

Export, foreign direct investment and firm performance: Evidence from French firm level data

Alexandre Gazaniol, Frédéric Peltraut, Jean-Marc Siroën

University of Paris Dauphine, LEDa - Mondialisation et Développement

The sharp decline of French exports, compared to German spectacular trade surplus, has raised some concern over the recent period. According to Fontagné and Gaulier (2008), French exporters essentially suffer from a supply problem. Beyond the issue of wages, the authors emphasize the role of internationalization strategies. German firms mostly chose to import intermediate goods in order to assemble final goods in Germany. This strategy played a key role in the improvement of German exporters' competitiveness. At the opposite, French firms essentially chose to outsource abroad the production of final goods. For instance, the French automobile industry has deprived itself of a huge pool of competitiveness by doing so.

More generally, the relationship between firms' productivity and international commitment is the core of the new literature on heterogeneity and international that has emerged since the pioneering work of Bernard and Jensen (1995, 1999) and Melitz (2003). Whereas Melitz (2003) considers exports as the only form of internationalization, Helpman, Melitz and Yeaple (HMY, 2004) also incorporate FDI.

In this paper, we evaluate the performance of French manufacturers according to their level of internationalization, over the period 2001 - 2006. Crossing the French manufacturing census (Enquête Annuelle Entreprise or EAE) and the survey on Financial Links (LiFi), we compare purely domestic firms, exporters, and multinationals in terms of productivity, sales, value added, employment and wages. We then compare our results to Bellone et al. (2006, 2008) and Crozet et al (2008), who estimate the performance of exporters respectively over the periods 1990 – 2002 and 1995 – 2001.

Our results are consistent with HMY(2004) : whatever performance indicator is considered, multinationals are found to outperform exporters and exporters in turn outperform domestic firms. Quantile regression methods reveal that this hierarchy is accurate within each quantile of the conditional distribution of the dependant variable. Moreover, we assess that the contribution of multinationals to economic activity is disproportionately large and that being controlled by a group has a significant influence on multinationals' performance. Comparing our results with Bellone et al (2006, 2008), we also find evidence for a decline of export productivity premia, in line with the bad shape of French exporters over the recent period.

This paper is organized as follows: section 1 provides a review of the literature. Section 2 documents the characteristics of French firms in 2005. Section 3 estimates export and FDI premia over the period 2001 – 2006 with Ordinary Linear least Square (OLS) regression and quantile regression.

SECTION 1. FIRM HETEROGENEITY AND INTERNATIONALISATION: LITERATURE REVIEW

Exporters outperform firms which only serve national markets. They are fewer and the largest ones disproportionately contribute to exports, though they often export a little fraction of their production. Some authors already made this assessment in the 1970s – 1980s as they were interested in the effects on internationalization on performance: static and dynamic scale effects, access to innovation, competition constraints (X-efficiency), market segmentation effects¹.

Numerous recent studies report higher performances for exporters. Wagner (2007) counts 45 microeconomic studies published between 1995 and 2006, which confirm the existence of an export premium defined as a gap of performance between exporters and non-exporters². This general trend does not exclude some heterogeneity in the results. This heterogeneity partially comes from the lack of harmonization between national samples, which consider different periods and firm sizes.

Therefore, export premia are always found positive but appear much contrasted. Mayer and Ottavio (2007) compare exporters' performances (in terms of employment, value added, wages, capital intensity) for 7 European countries (Germany, Belgium, France, Hungary, Italy, Norway, United Kingdom). The ISGEP (2008) compares data for 14 countries (11 in European Union, plus Chile, Colombia and China). French exporters are found to exhibit a positive labour productivity premium in most industries. When controlling for firm unobserved heterogeneity, labour productivity premia vary from -0,1% for Sweden to +16,4% for Colombia (+7,6% for France). Total Factor Productivity (TFP) premia vary from +0,33% for Italy to +9,53% for Colombia (+2,1% for France).

Results on French data are also contrasted. Some studies use exhaustive data provided by French customs (Mayer and Ottaviano (2007); Crozet, Méjean and Zignago (2008); Eaton and alii (2004 and 2008)). Other studies use the French annual census, known as Enquête Annuelle Entreprise (EAE), excluding firms with less than 20 employees (Bellone and alii (2006, 2008); ISGEP (2008)). The evaluation of the exporter productivity premium also depends on the measurement of TFP. Using the Olley and Pakes (1996) methodology, Crozet, Méjean and Zignago (2008) assess that export productivity premium reach 11%. But export productivity premium is two times lower when TFP is computed with a non parametric methodology (Bellone et al (2008)). According to Eaton et al (2008), the labour productivity premium is about 22%. Finally, Irac (2008) makes the distinction between exporters and multinationals and finds similar results, but observes that the premium for productivity is lower for services.

Recent literature focuses on self selection to explain these results: high performances, and especially high productivity, precede export activity. At the opposite, there is no clear evidence that export commitment has a positive impact on productivity thanks to learning or spillover effects. Displaying a high level of productivity seems then to be the cause and not the consequence of engaging in exports; however, becoming more productive still could be the first step of an internationalization strategy (Bellone et al, 2008). By the way, recent studies are more optimistic about learning-by-exporting, especially for developing countries (Van Biesbrock (2005, 2008); Isgut and Fernandes (2007); Lileeva and Trefler (2007); De Loecker (2007)). Irac supports the self-selection hypothesis for industry, and the learning-by-exporting hypothesis for services. Moreover, studies often show that firms which engage in exports exhibit higher growth rates for production and employment (Bernard et al, 2007).

¹ See Siroën (1985) for a review of literature over the 1970s – 1980s.

