyprus
	Rwanda	Burkina Faso	Paraguay	Madagascar	Madagascar
	Nepal	Mali	Burkina Faso	Burkina Faso	Burkina Faso
	Jordan	Rwanda	Mali	Mali	Mali
	El Salvador	Nepal	Rwanda	Rwanda	Rwanda
	Panama	Panama	Nepal	Nepal	Nepal

However, institutions seem to matter more at a higher level of export performance. This result suggests that what appears to be essential in the overall growth process as suggested by recent research[14] is only partially true for export performance. It might also suggest that institutions and macroeconomic variables are substitutable along the export development process. While the real exchange rate is an essential price competitiveness component for low-performers, once macroeconomic stability has been achieved and the composition of exports is more oriented towards capital -intensive goods, as is most likely the case for high-performers, the institutional framework comes in as an essential competitiveness ingredient. Better institutions are expected to guarantee better protection of property rights, which becomes essential as production becomes more and more capital intensive. Better institutions are also likely to be associated with more efficient administration and in particular regulation, which could prove to be important price components in industrialized countries.

(vii) Foreign Market Access

Results suggest that foreign market access remains essential even after controlling for supply capacity. They do not show a time recurrent pattern. However, coefficients on foreign market access reveal that it is always a significant explanatory component for under performers in all periods as it was the case for most of the supply capacity elements analyzed above. The 1988-91 period is characterized by a non-monotonic influence of FMA across quantiles. The coefficient first increases then falls in the Q75 regression to increase for the last quantile. The coefficient is significant at the 1 per cent level for all quantiles. For the 1992-95 period the impact and the significance of the estimates decrease over the first three quantiles. Coefficients become insignificant in the upper two quantiles regressions. As export performance improves, it becomes less and less responsive to foreign market access. In the 1996-99 period the tendency appears to be reversed. The level of the reactivity of exports to foreign market access increases with export performance. Coefficients remain significant at the 1 per cent level for all quantiles. In some regressions increasing returns to scale appear. The coefficient on the FMA (log) variable becomes larger than one in the Q90 quantile. From a theoretical point of view this would correspond to a small elasticity of prices in the export sector with respect to the quantity of resources used in the sector. In other words, at some points of the external sector performance there may be some increasing returns in the domestic supply response to better foreign market access.[15]

Foreign market access is explained by various elements that include essentially geography, trade policy and partners' characteristics, such as the size of their market and transport facilities. It could be the case that a more integrated world implies a more uniform set of partners' characteristics across countries. As a consequence, changes in the magnitude of the estimated coefficients could be associated with changes in policy. However, this would be the case only if one could control for the nature and composition of trade. In this empirical context, partner characteristics can not be fully separated from policy components, so that a possible interpretation of the increased significance of foreign market access in the upper part of the distribution across periods can be based on the evolution of the external sector structure. An associated result of that just presented is the decrease in the magnitude of the coefficient on the FDI variable across periods. The two observations put together suggest that linkages to international markets have become more important than the structural development of the external sector assumed to be captured by FDI contribution to

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[14] See Rodrik et al. (2002) for empirical assessment and for a critical review of empirical work.
[15] This is a form of the home market effect as presented in Krugman (1980).

capital formation. This could be due to the fact that the external sector in high performing countries has completed its structural change, that is, its intra-sectoral development and diversification. This is plausible only if the FDI variable does proxy such a process in the upper part of the distribution. In that context, access to international markets becomes *relatively* more significant in determining export performance. This interpretation supports the argument that better access to international markets can contribute towards the expansion of the external sector at all stages of its structural development.

(e) Sensitivity Analysis

Only the most relevant results from a statistical point of view have been presented. However, a large set of variables and their combinations have been considered in estimations.

