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Domestic Competition and Export Performance of Manufacturing Firms in Côte d'Ivoire

by

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Abstract: Because of transportation costs, African manufacturing firms benefit from some market power on their domestic market, where they can charge a higher price than the export price, net of transportation cost. We present a simple theoretical model of an exporting firm that discriminates between the export and the domestic markets, where firms engage in Cournot competition. It is then shown that the impact of increased competition on export performance by the firms is ambiguous, and may be negative for a non trivial range of parameter values. Using survey data on Ivoirian firms, our empirical analysis gives some support to this prediction, showing that the probability of a firm exporting decreases with increased competition.

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1. Introduction

The need for diversifying the exports of African economies is well known, as most of these countries rely on exporting a small number of primary commodities on highly volatile markets. A recent series of case studies has shown how the resulting trade shocks are liable to destabilise these economies, especially when the government responds by inappropriate policies (Collier, Gunning et al., 1999) ; this occurs quite frequently. The whole theory of the 'Dutch Disease', and the associated de-industrialisation, was motivated by this type of issues. In particular, Van Wijnbergen (1984) suggested that the commodity shocks have a lasting detrimental dynamic effect on industrialisation, as the Dutch Disease retards the process of learning by doing in the industrial sector. However, commodity booms often entail a massive inflow of foreign currency, and there are examples of economies, like Mauritius, that have used the funds accumulated during such trade booms, concerning sugar in this case, for financing a diversifying industrialisation of their countries, with very positive effects on growth. Consequently, the impact of these shocks tends to work either way, and does not come out significantly in single-equations cross-country growth regressions (Deaton and Miller, 1996), probably because it is conditioned by the response of the government, and hence by the political economic circumstances of the country affected. Nevertheless, the case for export diversification in developing countries in general seems to be supported by most observers. The jury is still out for determining whether manufacturing industries will provide the right solution for diversifying African economies, or whether services or other industries will be more appropriate.

The aim of the present paper is to contribute some empirical elements for evaluating this issue, by analysing the determinants of the export performances of manufacturing firms in one of the most industrialised economies of this continent, namely Côte d'Ivoire. We focus on the links between domestic competition and export performance. A widespread argument in the 'export-led-growth' literature is that export-orientation, especially in the non-traditional sectors, is the key to fast growth and industrialisation for developing countries. In many popular expositions of this doctrine, exporting firms are regarded as necessarily competitive, and hence, progressive. However, the relationships between export performance and competition are not as straightforward as generally thought. This is discussed in the next section, using a simple model of the type used in the literature on 'dumping' (e.g. Deardorff, 1990). In this model, firms are able to discriminate between the domestic market and the export market, charging a different price on each segment. However, the model used does not provide any argument for the export-destination countries to take any anti-dumping actions against Côte d'Ivoire. In particular, because the exporting firm charges a domestic price that is higher than the net export price, net of transportation costs, the model does not make any predictions about the relationship between the domestic selling price and the foreign selling price, transportation costs included.

The handicaps faced by industrial firms in Africa are well known, even in largely open economies like Côte d'Ivoire, where the discretion of the government for soaking up the profits of incumbent firms is credibly kept under control, in an orderly polity (Azam and Morrisson, 1994). Labour in the formal sector is relatively expensive, given its productivity; transportation costs are high, and contribute to make imported goods dearer than in other continents (Yeats, 1990) ; etc. This is true not only of landlocked countries, but also of coastal ones, as the cost of shipping goods to or from African countries are higher than for other continents, probably because of the small size of the African markets, that precludes the full exploitation of economies of scale in shipping, and of the correlative market power of the incumbent shipping firms, that allows to sustain a profitable traffic below the optimal scale. The other side of this coin is that firms located in African countries benefit from some natural

protection by these high transportation costs, in addition to some possible barriers erected by the domestic government for the sake of protecting some domestic firms. Market power is temporarily good when it enables the benefiting firm to make the most of learning-by-doing effects, as in the standard 'infant-industry' argument, but the resulting excessive comfort of a monopolistic position may also inhibit any dynamic behaviour of the firm in the fields of innovation and commercial aggressiveness.

The next section discusses the theoretical model, showing that the relation between a firm's export performance and domestic competition is ambiguous, with a range of parameter values for which an increase in domestic competition reduces the firm's quantity exported. Although the analytic condition for this result to prevail is relatively complex, involving the change in the elasticity of demand, we show with a very simple example that this phenomenon is not a *curiosum*, and can arise with a fairly standard specification of the model. In this theoretical framework, the number of incumbent firms is regarded as exogenous, and the impact of increased competition is analysed as the result of the entry of a new competitor. Hence, implicitly, we rule out free entry in the market, and postpone the analysis of endogenous entry until further research. Because of the discretion left to the government by the investment code, in Côte d'Ivoire, incumbent firms often benefit from secret tax exemptions, and other privileges that do not help creating a level playing field. Therefore, treating the number of firms as exogenous, or policy-determined, is undoubtedly a better first approximation than assuming that free entry prevails. Some thoughts about the potential impact of exports as an entry deterrent are offered in the concluding section.

Section 3 presents the data used, coming from the RPED (Regional Program for Enterprise Development) survey performed in Côte d'Ivoire under the direction of one of the authors in two rounds, in 1995 and 1996, and some descriptive statistics. The latter show in particular that the most important exporting industries of the manufacturing sector, in terms of their share of the value of total manufacturing exports, are comprised of firms that sell most of their output in the domestic market, and export the remainder to a diversified set of countries. Section 4 presents an empirical test of the predictions of the model, showing that the probability of a firm exporting is negatively related to the number of competitors in the domestic market, when the latter is small, and becomes positively related for a larger number of them. However, the impact of the number of competitors on the export performance of the firms, conditional upon their actually exporting, is not significant. Section 5 concludes, and suggests extensions of this analysis.

2. The Model

In order to bring out clearly the effect of increased competition on export performance, we restrict the analysis to the case where n identical firms are competing à la Cournot on the domestic market, while they are facing a perfectly elastic demand for their product on the international market. Transportation costs, and other possible tariff or non tariff barriers, play a central part in making such a setting possible, in particular by making the re-import of exported goods very costly. Otherwise, arbitrage would prevent the domestic firms from exerting any market power on the domestic market. So, if p^* is the price of the exportable good on the foreign market, μ the unit cost of importing the good, and ξ the unit cost of exporting it, there exists a price band:

$$p \in [p^* - \xi, p^* + \mu]$$

within which the price of the good is determined by the domestic market conditions, rather than by the foreign market. In Africa, this price band is probably quite wide, because of the

transportation costs and the tariffs and non tariff barriers which are common in this continent. Denote $p^x = p^* - \xi$ the export price that the firm gets, net of exportation costs, and x the quantity exported.