² See also the survey by Greenway and Kneller (2007). For country studies, see Bernard and Jensen (1995, 1999, 2004a, 2004b), Bernard et al (2003) for US firms and the introduction of Bertrand competition ; Bernard and Wagner (2001) and Wagner (2002) for Germany ; Aw et al (2003) for Taiwan and Korea; Clerides et al (1998) for Colombia, Mexico, and Morocco ; Girma et al (2003, 2004) for United Kingdom. Yasar et al (2006) use quantile regression methods on Turkish data.

The theory backing these empirical results has been developed by several authors and especially Melitz (2003). His model integrates monopolistic competition with horizontal differentiation³. Firms which engage in exports have to pay sunk costs and ignore their relative level of productivity in their industry. They choose whether to export or not according to a fixed distribution, meaning that they consider a constant and exogenous exit probability. Firms whose productivity would be below a certain limit could not cover their sunk costs and then would have to exit the market. Given this risk, only firms which exhibit a productivity level above the export productivity cutoff will decide to export. This threshold decreases with trade barriers: a decline of tariffs or transport costs will encourage existing exporters to increase their exports (intensive margin) and non-exporters to enter the export markets (extensive margin), increasing labour demand and wages. This reduces non-exporter's profit, pushing the least productive ones out the market. Combined with the reallocation of factors towards the most productive firms, this contributes to elevate the industry's mean productivity.

Therefore, Melitz's model gives a solid explanation for the link between exports and productivity. The link with wages can be deduced from the model, in line with labour productivity. Reallocation effects can also explain the positive link with employment, as well as market size and diversification (sunk costs increase as the firm serves more markets). Moreover, the "self-selection" hypothesis predicted by the model seems to corroborate with the empirical results.

However, the model of Melitz (2003) only considers one form of internationalization, exports, neglecting two other ways of expansion: Foreign Direct Investment (FDI) and licensing. Considering exports and FDI, Helpman, Melitz and Yeaple (HMY, 2004), following Brainard (1997), expand the initial model by integrating a trade-off between exports and local sales by affiliates abroad. These two ways of accessing the local market imply different relative costs. When engaging in exports, firms face both sunk costs (including R&D, distribution or publicity) and variable costs (transport). When engaging in FDI, transport costs disappear but sunk costs are higher. This way, costs for engaging in exports are higher than costs for engaging in FDI in variable terms, but lower in fixed terms. Following the model of Melitz and its "self-selection" logic, the most productive firms are expected to engage in FDI. Firms which exhibit intermediate performance prefer to engage in exports, as exports generate less sunk costs. Finally, as in the initial model, the least productive firms only serve the national market. Therefore, firm heterogeneity, or productivity dispersion, is expected to impact the trade-off between exports and FDI, and trade composition. The propensity of setting affiliates abroad increases with trade barriers: firms engage in FDI when transport costs become higher than the cost of setting facilities on multiple markets, making classical proximity vs concentration/economies of scale trade-off (Brainard, 1997)⁴.

However, FDI is here limited to operations whose production is entirely intended to local markets. This excludes vertical FDI, which are motivated by international division of labour. Yet, differences in factor prices or market sizes can lead to vertical FDI. Head and Ries (2003) even show that taking vertical FDI into consideration can inverse the predicted conclusions of the HMY model: a small but low-cost market may attract the least productive firms, as they have more to gain from cutting their costs. In that case, the least productive firms may be more eager to pay higher sunk costs than the most productive ones.

As revealed by Greenaway and Kneller (2007), many studies compare multinationals and national firms in terms of productivity⁵, but few compare exporters and multinationals, as data are less available (although this is less true nowadays).

³ See Bernard et al (2007) for introducing this approach in the model of Helpman and Krugman (1985).

⁴ Authors test the model on a sample of US firms and their sales affiliates. The greater productivity heterogeneity is inside the branch, the more firms engage in FDI. Firms tend to substitute FDI to exports when transport costs are relatively high and scale effects are relatively low.

⁵ See for example Doms and Jensen (1998) for US, Girma et al (2001) for UK, Globerman et al (1994) for Canada.

Empirical studies censed by Greenaway and Kneller find evidence for the hierarchy predicted by HMY, except Head and Ries (2003) for Japan. However, this exception may be due to a limited sample (only 1070 firms).

Table 1: Evidence on relative productivity of exporters and multinationals

Authors	Country	Period	Method	Exporters vs non-exporters	Multinationals vs exporters
Arnold and Hussinger (2005)	Germany	1996 - 2006	K-Stest of stochastic dominance	+	+
Castellani and Zanfei (2007)	Italy	1994 - 1996	OLS	0	+
Girma, Görg and Strobl (2004)	Ireland	2000	K-Stest of stochastic dominance	0	+
Girma et al. (2005a)	UK	1989	K-Stest of stochastic dominance	+	+
Head and Ries (2003)	Japan	1989	OLS	0	0
Kimura and Kiyota (2004)	Japan	1994 - 2000	OLS	+	+
Wagner (1995)	Germany	1995	K-Stest of stochastic dominance	+	+

Source : Greenaway and Kneller (2007)

Notes : + the effect is positive and significant ; - the effect is negative and significant ; 0 the effect is insignificant and/or changes signs and/or significance through the paper

Studies have multiplied recently. Tomiura (2007) uses a sample of 118 300 Japanese firms and shows that multinationals outperform exporters (and foreign outsourcers), which outperform domestic firms. Castellani and Zanfei (2007) find the same result on Italian data. Yasar and Paul (2007) use semi-parametric methods and quantile regressions for the Turkish textile and automobile sectors. They confirm that high levels of productivity are more correlated with FDI than exports. Mayer and Ottaviano (2007) estimate export and FDI premia for 4 countries (France, Belgium, Norway and just employment for Germany). FDI premia for value added and employment are clearly higher than export premia. The gap is less important for wages and capital intensity. In Belgium, firms that engage in FDI are more likely to reach high levels of productivity than exporters. Using non-parametric methods on French data, Irac (2008) shows that multinationals have a positive probability of outperforming exporters in terms of labour productivity and TFP.