Various variables related to internal transport costs were introduced. To account for transport costs related to internal geography the study used in turn the equivalent of the average distance between two points in a circular country given by $0.33 \left(area \ / \pi \right)^{0.5}$ and, the percentage of population living within 100 km of the coast and rivers in 1996. The former variable is never significant. The latter appears to be significant and positive at high quantiles for the 1992-95 and 1996-99 periods. A larger proportion of people living close to rivers imply lower transport costs. Nevertheless, the measure seems not to be fully appropriate for the 1989-91 period regressions. Moreover, it could place too much weight on water transport, which is likely to be questionable in a number of countries in the sample. The extent of the internal road network simply given by the total number of kilometres of roads whether paved or not, was also used. Essentially this is due to physical structural transport costs. Likewise,the number of telephone lines per '000 people and the number of telephone lines per employee was also considered. None of these variables turn out to be significant, even though the coefficients appear to be correctly signed. The study also considered various combinations of measures of geography-related and physical-infrastructure-related transport costs. However, none appear to be relevant and, collinearity may be present as there are very high cross-correlation rates.

The study controlled for the macroeconomic environment using a large set of variables. First it introduced the real interest rate, which appeared to be significant for high quantiles in the last two periods. Nevertheless, the data were available only for 74 countries, which might mitigate the robustness of the results. The spread between the borrowing and lending rates was also considered. This variable could be seen as an indicator of the functioning of the capital market. It remained insignificant in all regressions and was only available for 73 countries. The real effective exchange rate computed by the IMF was also considered. However, this was only available for a few countries, and the coefficients never appeared to be significant. The same is true for the index of overvaluation of the currency computed by the World Bank following Dollar (1992).

Export concentration and diversification indices of exported products constructed by the UNCTAD are introduced to account for the structure of the export sector. None of these indices appears to be significant.

All these variables were considered in various sets of explanatory variables. None generated any result that contained a message strikingly different from those presented previously, nor were any more relevant statistically.

IV. POLICY IMPLICATIONS

Chapter II sheds some light on the relative importance of export performance components including to which extent that export performance has been constrained by poor supply capacity conditions. The results outlined in chapter III, helped in the understanding of the importance of certain elements affecting supply capacity elements in the process of export development.

The East Asian countries' experience indicates that strong export performance is likely to support strong economic growth. It is thus essential to identify what determines export performance. The major components of the latter are access to international markets and supply capacity. This study investigates the relative importance of these two components. It attempts to define whether export performance in various regions has been constrained by either of them. Supply capacity appears to have been a limiting element of export performance in African, Middle Eastern and Latin American countries. By contrast, supply capacity has been the driving force behind the export performance of South Asia. Empirical analysis indicates that major determinants of export performance are also likely to vary with the level of performance itself. Poor transport infrastructures and a weak macroeconomic environment are expected to explain poor performance (e.g. African countries). The structure of the external sector is also expected to matter at all levels of export performance. As might be expected, foreign market access is highly significant. This has been a particularly significant factor in explaining poor export performance for a number of countries whose exports are badly affected by trade barriers. However, it was also found that market access also affected high performing countries in the last period under investigation. Nevertheless, they were able to overcome this constraint. This result may suggest that the structure of the external sector and foreign market access are complements at low levels of performance and tend to become substitutes at higher levels. That is to say that as the external sector structure develops, access to international markets becomes more significant in explaining export performance.

The above analysis suggests that policy intervention should have static and dynamic effects:

- Transport infrastructures appear to be an important determinant of exports for low-performers. Since it takes a long time to recoup investment in infrastructure and the yields tend to be low, this reinforces the argument in favour of promoting public investment, either national or international, and international technical cooperation in that domain.

- Macroeconomic stability is also an important determinant of export performance at the early stages of development of the external sector.

- Inter-sectoral diversification should be promoted at the early stage of development of the external sector. This could be done via the promotion of foreign direct investment, as suggested by the empirical results. This could also support arguments in favour of more neutral sectoral policies. However, lowering policy trade barriers on intermediate inputs could also be useful as a step toward enhancing export performance. Thus there is scope for pushing forward the liberalization of intermediate inputs more rapidly than final goods.