Let q represent the level of domestic sales by the individual firm, and $Q = n\,q$ the industry's total domestic sale in a symmetric equilibrium. Assume that the domestic demand for the good may be represented by the following inverse demand curve:

$$p = p(Q), \quad p'(Q) < 0, \tag{1}$$

and define the demand elasticity ε such that:

$$\frac{-1}{\varepsilon} = \frac{Q\,p'(Q)}{p(Q)} > 0. \tag{2}$$

Now, under the Cournot-Nash conjecture, the firm will regard the domestic sale level of the other firms $\bar{q}$ as given, and will choose the quantity produced z, the domestic sale q, and the level of export x, that maximise:

$$\begin{aligned} &\max_{q,\,z} \;\; p(q + (n-1)\,\bar{q})\,q + p^x.[z - q] - c(z), \\ &\text{s.t.} \qquad x = z - q \;\geq 0, \end{aligned} \tag{3}$$

where $c(z)$ is the cost of producing z, such that $c'(z) > 0$.

Examination of (3) shows clearly that, for an exporting firm, the marginal price of selling the output z is p^x, while the marginal cost of selling q on the domestic market is also p^x, its opportunity cost. Hence, in an interior symmetric equilibrium, with identical positive exports for all the firms in the industry, the first-order conditions will read:

$$c'(z) = p^x, \tag{4}$$

and

$$p(n\,q).\left(1 - \frac{1}{n\,\varepsilon}\right) = p^x. \tag{5}$$

Condition (4) simply states that the marginal cost of producing the good should be equated to its marginal price, i.e. the export price, net of transportation costs. This condition would hold also were the industry perfectly competitive. It determines the output level irrespective of the domestic demand conditions. Condition (5) shows that the level of domestic sales should be chosen so as to equate the marginal revenue on this segment of the market to the opportunity cost of selling the good locally rather than abroad. Because of the symmetric equilibrium assumption, the perceived elasticity of the demand facing the firm is increasing in the number of competitors. The larger the latter, the more elastic is the demand curve facing each firm, and the lower is the incentive for it to restrict sales on the domestic market with a view to increase the selling price. In the limit, if $n \to \infty$, the firm has no market power on the domestic market, and is unable to discriminate between the two segments. However, in African countries, we expect the number of domestic competitors to be relatively small, in manufacturing industries.

In a corner symmetric equilibrium, with no exports, the first-order conditions (4) and (5) become:

$$p(nq).\left(1-\frac{1}{n\varepsilon}\right)=c'(q)\geq p^x. \qquad (6)$$

Hence, the firms that specialise in selling on the domestic market should have a larger output level, *ceteris paribus*, and thus a higher marginal cost of production. From the viewpoint of a simple analysis of their production cost, they would thus look less competitive.

Figure 1 represents the interior equilibrium, for a given (small) value of n. The level of output is determined where the marginal cost of production is equal to the net export price, irrespective of domestic demand conditions, while the level of domestic sale is found where the domestic marginal revenue R', i.e. the left-hand side of (5) and (6), is also equal to the net export price. In this equilibrium, the firm discriminates between the foreign market and the domestic market, where it charges a price $p(nq) > p^x$.

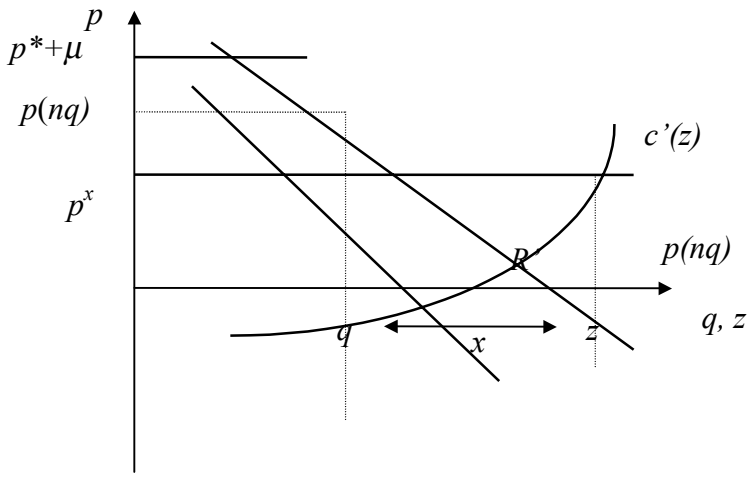

Figure 1: Output and Domestic Sale Levels

This theoretical framework is akin to the classic analysis of the dumping problem (see e.g. Deardorff, 1990). However, this case would provide no justification for the adoption of an anti-dumping action by the destination market, as the exported goods are sold there at the market price, which is equal to the marginal cost of delivering the good there, transportation cost included, with no cross subsidy by the domestic market. This model does not rule out the case where the selling price at destination is higher than the domestic price.

With the empirical analysis of the next two sections in view, we are interested in the comparative statics of the quantity exported by the firm, which may be written as:

$$x(p^x,\Phi,n,\Psi)=z(p^x,\Phi)-q(n,p^x,\Psi), \qquad (7)$$

where Φ and Ψ represent respectively the vectors of parameters affecting the marginal cost of production and the demand curve. Most effects are pretty obvious, and can be derived intuitively: any reduction in the marginal cost of production will increase exports, *ceteris paribus*, as will an increase in the net export price, while an increase in domestic demand, not affecting the number of firms or the elasticity of the demand curve, will reduce exports. The only ambiguous impact is that of an increase in the number of competitors in the domestic

market. There are two conflicting effects: an increase in the number of competitors will reduce the level of domestic demand addressed to each individual firm, as its market share falls, which tends to push it to export more, but, under the Cournot-Nash conjecture, this will also entail an increase in the perceived elasticity of the demand curve facing each firm. Then, the payoff to restricting the sales on the domestic market with a view to get a higher price falls, providing a countervailing incentive to sell more on the domestic market. Therefore, the net impact will depend on the relative strength of these two opposing effects. The outcome is clearly driven by the change in the elasticity of demand facing the firm as the intensity of competition increases. This is formalised by the following proposition, taking due account of the integer constraint that bears on the number of firms. Denote ε^+ and q^+ respectively the elasticity of demand and the level of output, when the number of competitors is $n + 1$, and define $\Delta\varepsilon = \varepsilon^+ - \varepsilon$ and Δq likewise. Then we can prove the following proposition:

Proposition 1: The impact of an increased number of competitors in the industry will increase the firm's exports unless:

$$\Delta\varepsilon > \varepsilon.(n\,\varepsilon^+ - 1) > -\varepsilon^+\,\varepsilon. \qquad (8)$$

or unless these two inequalities are simultaneously reversed.