The HMY model focuses on horizontal FDI which tends to lead a reduction of exports. By neglecting vertical FDI, the HMY model excludes exports of intermediate goods from the parent company towards its affiliates abroad. Hence, empirical studies document both negative and positive effects of FDI on exports. For example, Mucchieli et al (2000), using French data and focusing on multinationals, show that FDI substitutes for exports when inter-firm trade is concerned but FDI complements exports in the case of intra-firm trade (the complementary effect dominates at the aggregated level). In average, when a French group increases employment in a foreign country by 1%, exports from the parent company to this country increase by 0,2% (see also Fontagné et Pajot (1998)). According Head and Ries (2004), complementary effect between horizontal FDI and exports can also arise in the case of multi-product firms.

Box 1. Data description and methodology

Our sample results from the intersection of two different sources over the period 2001 – 2006: the French manufacturing census, known as EAE, and the survey on Financial Links (LiFi).

The EAE provides financial statements and balance sheets of all manufacturing firms with at least 20 employees. This survey provides information on sales, value added, employment, capital, investment, wages and exports. Since only firms with at least 20 employees are surveyed (about 20.000 each year), exporters and multinationals represent over 75% of our sample.

We clean the EAE dataset by following several steps. First, all observations from the energy sector are dropped from the sample. Then, we drop missing, zero and negative values for sales, value added, employment, capital, investment and wages. Dropping those values allows us to use a unique sample for all estimations: this way, changing the specification of our model or the construction of a variable does not affect the number of observation used, so differences in results can only come from differences in methodology. Finally, we drop extreme values for labor productivity and capital intensity using the methodology of Mairesse et al (1995), as these values can affect the estimates of coefficients by Ordinary Least Square (OLS) regression. This last step does lower the exporters' and multinationals' premia, but does not change the conclusions of our work. Finally, we lose 13,7 % of all observations by cleaning our dataset.

The EAE is then crossed with the LiFi survey in order to know which French manufacturing firms own affiliates abroad. LiFi also permits us to know the first shareholder of foreign-owned French affiliates. Only firms displaying one of the following characteristics are surveyed: having sales superior to 50 million Euros, more than 500 employees, a total amount of equity interest superior to 1,2 million Euros, being directly controlled by a foreign corporation, or being the parent companies. All sectors are surveyed by LiFi. It is completed with the Diane database, which provides information about groups with less than 500 employees.

Crossing EAE and LiFi allows us to distinguish three types of firms, according to the literature:

- Purely domestic firms;
- Exporters (without affiliates abroad) ;
- Multinationals, which are defined as firms owning at least 10% of the ordinary shares or voting power of a foreign company⁶. Note that 98% of the multinationals of our sample are also engaged in exports.

Data cleaning drops about 230 multinationals each year. Nevertheless, this leaves about 1.100 multinationals in our final sample.

SECTION 2. DESCRIPTIVE ANALYSIS OF MULTINATIONALS' RELATIVE PERFORMANCE

We begin our analysis with a global presentation of multinationals, focusing on the following issues: how many multinationals are Small and Medium Enterprises (SMEs)? Are multinationals concentrated in a few sectors? How many are controlled by a French or a foreign group? How much do they contribute to industrial sales, value added, employment, and exports?

⁶ We choose this threshold value in order to fit the official definition of FDI. Changing this value does affect the number of multinationals in our sample, but does not change our conclusions.

2.1 Multinationals' general characteristics

We count 1102 multinationals, owning together 4395 affiliates abroad, in our sample in 2005. Table 2 displays the number of multinationals and affiliates according to the size of the parent company. First, we observe that regardless of size, multinationals mostly prefer majority-owned foreign affiliates, which represent about 80% of all affiliates. This means multinationals want to have exclusive control over their affiliates.

More multinationals among large firms

Firms with more than 250 employees amount to 9% of the sample, but 47% of all multinationals. Moreover, large firms own on average 5 times more affiliates abroad than SMEs.

Table 2: Number of multinationals and FDIs according to the size of the parent company, 2005

Size class	Number of multinationals	Number of FDIs	Number of majority-owned affiliates	Number of minority participations
Less than 50 employees	127	182	150	32
50 - 249 employees	453	975	828	147
250 - 499 employees	211	791	687	104
More than 500 employees	311	2447	2125	322
All sizes	1102	4395	3790	605

Source : EAE Industrie, LiFi

Lecture : We count 127 multinationals with less than 50 employees in our sample in 2005.

Higher propensity to engage in FDI in some industries

The propensity of setting activities abroad clearly seems to be higher in some industries (see table 3 in appendix 2) This table outlines the importance of controlling for sector when measuring the performance of multinationals, as the propensity of setting activities abroad clearly seems to be higher in some industries. The pharmaceutical industry seems to be the most engaged in international activities, with only 5% of domestic firms and over 15% of multinationals, owning each 9 affiliates abroad in average. In relative terms, this sector represents 6% of all multinationals and 15% of all affiliates abroad, though it only weighs 3% of the whole sample. At the opposite, the printing and publishing industry is the least internationalized one, with 37% of domestic firms and only 3% of multinationals. Although it represents 8% of the whole sample, it gathers only 3% of all multinationals.