- In a more dynamic context, diversification should also be promoted within sectors. This could operate through the promotion of technological improvement. Technological improvement cannot be efficiently obtained without the presence of adequate human capital. This implies that public investment should also be devoted to raising the level of human capital (e.g. through education) and the "technological competency" of the labour force (e.g. through training). However, technological improvement remains the output of technological innovation which could either be imported via FDI or nationally generated via R&D. Then, in the process of the external sector development, inter-sectoral diversification should be associated with the accumulation of competencies that will be able to lead to intra-sectoral diversification, which appears at latter stages of development.

- Foreign market access proves to be significant at all levels of export performance. This indicates that there is scope for further lowering trade barriers at all stages of development of the external sector. Beside facilitating access to international markets it would also facilitate trade in intermediate outputs. Moreover, increasing returns in terms of export performance could be obtained.

- Finally, the empirical results suggest that it is necessary for policy makers to care about all dimensions of the process of development of the external sector. For instance, fighting for better access to international markets while neglecting supply conditions is likely to be unproductive in terms of export performance, as suggested by the African and to some extent the Latin American experiences.

V. POSSIBLE FURTHER RESEARCH

While the study gives some useful guidance to policy makers, a number of points could be clarified by further work, and this would help to give greater specificity to policy guidelines.

The analysis has been carried out at an aggregate level, and in future work it may be useful to carry forward the analysis to account for sectoral specificity.[16] This should allow better qualification of supply capacity constraints and the identification of those sectors that face them the most severely. Analysis at the country level could then be run sector by sector as foreign market access series would be obtained for each of them. This could further refine the framework for policy-oriented exercises.

It might also be useful to carry forward the analysis using a structural approach in determining export performance components. This approach would allow the decomposition of foreign market access and supply capacity into well-identified elements. For instance, it would become possible to quantify the stringency of trade barriers and their impact on foreign market access. Likewise, it might also be able to better assess the impact of special trade agreements and in particular of RTAs. This could be done by simply considering trade agreements partners grouping on top of, or instead of geographical grouping. It could then be assessed how much such agreements contributed to a particular country's or region's export performance evolution. Typically, a pre-agreement period of time and a comparison of the underlying results with those obtained in a post-agreement period of time, could be considered. Hence, the impact on supply capacity could be interpreted as some sort of adjustment cost or, could serve to identify those elements that possibly contain the latter.

The analysis in this study did not explicitly take account of time. It is possible to compare results across time as long as data are available. However, it should also be possible to integrate time into the cross-sectional analysis itself without making it a panel analysis. This approach was followed by Dollar and Kraay (2002) who considered decadal changes in their dependent and independent variables, that is the relationship between changes over time. The relevance of such an approach is supported by the empirical fact that trade to GDP ratios are not strongly correlated with themselves across decades. This could lead to a better understanding of the decomposition components influence. Practically, the total exports real value would be put as the dependent variables, its lag T years ago (T=10 for instance), and the averages over the T years period before the current date of a set of control variables.

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[16] Data availability in COMTRADE permits the consideration of exports at various sectorial levels rather than simply at the aggregate level. Elbadawi, Mengistae and Zeufack (2001) adopt a similar approach using even more disaggregated data. The data used are from more than 1400 manufacturers of textile and garments in six Sub-Sahara African countries, Morocco and India. They conclude that geography is as probably as important for African manufacturers as are trade policy and institutional infrastructure.

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APPENDIX

A. Data Sources

Bilateral Trade Flows: United Nations COMTRADE database

GDP, Population, Geographical variables (data on bilateral distance, existence of a common border): World Bank World Development Indicators

United States GDP deflator: IFS from the IMF.