Proof: Comparing the first-order condition (5) when there are n and n+1 competitors, we find:

$$p[(n+1)q^+].\left(1-\frac{1}{(n+1)\varepsilon^+}\right) = p(nq).\left(1-\frac{1}{n\varepsilon}\right).$$

Now, take a Taylor expansion of $p[(n+1)q]$ about nq, limited to the first order, to find:

$$p[(n+1)\,q^+] = p(nq) + p'(nq).[(n+1)q^+ - nq].$$

Then, substituting and rearranging yields:

$$\frac{\Delta q}{q} = \frac{1-\varepsilon\, n}{(n+1)[(n+1)\,\varepsilon^+ - 1]}.$$

Then proposition 1 follows as the firm's exports increase when q falls.

As condition (8) is not particularly illuminating, from an intuitive point of view, except insofar as it draws attention to the change in the elasticity of demand, it is worth working out a simple example in order to show that a negative impact of increased domestic competition on exports can arise without making any heroic assumptions.

Example: Assume that the inverse demand curve is given by:

$$p = Q^{-1/2},$$

and that:

$$p^x = 1.$$

Then, output is fixed, and export will fall if domestic sales increase. Table 1 describes the outcome for three levels of domestic competition.

Table 1: Domestic Sales and Price
(example where $p = Q^{-1/2}$ and $p^x = 1$)

	q	p
$n = 1$	**0.25**	**2**
$n = 2$	**0.28**	**1.333**
$n = 3$	**0.231**	**1.2**

This example thus shows that, in this case, the quantity exported by each firm would fall were a new entrant to turn a monopoly into a duopoly. After that point, any new entrant would lead all the firms to increase their exports. Obviously, this simple example is just that, and thus only provides simple predictions. However, proposition 1 shows that a wider array of possible cases can be constructed by allowing a variable elasticity of demand in the domestic market.

Notice that a similar argument would apply to analyse how an increase in the number of competitors would turn firms from exclusive dealings in the domestic market to exporting. Then, for some values of the parameters of the model, it is possible that an exporting industry will stop exporting at some point when the number of competitors increases, and then will become exporter again at a higher level of competition. This happens very simply in the simple example analysed above, if one completes the model by assuming that the marginal cost of production is $c'(z) = 3.9\ z$. Then this industry exports when there is a monopoly, stops exporting when a duopoly is established, and becomes again an exporter when three or more firms are active.

We now turn our attention to the case of manufacturing firms in Côte d'Ivoire, in order to confront the predictions of this theoretical framework to the actual experience of these firms. We first describe some salient features of our sample.

3. Description of the Data

A panel of about 230 manufacturing firms has been randomly selected at the beginning 1995 and 1996, with replacement of the exiting ones (about 10 %), for collecting the data relative to the preceding years. The firms have been picked at random in four industries: textile and clothing, wood, metal, and food processing and agro-industry. Formal sector firms are defined as firms which do pay national taxes, or at least are supposed to do so in case of positive profits, while informal sector firms are those which only pay communal taxes (« *la patente* »). We have created a sub-group of semi-formal firms, that are informal according to the previous criterion, but are organised in an association which lobbies the government and manages to get various advantages from it. The sample is stratified insofar as about 75 % of the formal and semi-formal sector firms from the cities of Abidjan, Bouaké and San Pedro, in four manufacturing industries (wood, metal, textile, and agro-industry), have been drawn in the sample, while the sampling rate for the informal sector is much smaller. However, some experimentation with weighted estimation has shown that the problem can safely be neglected. Less than a fifth of our sample firms are from the informal sector. A close scrutiny of the data has led to the identification of seven markets, to which firms have been allocated, with a view to better capture the extent of competition, according to the substitutability or

otherwise of their products: clothing industry, furniture, metalwork, plywood, primary consumption goods, secondary consumption goods (i.e. more elaborated products), other (mainly bread).

Firms have been asked: « what fraction of your production do you export ? » Out of the initial sample of 234 firms in 1994 (230 in 1995), we have:

- ten firms which failed to answer in 1994 (four in 1995),
- 139 firms (59.4 % of the sample in 1994, 60.4 % in 1995) that declare exporting nothing ; the majority of them are in the informal or semi-formal sector. In 1994, 83 % of the informal and 88.5 % of the semi-formal sector firms are not concerned by exports. This percentage falls to 46.5 % in the formal sector. Of course, firms only answer about the exports that they process themselves, and are unable to tell if their products are exported by informal traders to the neighbouring countries.
- 85 firms (81 of them in the formal sector) that answer that they actually export a positive share of their production in 1994 (87 in 1995). Chart 1 shows the number of the exporting firms by market for 1994 and 1995.

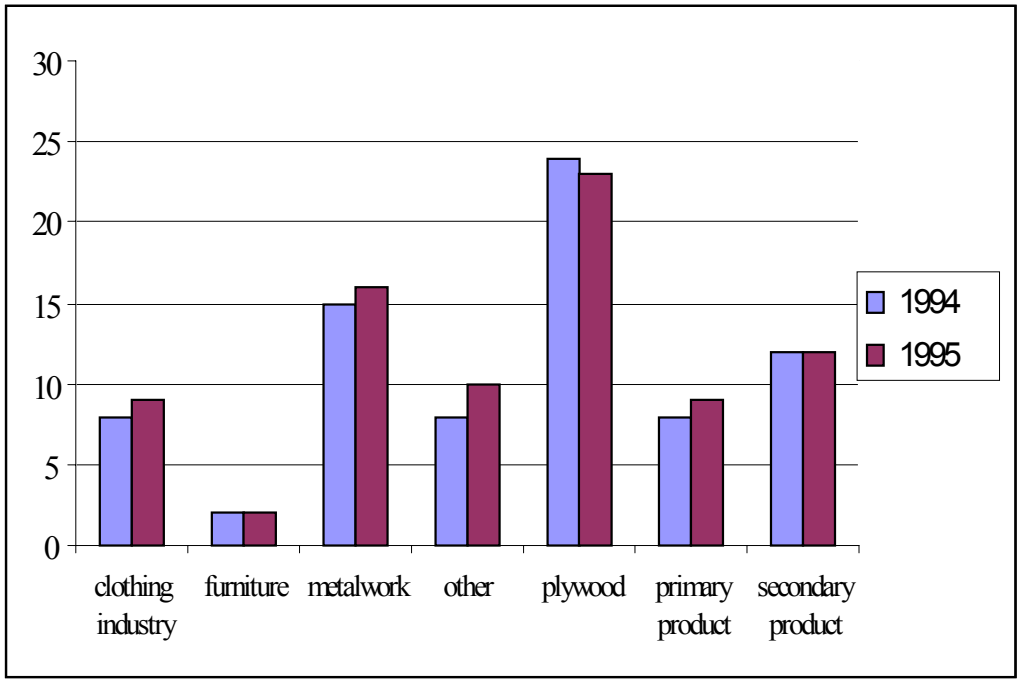

Chart 1 Number of Exporting Firms per Market

As the samples have very similar properties for 1994 and 1995, our descriptive analysis of export performance is based on the 1994 data.