Moreover, some industries seem to demand higher size requisites for setting affiliates abroad. Indeed, about half of the multinationals in the sample are SMEs, but this proportion falls to 23% in the automobile industry, against 80% in the clothing industry. This great heterogeneity may come, among other factors, from differences in the costs structure, which affect the trade-off between exports and FDI. Thus, controlling for sector and size is very important when measuring the average performance of multinationals.

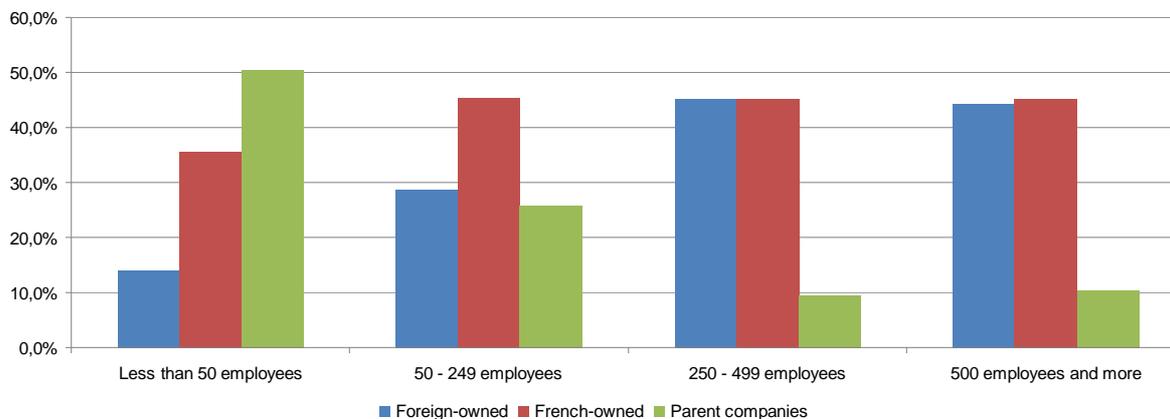
Multinationals with more than 50 employees are mostly controlled by a group

Figure 1 displays a major characteristic of multinationals in our sample: about 75% are controlled by a group. Also, the proportion of parent companies⁷ seems to decrease with size⁸. Half of the

⁷ Parent companies own at least one affiliate and are not (directly or indirectly) controlled by another company.

multinationals with less than 50 employees are parent companies, against only 10% of multinationals with more than 250 employees.

Figure 1: Ownership of multinationals according to their size class, 2005



Source : EAE Industrie, LiFi

NB : We drop joint-ventures and independant multinationals from the sample (total of 15 firms)

Reading : 50,4% of multinationals with less 50 employees are heads of group, against only 10,4% of multinationals with more than 500 employees.

Being controlled by a group provides additional financial and human resources, and allows access to a global network. However, all these benefits often imply less autonomy. The nationality of the absorbing group can also impact organization, management, knowledge of local markets or international development. Therefore, being controlled by a group may have a significant influence on multinationals' performance.

2.2 Multinationals' relative performances

As seen previously, economic literature predicts a clear hierarchy between firms according to their level of internationalization:

- Most productive firms engage in FDI ;
- Firms with an intermediate level of productivity only engage in exports ;
- Finally, least productive firms stay domestic.

In this paper, the following indicators of performance are considered to compare the performance of French firms given their international commitment.

- Labour productivity;
- Sales;
- Value Added (VA);
- Export intensity, measured as the ratio between sales and exports;
- Employment;
- Wages.

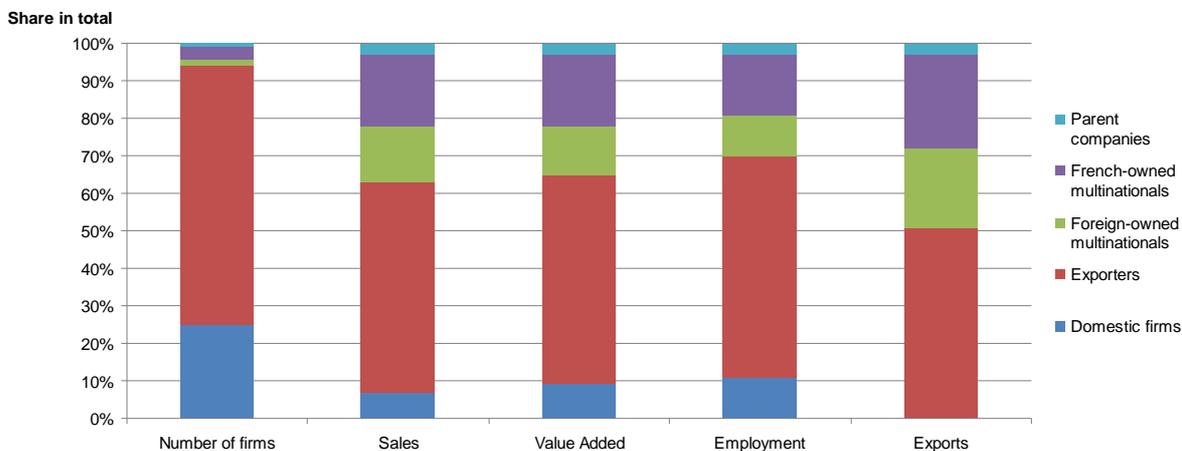
The data set we use only provides information on the French part of multinationals. The LiFi survey does not give any economic information about firms located outside of France. This means that sales and employment of French affiliates abroad are not included in our data. We only compare legal entities, physically located in France. All variables of interest are deflated using price index provided by INSEE (French System of National Accounts).