Internal Geography: Gallup, Sachs and Mellinger (1998) / (www2.cid.harvard.edu/ciddata)

Miscellaneous: CIA World Fact Book

Infrastructures: World Bank WDI 2003

Trade Openness: Sachs and Warner (1995) / (www2.cid.harvard.edu/ciddata)

Labor Market Indicators: Forteza and Rama (2001)

Effective real Exchange rate Overvaluation Index: World Bank World Development Indicators (Dollar (1992) methodology)

Exchange and Interest rates: World Bank WDI 2003

FDI contribution to capital formation: UNCTAD handbook of statistics

Institutions: Expropriation risk form International Country Risk Guide database / Hall and Jones (1998) / www.standford.edu/~chadj/datasets.html

B. Geographical Country Groups

Western Europe: Austria, Belgium-Luxembourg, Switzerland, Cyprus, Germany, Denmark, Spain, Finland, France, United Kingdom, Republic of Ireland, Italy, Netherlands, Norway, Sweden, Greece, Portugal

Sub-Sahara: Burkina-Faso, Cote d'Ivoire, Ghana, Kenya, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, South Africa, Zambia, Zimbabwe

South Asia: Bangladesh, India, Sri Lanka, Nepal, Pakistan

Middle East and North Africa: Algeria, Arab Republic of Egypt, Islamic Republic of Iran, Israel, Jordan, Kuwait, Morocco, Syrian Arab Republic, Tunisia

Latin America and Caribbean: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Domican Republic, Ecuador, Guatemala, Honduras, Jamaica, Nicaragua, Panama, Peru, Paraguay, el Salvador, Trinidad and Tobago, Uruguay, Venezuela

Eastern Europe and Central Asia: Bulgaria, Hungary, Poland, Romania, Turkey

East Asia and the Pacific: Australia, China, Hong Kong China, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand, Taiwan (Province of China)

C. Quantile Regression

Quantile regression, developed by Koenker and Bassett (1978), is an extension of the classical least squares estimation of the conditional mean to estimation of different conditional quantile functions. The conditional mean function is estimated by minimizing the symmetrically weighted sum of absolute errors, where the weight is equal to 0.5. Other quantile functions are estimated by minimizing an asymmetrically weighted sum of absolute errors, where the weights are functions of the quantile of interest. As a consequence, quantile regression is robust to the presence of outliers.
The general quantile regression model is

$$y_i = x_i^{'}\beta_\theta + u_{\theta i}$$

or alternatively

$$\theta = \int_{-\infty}^{x_i^{'}\beta_\theta} f_y(s \mid x_i)ds$$

where β_θ is an unknown k x 1 vector of regression parameters associated with the θth percentile, x_i is a k x 1 vector of independent variables, y_i is the dependent variable of interest and $u_{\theta i}$ is an unknown error term. The θth conditional quantile of y given x is $Quant_\theta(u_{\theta i} \mid x_i) = x_i^{'}\beta_\theta$. Its estimate is given by $x_i^{'}\hat{\beta}_\theta$. As θ increases continuously, the conditional distribution of y given x is traced out. Although many of the empirical quantile regression papers assume that the errors are independently and identically distributed, the only necessary assumption concerning errors is

$$Quant_\theta(u_{\theta i} \mid x_i) = 0$$

that is, the conditional θ^{th} quantile of the error term is equal to zero. Thus the quantile regression approach allows the marginal effects to change for countires at different points in the conditional distribution by estimating β_θ using several values of θ, $\theta \in (0,1)$. It is in this way that quantile regression allows for parameter heterogeneity across different levels of export performance.

The quantile regression estimator is the solution to the following minimization problem:

$$\hat{\beta}_\theta = \arg\min_{\beta} \left(\sum_{i:y_i > x_i'\beta} \theta \left| y_i - x_i'\beta \right| + \sum_{i:y_i < x_i'\beta} (1-\theta) \left| y_i - x_i'\beta \right| \right)$$

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