Table 2 clearly shows that a large fraction of the exporting firms (37.6 %) are export-specialist, as 32 out of the 85 exporting firms export more than 75 % of their production, including 15 firms that export 100 %. Chart 2 brings out more strikingly that firms tend to polarise at the two ends of the distribution, exporting either very little, or quite a lot of their production.

A breakdown by market shows that export orientation is very contrasted by type of product (table 3). For example, 60 % of the firms exporting more than 75 % of their production are in the plywood industry, while 40 % of the firms exporting less that 25 % of

their production are in the metalwork industry. Firms do not export anything in the bakery industry, and almost nothing in the furniture industry, with only one firm being highly specialised in producing furniture for export.

Table 2: Distribution of Exported Share Among Exporting Firms

Fraction Exported	Number	Percentage
Between 0 and 25 %	23	27.5
Between 25 and 50 %	16	18.8
Between 50 and 75 %	14	16.5
Between 75 and 100 %	32	37.6

Source: Computed from the RPED survey 1994.

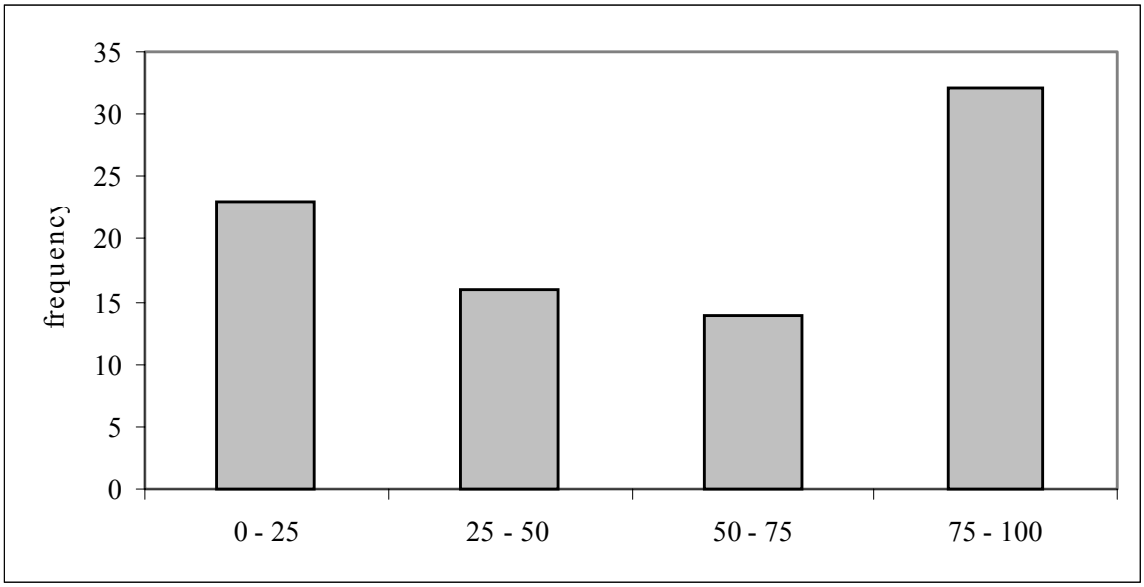

Chart 2: Distribution of Firms per Share of Exported Production

Table 3: Export Shares per Firm and per Market

	bread	clothing	furniture	metalwork	plywood	primary	secondary	total
0 %	16	35	22	21	12	6	5	117
0 to 25 %	0	1	0	8	1	2	5	17
25 to 50 %	0	3	0	1	3	2	1	10
50 to 75 %	0	1	0	2	5	1	3	12
75 to 100 %	0	3	1	1	18	3	3	29
total	16	43	23	33	39	14	17	185

Source: Computed from the RPED survey 1994.

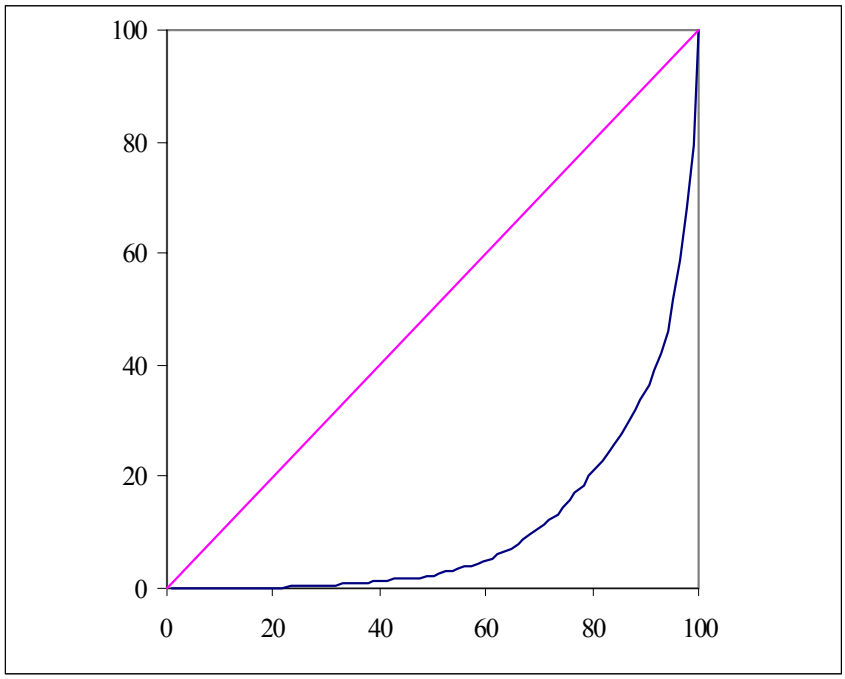

Chart 3: Distribution of Exported Value (1994)