Multinationals which are controlled by a group disproportionately contribute to economic activity

⁸ See Nefussi (2007)

Multinationals disproportionately contribute to industrial sales, value added, employment and exports (see figure 2). Although the share of multinationals amount to 6%, they gather 37% of total sales, 35% of total value added, 49% of total exports and 30% of total employment. On average, each multinational exports 55 million Euros and employs 579 people.

Figure 2: Contribution to sales, value added, employment and exports according to firm's level of internationalization and ownership, 2005



Source : EAE Industrie, LiFi

NB : We drop joint-ventures and independant multinationals from the sample (total of 15 firms)

Reading : In 2005, domestic firms represent 25% of our sample, but only 11% of total employment, and 9% of total value added.

This high contribution to industrial activity is mostly due to controlled multinationals. Indeed, these firms only represent 5% of the sample, but about one third of total sales, value added and employment. At the opposite, the contribution of parent companies is more in line with their weight in the sample.

Multinationals exhibit higher performance, regardless of size

From feature depicted in table 4 (see appendix 2), it appears that the disproportionate contribution to industrial activity is not only a matter of size. SMEs owning affiliates abroad have higher performances than other SMEs. More surprisingly, multinationals exhibit relatively close levels of productivity, wages, or export intensity across size classes. For example, multinationals with less than 50 employees even pay higher wages in average than large multinationals.

The gap between multinationals and exporters seems to decrease as size goes up. For example, the productivity gap between multinationals and exporters is 30% among firms between 50 and 250 employees, but only 5% among firms between 250 and 500 employees. Likewise, the superiority of multinational seems to be sharper within small size classes in terms of value added, wages or export intensity.

FDI complements exports regardless of sector

The performance of French firms regarding their level of internationalization and their sector is emphasized in table 5 (see appendix 2). Firstly, the hierarchy predicted by the theory is not only accurate for all size classes, but for all sectors as well. Secondly, it looks like FDI rather complements exports than substitute exports: indeed, for all size classes / industries, multinationals exhibit both higher sales and higher export intensity than exporters. Moreover, re-exports of goods produced by affiliates abroad cannot constitute the only explanation for the sales bonus of multinationals, as they exhibit higher value added than exporters as well.

However, there is great heterogeneity regarding multinationals' productivity, wages or export intensity across sectors. For example, the average multinational in the printing and publishing industry

exports 20% of its sales, compared to 40% for the average multinational in the pharmaceutical industry.

Section 3. Export and FDI premia

In order to assess the superiority of multinational firms, we now estimate FDI and export premia using OLS and quantile regressions. FDI (export) premia are defined as differences in some characteristics of multinational (exporting) firms compared to domestic ones. Following Bellone and al. (2008), these premia are estimated using an econometric model which controls for year, size and sector. TFP is computed in two ways: we use both the Olley and Pakes methodology (OP) and the non parametric method (Index number approach, thereafter IN) following Bellone and al (2008). Appendix 1 provides some explanation on these methods.

3.1 OLS estimates of export and FDI premia

We estimate the following equation:

$$\ln X_{it} = \alpha + \sum_m \beta \times E_m + \lambda \ln \text{Eff}_{it} + \sum_j \delta_{1j} \times S_j + \sum_j \delta_{2j} \times A_j + \sum_{j \times cl} \delta_{3j} \times S \times CE_{cej} + \varepsilon_{it}$$

X is the dependant variable: it refers successively to Total Factor Productivity (TFP), labor productivity, employment, sales, value added and wages. Variable E stands for the level of internationalization of the firm E_m , with $m=\{\text{domestic, exporter, multinational}\}$. The estimate of parameter β then corresponds to the influence of the level of internationalization on performance. Variable Eff stands for employment; it is dropped from the model when employment or labor productivity become the dependant variable. Variables S and A control respectively for industry S_j , $j=\{1..14\}$, and year A_t , $t=\{2001,..,2005\}$. Variable CE stands for size class, taking the same classes as in table 4. It is crossed with S_j in order to control for specific market structures. Finally, α and ε stand respectively for the constant and the error terms.

The results of the model are reported in table 6. Firstly, FDI premia are positive and highly significant (at 1%). Regardless of sector or size, multinationals exhibit higher performances than purely domestic firms. Sales exhibit the highest premium (64%). This does not only imply that parent companies sell goods that are produced abroad. Indeed, the value added bonus is also high (29%), which means that multinationals do have a higher contribution to GDP. Multinationals also appear larger than domestic firms within the same size class (34%). They pay higher wages (24%), which suggests that they employ more skilled workers. The estimation of the productivity premium depends on the measure we choose: labour productivity premium is equal to 25% and TFP premium lies between 9% (OP) and 22% (IN).

Export premia appear much lower than FDI premia. The widest gap is for employment: the FDI premium is then about 5 times higher than the export premium. The ratio lies between 2 and 3 for other variables. Concerning TFP, methodology has a great impact on the results. Whereas the export premium is clearly positive and significant using OP methodology, there is no TFP premium for exporters using the index method. In this case, multinationals are the only firms who benefit from their international commitment.