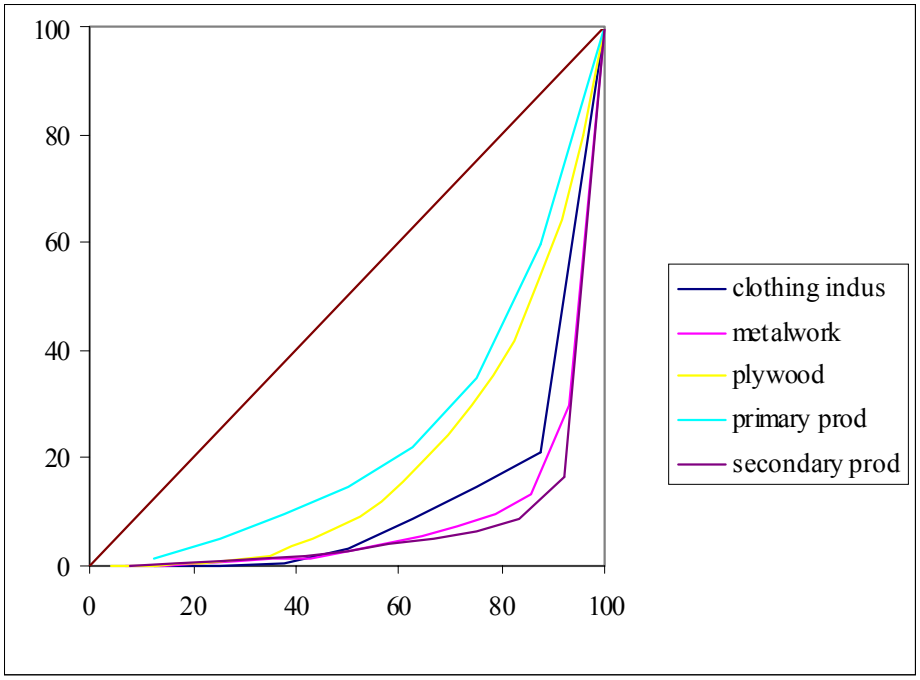

Chart 4: Distribution of Exported Value (per market in 1994)

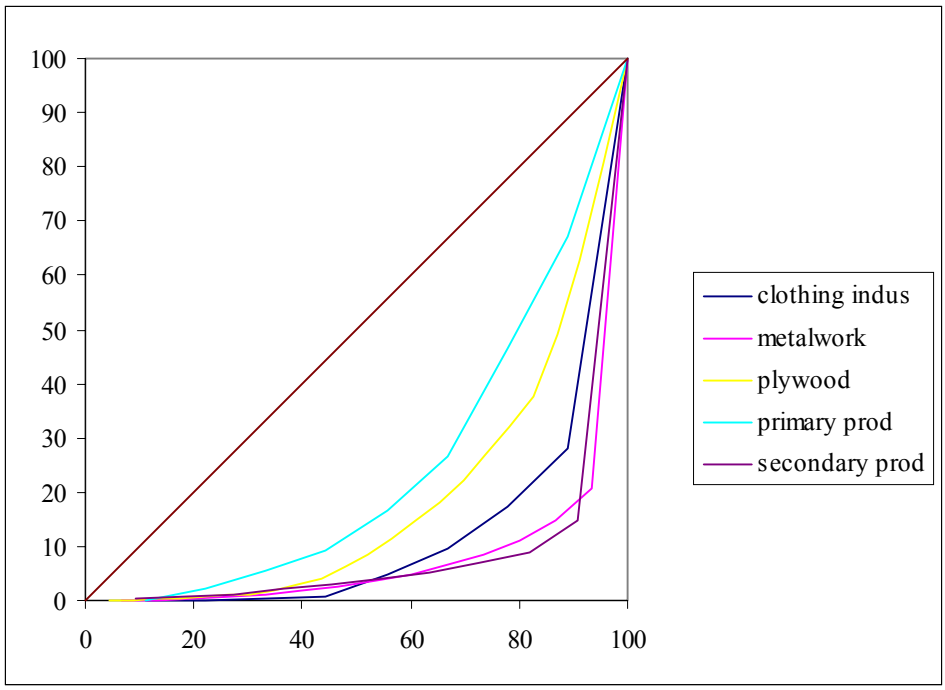

Chart 5: Distribution of Exported Value (per market in 1995)

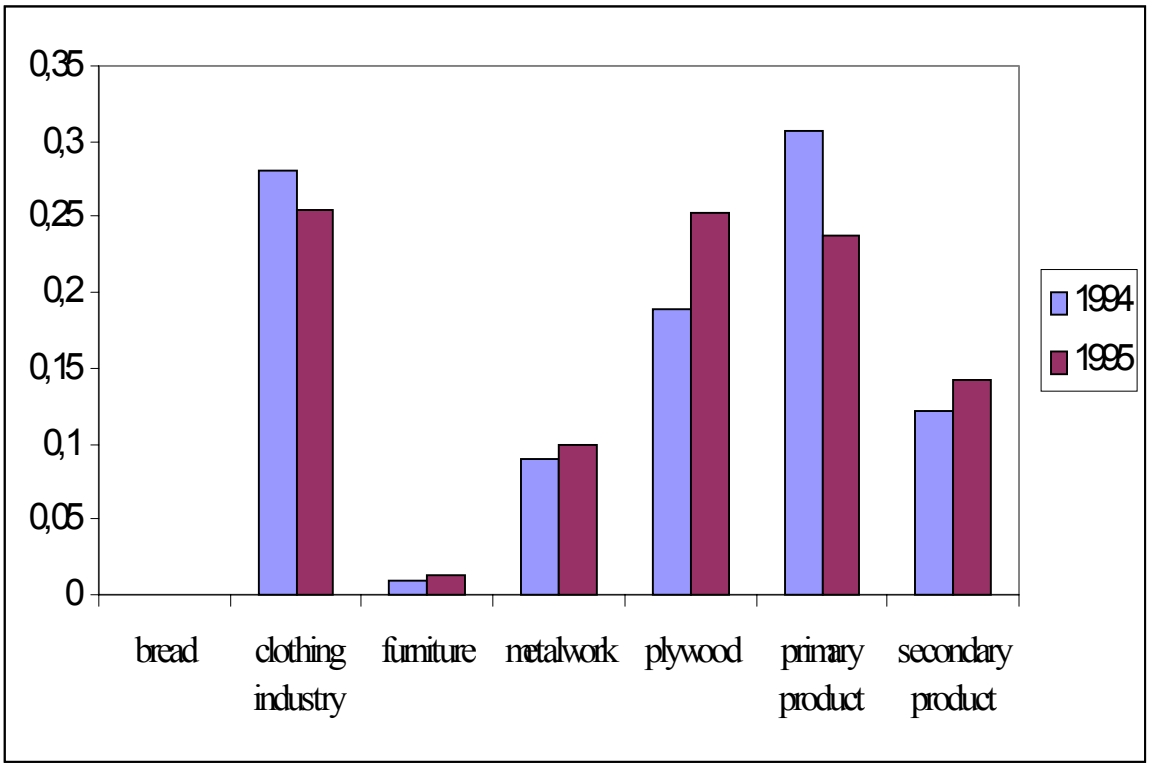

Chart 6: Share of Each Market in the Total Exported Value (1994 and 1995)

Chart 3 shows the distribution of the value of these exports, as a Lorenz curve. We see that it is highly concentrated, insofar as 20 % of the exporting firms export 80 % of the value exported. Chart 4 and 5 break this down by markets. We see that the value exported is more evenly distributed across firms in the plywood and the primary consumption goods industries than in the secondary consumption goods and the metalwork ones.

Considering now the share of each market in the total exported value in 1994 (chart 6), we see that two markets are very prominent: primary consumption goods (30.76 % of the total value) and clothing industry (28.14 %). Then, plywood, secondary consumption goods, and metalwork account respectively for 18.89 %, 12.24 %, and 9 % of the total exported value. The furniture market accounts only for 0.95 % of the total. Hence, the two most important export industries in terms of value exported are among the least concentrated ones at charts 4 and 5: the majority of the firms in these two markets are exporting less than 25 % of their production. This is a remarkable feature of these data: the firms in the most important exporting industries sell a large fraction of their output in the domestic market. Hence, although we have seen above that the largest number of exporting firms tend to be relatively specialised in this activity, we see that the opposite is true in terms of the share of the value of exports. The largest share of the latter is provided by firms that serve the domestic market first, and only vent the rest on the external market.

This might explain why we observe a fall by 18.66 % in the total value exported by our sample firms, between 1994 and 1995, that we observe at table 3, as the economy was then recovering after the successful devaluation of the CFA franc of January 1994, and the resumption of international aid after the disastrous 1993 « sanction year » (see Azam, 1997). Then, a buoyant domestic demand might have crowded out exports. Wages only increased on average by less than 15 % over this period, in front of a 100 % devaluation. This fall is particularly strong for the primary consumption goods (-37 %) and the clothing (-26.5 %) industries, while the fall is smaller in metal work (-10.6 %). By contrast, exports are picking up in the plywood market (+ 9 %), where we have seen that the domestic market claims a relatively small share of output. Then, the fall in real wages entailed by the devaluation may have been the driving factor behind the increase in exports by this industry.

Table 3: Exported Values for 1994 and 1995

	Bread	Clothing	Furniture	Metal work	Plywood	Primary product	Secondary product
1994	0	100 854 403	3 418 680	32 282 527	67 680 099	110 248 106	43 876 549
1995	0	74 173 603	3 758 272	28 867 253	73 797 746	69 382 665	41 519 496
Growth		-26,45%	9,93%	-10,58%	9,04%	-37,07%	-5,37%

Source: Computed from the RPED survey 1994 and 1995.

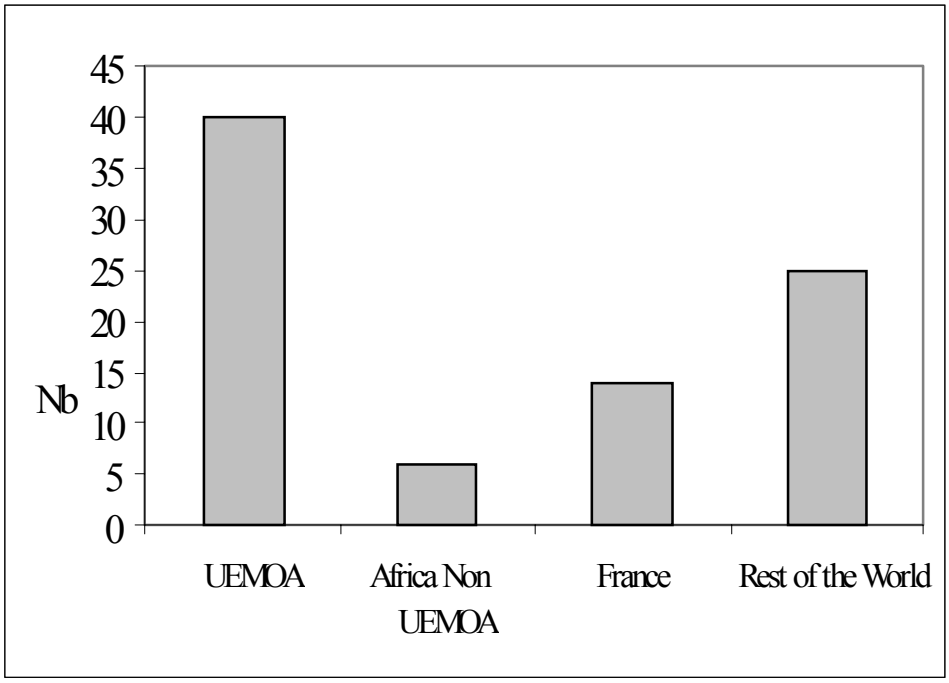

Chart 7 Exports Destination

Breaking down these data by destination (chart 7) sheds some light on the transportation cost incurred by the exporting firms. We find that 40 firms (47.1 % of the exporting firms) declare exporting the largest part of their production to the UEMOA countries (West African Economic and Monetary Union), between 78 and 92 % on average depending on the market, 14 export mainly to France, 6 to other African countries, and 25 to « other countries ». The former ones are in the metalwork and secondary consumption goods markets, as seen from chart 8, and are largely specialised in exporting to the UEMOA countries. The plywood market firms export mainly to « other countries », while the clothing industry, the primary consumption goods industry, and the furniture industry are not specialised by destination, except that they never export to « other African countries ».