Table 6: Export and FDI premia for French manufacturers (2001-2006)

Variable	Export premia	FDI premia
TFP (index method)	0,002 (0,002)	0,088 * (0,005)
TFP (Olley and Pakes method)	0,081 * (0,003)	0,220 * (0,007)
Labour Productivity	0,101 * (0,003)	0,249 * (0,007)
Employment	0,069 * (0,003)	0,292 * (0,006)
Sales	0,239 * (0,004)	0,496 * (0,009)
Value Added	0,103 * (0,003)	0,258 * (0,007)
Wages	0,088 * (0,002)	0,216 * (0,004)

Source : EAE Industrie, LiFi

* means that the estimate is significant at 1%, ** at 5%, *** at 10%. No star means that the estimate is not significant.

Compared to previous studies, we find out that exporter TFP premia are lower than the ones estimated before. Using the IN approach, Bellone et al (2006) find out that the exporter TFP premium over the period 1990 – 2002 is equal to 4,5%⁹. The decline of French export premia between 1990 and 2006 could have several explanations. First, sunk costs may have decreased for exporters, allowing less productive firms to go international. Second, learning effects may be less consistent in 2006 than in the 1990s. Finally, public policies for the promotion of exports may have encouraged domestic firms which did not have the requisite levels of productivity to start export activity.

Premia increase with the number of affiliates abroad

Being marked as a multinational can cover different realities. This is why we cross the variable E with the number of affiliates abroad, in order to capture the size of the network of multinationals. The results of this new model are reported in table 7¹⁰.

Multinationals' performance clearly increases with the number of affiliates abroad. We expected this result for two reasons. First, setting more affiliates abroad generates new costs and demands higher levels of productivity. Second, we already noted that, on average, large firms own more affiliates abroad than SMEs. This means that controlling for the number of affiliates is also a way of controlling for size. However, it is interesting to observe that FDI premia for multinationals owning only one affiliate abroad are already very high, and even close to average FDI premia. It seems that setting the first affiliate abroad is already a difficult step, which few firms can afford.

⁹ Our evaluation of export TFP premium is also lower than Crozet et al (2008). Using the Olley and Pakes methodology they assess that the exporter TFP premium is equal to 11% over the period 1995 – 2001. However, it is more delicate to compare our results since we use different data sets and model specifications.

¹⁰ Variable E can now take 6 different values $m=\{\text{domestic, exporter, multinational with 1 affiliate abroad, multinational with 2 affiliates abroad, multinational with 3, 4 or 5 affiliates abroad, multinational with more than 5 affiliates abroad}\}$.

Table 7: FDI premia for French manufacturers, according to number of FDIs (2001 – 2006)

Variable	1 FDI	2 FDIs	3 to 5 FDIs	More than 5 FDIs
TFP (Index method)	0,071 * (0,006)	0,066 * (0,01)	0,112 * (0,009)	0,147 * (0,010)
TFP (Olley and Pakes method)	0,204 * (0,009)	0,215 * (0,013)	0,223 * (0,012)	0,280 * (0,014)
Labour Productivity	0,232 * (0,009)	0,244 * (0,013)	0,254 * (0,013)	0,305 * (0,014)
Employment	0,239 * (0,008)	0,298 * (0,012)	0,325 * (0,011)	0,419 * (0,013)
Sales	0,480 * (0,012)	0,475 * (0,017)	0,523 * (0,016)	0,542 * (0,019)
Value Added	0,240 * (0,009)	0,253 * (0,013)	0,265 * (0,013)	0,318 * (0,014)
Wages	0,195 * (0,006)	0,200 * (0,009)	0,242 * (0,008)	0,276 * (0,009)

Source : EAE Industrie, LiFi

* means that the estimate is significant at 1%, ** at 5%, *** at 10%. No star means that the estimate is not significant.

Previously, we outlined that over 75% of the multinationals in our sample are controlled by a group. Table 8 shows that these controlled multinationals exhibit higher performances than parent companies. This is not an intuitive result from a theoretical point of view. Indeed, firms which are parent companies have to support the cost of setting affiliates abroad all by themselves, whereas controlled firms can count on the support of their group. The first ones should then exhibit higher productivity levels as they face a greater challenge. However, we observe exactly the opposite. The main explanation is that firms which are absorbed by a group already exhibit higher performances than other independent firms before being absorbed. Two different scenarios can then explain why these absorbed firms exhibit higher FDI premia:

- These firms were already multinationals before they became controlled. Indeed, groups tend to absorb firms that already have international activities, in order to save fixed costs (distribution, R&D, facilities).
- These firms already had the requisite level of productivity to set affiliates abroad before becoming controlled, and were finally encouraged to do so with the support of their group.

Furthermore, the nationality of the controlling company also seems to impact the levels of premia, as foreign-owned multinationals display higher performances than French-owned ones. Several explanations can be found. First, foreign groups only absorb firms with high performance profiles. Second, foreign-owned multinationals enjoy more consistent learning effects, thanks to their parent's network or knowledge of local markets. Finally, foreign-owned firms are more likely to relocate their production than French-owned firms. The first ones are then more likely to keep support functions (marketing, logistics or R&D), while the last ones keep more low-skilled intensive activities.

Table 8: FDI premia for French manufacturers, according to ownership (2001 – 2006)

Variable	Foreign-owned multinationals	French-owned multinationals	Parent companies
TFP (index method)	0,063 * (0,008)	0,117 * (0,007)	0,067 * (0,009)
TFP (Olley and Pakes method)	0,244 * (0,010)	0,217 * (0,009)	0,202 * (0,012)
Labour Productivity	0,280 * (0,011)	0,241 * (0,009)	0,227 * (0,012)
Employment	0,328 * (0,01)	0,316 * (0,008)	0,199 * (0,011)
Turnover	0,566 * (0,014)	0,493 * (0,012)	0,407 * (0,016)
Value Added	0,291 * (0,011)	0,251 * (0,009)	0,234 * (0,012)
Wages	0,247 * (0,007)	0,196 * (0,006)	0,213 * (0,008)

Source : EAE Industrie, LiFi

* means that the estimate is significant at 1%, ** at 5%, *** at 10%. No star means that the estimate is not significant.