Given this description of the export behaviour of the firms in our sample, we turn our attention to the empirical analysis of our theoretical framework using the RPED survey data collected in Côte d'Ivoire

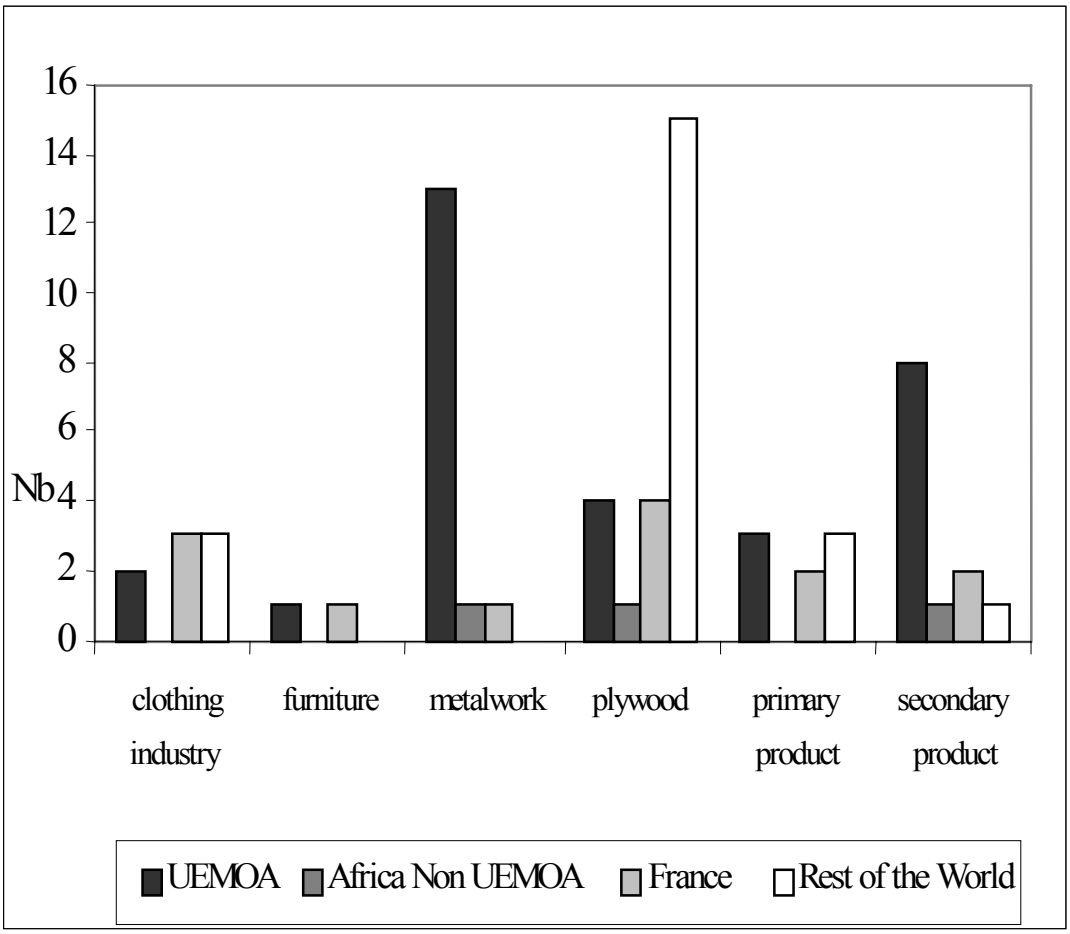

Chart 8 Export Destination Per Market

4. Empirical Analysis

Because of the missing values of some of the variables involved, our sample falls down to 206 observations over the two years, including 73 with non zero exports, and 133 with zero exports. As we only have two years of observations, and not even for all the firms, we neglect the panel dimension of the sample, and we do not try to estimate a fixed effect or a random effect model. The « within » dimension seems too short for resulting in reasonable estimates of the unobserved time-invariant effects for each firm. However, we use some observed time-invariant variables, like dummy variables indicating the market in which the firm is operating, or its location. We use Heckman's two-stage procedure for estimating the export equation, while correcting for the selection bias. The first step is devoted to the estimation of a probit regression, for determining which firm does, or does not export, and the second step involves the estimation of an export equation for the exporting firms, correcting for the possible selectivity bias by including the probability *lambda* of being in the sample for each observation. The latter is estimated by the inverse Mill ratio computed from the probit analysis performed at the first step (Heckman, 1979).

Roughly speaking, our aim is to estimate the impact of increased domestic competition on export performance by the firms, using an econometric equation which is a log-linear approximation of (7) above. We need to control for various determinants of the marginal cost of the firm, as well as for various determinants of the sectoral demand level, before we can

estimate the marginal impact of the number of competitors. We use the log of the capital stock, the log of the average wage, which turned out insignificant, and hence was removed, a price index of intermediate consumption, the log of the number of expatriate workers employed in the firm, a dummy indicating whether the firm engages in any R&D, and another one indicating if the firm has borrowed money recently for funding an investment, both of them being eventually removed as non significant, and a dummy variable indicating whether the firm holds a production licence, as well as the share of the capital owned by a foreign private shareholder, for controlling for the cost-side variables. In order to control for the domestic market conditions, we use market dummies and the number of competitors declared by the firm as demand-side variables. Moreover, we include a time dummy, for distinguishing 1995 from 1994. We also include in a second set of equations the number of competitors squared, with a view to capture the non monotone impact found in the simple theoretical example analysed above.

In table 4, we have excluded from the equations the non significant variables, for the sake of parsimony. In the first four columns, we present two versions of the equations, with or without a quadratic term for the number of competitors. When the linear term is included alone, we observe that it has the negative sign in the probit analysis, and is borderline significant at the 10 % level of confidence. This provides a partial support for the theoretical framework discussed above. This is reinforced by the results found when adding the number of competitors squared to the probit equation, showing by its positive sign that the impact of the number of competitors is quadratic, with a U shape, being negative at first, and then turning positive, only after more than four incumbents are active in the market (the sample average is 3.5). Both the linear and the quadratic terms are significant with the predicted sign in this equation. However, the result found when excluding the quadratic term suggests that most of the data points in our sample are located on the decreasing part of the U-shaped relation, where increased competition reduces export performance.

In the log of exports equations, the terms representing competition do not come out so clear cut. When only the linear term is included, it comes out with a positive sign, suggesting that when the sample is restricted to the exporting firms only, most of them are located on the positively sloped part of the U. When both terms are included, while correcting for selectivity by the Heckman procedure, both terms have the right signs, but are not significant. As can be guessed from the probit analysis that produces it, the estimated probability of being in the sample, computed from the inverse Mill ratio, depends strongly on the polynomial in the number of competitors. Therefore, this raises the possibility that some multicollinearity is at work here, reducing the significance of the former in the log of export equation. In order to get a feel about this, we also ran the equation without the correcting variable. The resulting equation is presented in the final column of the table, under the heading OLS. It turns out that the competitor polynomial is much more significant, with coefficients close to the ones in the probit equation, providing some support to the multicollinearity diagnosis. However, we can see also that some of the other coefficients are significantly changed by dropping lambda, suggesting that the selectivity bias is probably somewhat important.

Table 4: Estimated Export Equations

Dependent Var.	Probit	Log Export	Probit	Log Export	OLS
Intercept	-2.27 (0.07)*	8.32 (0.00)**	-0.90 (0.54)	9.80 (0.00)**	6.29 (0.00)**
Log Capital	0.21 (0.00)**	0.18 (0.07)*	0.21 (0.00)**	0.17 (0.08)*	0.33 (0.001)**
Log. Intermediate Cons. Price	0.005 (0.17)		0.005 (0.15)		
% Foreign Private Shareholder	0.006 (0.02)**		0.007 (0.01)**		
Licence	- 0.92 (0.02)**		- 0.94 (0.02)**		
Metalwork	-1.07 (0.005)**		-1.10 (0.005)**		
Plywood	0.81 (0.005)**		0.84 (0.005)**		
Primary Consumption	-0.89 (0.06)*	1.67 (0.04)**	-1.11 (0.03)**	1.94 (0.02)**	1.23 (0.09)*
San Pedro		1.74 (0.02)**		1.83 (0.01)**	2.46 (0.002)**
Time Dummy		- 1.27 (0.08)*		- 1.15 (0.09)*	- 1.26 (0.10)
Log Nb. Expat.		0.14 (0.001)**		0.12 (0.007)**	0.15 (0.001)**
Nb. Competitors	- 0.16 (0.10)	0.29 (0.08)*	- 1.14 (0.03)**	- 0.61 (0.43)	- 1.16 (0.11)
Nb. Competitors Squared			0.14 (0.06)*	0.16 (0.20)	0.22 (0.06)*
Lambda		-1.41 (0.05)*		- 1.72 (0.01)**	
Number of Obs.	206	73	206	73	73
Adjusted R^2		0.51		0.55	0.51

Note: p-values in parenthesis under coefficients, computed from White's heteroscedasticity-consistent variance-covariance matrix.

5. Conclusion

In this paper, we have analysed the relations between domestic competition and export performance of manufacturing firms from both a theoretical and an empirical points of view. Because of the natural trade barriers entailed by high transportation costs, African manufacturing firms typically enjoy some monopoly power on their domestic market. Hence, even if they are facing a strong competition on the foreign market, they have the ability to discriminate between the two segments of their market, where they can charge different prices. We have provided a simple theoretical framework for analysing this issue, somehow

related to the models used in the dumping literature. The simple model analysed shows that the level of output will be determined by the equality between the marginal cost and the export price, net of transportation cost, while the level of domestic sales depends on the market power that the firm has. A strong market power provides an incentive for restricting domestic sales, in order to get a high price on this segment. In this setting, the impact on the firm's export performance of enhanced domestic competition, captured by an increase in the number of competitors acting in the domestic market, is ambiguous. While a new entrant increases the quantity produced by the industry, which tends to push exports up, it also reduces the market power of the incumbent firms, thus reducing the incentive to restrict sales on the domestic market. We have worked out the analytical condition bearing on the change in the domestic demand elasticity in response to an increased sale level that implies a negative impact of increased competition on export performance. As this condition is not intuitively illuminating, we have also presented a very simple example, assuming a fixed domestic demand elasticity, where the level of exports falls as the market structure passes from a monopoly to a duopoly, whereas further entrants beyond this point have the opposite impact. We know from the general formula that a wider array of cases can be constructed by allowing for a variable elasticity of the domestic demand curve.

We have then described the sample used, based on an establishment survey of about 230 manufacturing firms in Côte d'Ivoire in 1994 and 1995, which shows that the representative exporting manufacturing firm, in terms of the share of the value of manufacturing exports, is a firm that caters first for its domestic market, and vents the surplus abroad. Hence, our theoretical framework seems well suited for this case. For the empirical analysis, the missing values for some variables have entailed the use of a reduced sample, with 206 observations, where about a third of the observations display a positive level of exports, while the rest does not sell on the foreign market. In order to estimate the determinants of the firms' export performance, we have used Heckman's two-stage method of correcting for the selectivity bias. A probit analysis is first performed, in order to identify the determinants of the decision to export or not, as a dichotomous variable. This equation is interesting in its own right, and shows that the number of competitors in the domestic market is a significant deterrent to the firm's orientation towards the export market. Then, using the estimated probability of exporting as a correction variable, we have estimated an export equation, with less clear cut results. The U-shaped impact of the number of competitors is found again, but its significance is low. However, the results found by dropping the quadratic term suggest that the non exporting firms are mainly located on the downward sloping part of the U, where an increase in the number of competitors reduces the probability that they export, while the opposite effect is found when the sample is restricted to the exporting firms, in the export equation.

The bottom line of this theoretical and empirical analysis is that a dilemma is facing the policy maker interested in industrialisation and export diversification. While increased domestic competition is good for national welfare, insofar as it helps reducing the price paid by the consumers for the exportable goods, it is liable to reduce export performance for some non empty range of parameter values. Our econometric analysis suggests that Côte d'Ivoire, one of the most industrialised economies in Sub-Saharan Africa, second only to South Africa, is most probably located precisely in this range of parameter values. Then, while a first-best policy would undoubtedly seek to increase domestic competition in these industries, some arguments in the opposite direction can be reasonably raised within a second-best framework that would emphasise the need to diversify exports, and to enhance the outward orientation of the Ivoirian manufacturing industries. Further research is certainly needed for refining the

analysis of this trade-off, as well as for investigating the longer-run issues related to the feed-back of export performance on innovation and growth in the industrial sector.

If the validity of this way of thinking about export performance of manufacturing firms was confirmed, it would probably find some interesting extensions in at least two directions. First, in this model, exports play a part that is similar to that played by excess capacity in the Spence (1977)-Dixit (1980) model of entry deterrence: while the incumbent firms do restrict their sales in the domestic market, in order to reap the benefit of their market power, their exports represent a spare production capacity that can be redirected instantly towards the domestic market, and punish any new entrant. Hence, in this discriminating oligopoly framework, exports are a nice way to make the best of excess capacity, while the latter remains idle in the Spence-Dixit model. Hence, an empirical analysis of the relationships between exports and entry, along the line just described, seems desirable.

Second, this model also provides an interesting potential explanation for the puzzling observation that manufacturing firms in Africa make large profits, but fail to invest (Bigsten et al., 2000). In our model, the marginal product of capital is determined by the export market, where competition prevails. On the other hand, the level of profits is mainly determined by the market power that is exploited in the domestic market, which is infra-marginal as far as the marginal productivity of capital is concerned. Hence, the observed rate of profit is in this case a very misleading indicator of the marginal efficiency of investment, as the incremental output would have to be sold on the export market, where profits are kept low by competition and transportation costs. This shows the way to further research.

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