NB : We drop joint-ventures and independant multinationals from the sample (total of 115 observations)

As we have seen before, multinationals' performances vary from one industry to another (see table 5). One way to control for sectorial heterogeneity is to estimate export and FDI premia within each industry¹¹. As depicted in table 9, we can draw the same conclusions: multinationals outperform exporters and exporters outperform domestic firms within each industry. However, more interestingly, exporters exhibit a negative TFP premium in some industries. This negative premium is insignificant for transportation machinery and textile, but is significant at 1% for machinery and mechanical equipments, metallurgy iron and steel, and mineral industries. Using OP methodology, only exporters belonging to the mineral industry display negative TFP premium. Therefore, the link between exports and productivity is not clear in some industries.

3.2. Premia estimates with quantile regression

OLS regression permits to estimate the impact of explicative variables on the conditional mean of the dependant variable. However, as we observe great heterogeneity in our sample, simple OLS regression may not give an accurate estimation of the link between internationalisation and performance. First, export and FDI premia may vary across different points of the dependant variable's distribution. Second, extreme values can tremendously affect OLS estimates.

Introduced by Koenker and Basset (1978, 2001), quantile regression methods control for the dependant variable's heterogeneity. Quantile regression enables us to estimate FDI and export at different points of the conditional distribution for each dependant variable. Consider $Q_{\theta}(X_{it}/Z_{it})$ the θ^{th} conditional quantile of $\ln X_{it}$ for firms with characteristics z , and β_{θ} the vector of parameters to be estimated:

$$Q_{\theta}(X_{it}/Z_{it}) = z_{it}'\beta_{\theta}$$

The regression quantile ($0 < \theta < 1$) solves the following optimization program:

¹¹ Our model now only controls for size class and year.

$$\text{Min}_{\beta} \left\{ \sum_{i,t: x_{it} \geq z_{it}'\beta} \theta |x_{it} - z_{it}'\beta| + \sum_{i,t: x_{it} < z_{it}'\beta} (1-\theta) |x_{it} - z_{it}'\beta| \right\}$$

Quantile regression methods use the whole sample, but place different weights on observations according to their position in the conditional distribution of the dependant variable. The estimates of β_{θ} are then different for each quantile. They can be interpreted as the impact of a marginal variation of explicative variable z on dependant variable x at quantile θ .

Table 10 (see appendix 2) displays export and FDI premia from the lowest quantile to the highest quantile. First, FDI premia are higher than export premia within each quantile: the expected hierarchy is then accurate at all points of the distribution. Some FDI and export premia (sales, value added and labour productivity) tend to increase between the first and the last quantile. However, results are more ambiguous when TFP is concerned since they depend on the way TFP is measured. As before, TFP premia increase between the first and last quantile when TFP is measured with OP. On the contrary, TFP premia tend to decrease when TFP is measured with IN approach. The exporter TFP premium becomes even significantly negative for the highest quantile. This result may suggest that exporters which suffered the most over the recent period are among the most productive ones. Finally, quantile regression reveals that export and FDI premia for wages have the same levels for all quantiles. Indeed, multinationals and exporters pay respectively 20% et 8% higher wages than domestic firms at all points of the distribution. Therefore, OLS regression seems to give good estimates of export and FDI premia for this variable.

CONCLUSION

Our work confirms there is a robust hierarchy between French firms according to their level of internationalization. Multinationals stand at the top: they disproportionately contribute to activity, employment and exports ; they are bigger and more productive than exporters, which also outperform domestic firms. Controlling for size, sector, or the sample's heterogeneity with quantile regression, does not change our results. However, export premia seem to have decreased over the recent period (2001 – 2006); question remains whether FDI premia have decreased as well or if multinationals have better resisted to global competition. We also have to specify the link between FDI and performance: does performance simply result from self-selection – only the most productive firms set affiliates abroad – or do multinationals enjoy learning effects? Finally, it seems that being controlled by a group has a great impact on FDI premia; we still do not know whether this is the consequence of groups absorbing the best firms, or if being supported by a group truly facilitates global expansion.

We thank Natixis Pramex International (group Natixis) for initiating and financing this research. M. Alexandre Gazaniol is employed by Natixis Pramex International under a CIFRE convention with University Paris Dauphine.

APPENDIX 2. Tables and Data.

Table 3. Number of domestic firms, exporters and multinationals, by industry, in 2005

Industry	Number of firms	Domestic firms	Exporters	Multinationals	Number of FDIs	Share of multinationals with less than 250 employees
Clothing	739	157	499	83	295	78%
Printing and publishing	1303	483	783	37	135	78%
Pharmaceuticals	465	24	368	73	663	34%
House equipment and furnishings	1045	184	781	80	347	63%
Automobile	452	70	356	26	106	23%
Transportation machinery	266	51	183	32	100	31%
Machinery and mechanical equipment	3171	973	2 006	192	623	60%
Electrical and electronic equipment	920	213	609	98	374	63%
Mineral industries	843	375	433	35	130	40%
Textile	787	111	641	35	92	71%
Wood and paper	1086	369	676	41	101	37%
Chemicals	1938	293	1 464	181	651	56%
Metallurgy, iron and steel	3191	773	2 311	107	307	49%
Electrical and electronic components	732	119	531	82	471	35%
All industries	16938	4 195	11 641	1102	4395	54%

Source: EAE Industrie, LiFi

Reading: In 2005, the "metallurgy, iron and steel" industry counts 107 multinationals, 49% of which are SMEs.

Table 4. Mean characteristics of industrial firms according to their level of internationalisation and size class (amounts in thousand euros, 2005)

	Less than 50 employees				50 to 249 employees				250 to 499 employees				500 employees and more			
	D	X	FDI	All	D	X	FDI	All	D	X	FDI	All	D	X	FDI	All
Number of firms	3080	5979	127	9186	1037	4733	453	6223	54	599	211	864	24	330	311	665
Sales	3 504	4 630	7 197	4 288	10 894	15 271	27 525	15 434	52 863	58 435	73 165	61 684	128 080	229 983	370 081	291 825
Value Added	1 421	1 661	2 258	1 589	4 061	5 221	8 534	5 269	16 210	18 432	22 981	19 404	47 153	70 572	115 441	90 710
Labour Productivity	45	50	65	49	44	49	61	49	48	54	66	56	66	64	67	65
Employment	32	33	35	33	91	105	140	105	344	344	351	345	736	1 043	1 616	1 300
Mean Wage	1,95	2,10	2,54	2,05	1,83	2,00	2,35	2,00	2,26	2,10	2,42	2,19	2,41	2,36	2,50	2,43
Export Intensity	0%	18%	35%	12%	0%	23%	40%	21%	0%	29%	41%	31%	0%	34%	42%	37%

Source : EAE Industrie, LiFi

Legend : D stands for "Domestic firms", X for "Exporters " et FDI for "Multinationals"

Reading : In average, multinationals with less than 50 employees have a value added of 2,258 million euros.

Table 5. Mean characteristics of industrial firms according to their level of internationalisation and industry (amounts in thousand euros, 2005)

Industry	Sales			Value added			Labour Productivity			Employment			Mean wage			Export Intensity	
	D	X	FDI	D	X	FDI	D	X	FDI	D	X	FDI	D	X	FDI	X	FDI
Clothing	2 204	9 086	49 093	1 141	2 639	13 984	26	39	47	45	74	286	1,50	1,95	2,16	22%	32%
Printing and publishing	8 822	14 582	85 634	3 692	5 026	23 712	48	53	77	69	89	313	2,29	2,45	2,94	7%	20%
Pharmaceuticals	30 179	61 902	307 574	7 445	17 674	91 371	67	73	103	113	193	856	2,33	2,50	3,05	27%	40%
House equipment and furnishings	7 298	18 192	113 288	2 279	5 327	24 126	40	45	53	57	116	468	1,84	1,98	2,27	22%	34%
Automobile	5 494	53 525	445 537	1 734	13 880	93 241	43	49	58	40	239	1 480	1,85	1,96	2,11	24%	43%
Transportation machinery	6 677	40 737	309 331	2 507	15 485	110 143	39	51	64	70	244	1 409	1,98	2,16	2,67	29%	52%
Machinery and mechanical equipment	5 473	14 893	75 570	2 132	4 941	27 468	46	51	57	47	91	441	2,01	2,16	2,41	22%	46%

Source : EAE Industrie, LiFi

Legend : D stands for "Domestic firms", X for "Exporters", FDI for "Multinationals".

Reading : In average, multinationals in the clothing industry have 286 employees and export 32% of their sales.

Table 5 (end). Mean characteristics of industrial firms according to their level of internationalisation and industry (amounts in thousand euros, 2005)

Industry	Turnover			Value Added			Labour Productivity			Employment			Mean Wages			Export Intensity	
	D	X	FDI	D	X	FDI	D	X	FDI	D	X	FDI	D	X	FDI	X	FDI
Electrical and electronic equipment	5 522	18 550	162 923	2 833	7 555	61 649	59	69	84	49	108	599	2,48	2,72	3,11	26%	47%
Mineral industries	8 624	13 151	101 513	2 711	4 530	35 903	46	41	48	58	105	799	1,74	1,80	2,05	19%	41%
Textile	3 183	10 834	35 684	1 622	3 325	9 347	35	42	49	46	79	202	1,69	1,90	2,12	28%	42%
Wood and paper	6 476	15 347	93 982	2 482	5 002	29 061	47	52	60	52	95	437	1,83	1,98	2,28	15%	35%
Chemicals	12 486	20 052	117 319	4 054	7 167	39 583	54	59	74	73	117	558	1,80	1,98	2,35	23%	38%
Metallurgy, iron and steel	4 612	11 049	84 001	1 825	3 595	24 982	39	41	46	48	86	528	1,77	1,81	1,91	19%	39%
Electrical and electronic components	7 698	23 225	174 636	3 346	8 459	53 517	48	59	63	62	135	873	1,98	2,21	2,49	24%	48%
All industries	6 679	18 113	130 595	2 526	5 925	40 747	45	50	64	54	107	585	1,93	2,06	2,43	21%	40%

Source : EAE Industrie, LiFi

Legend : D stands for "Domestic firms", X for "Exporters", FDI for "Multinationals"

Reading : In average, multinationals in the chemical industry have 558 employees and export 38% of their sales.

Table 9. Export and FDI premia by industry, 2001 – 2006

Industry	Premium	TFP (index method)	TFP (Olley and Pakes method)	Labour Productivity	Employment	Sales	Value Added	Wages
Clothing	Export	0,084 * (0,011)	0,304 * (0,018)	0,388 * (0,018)	0,008 (0,014)	0,995 * (0,028)	0,388 * (0,018)	0,241 * (0,011)
	FDI	0,280 * (0,021)	0,453 * (0,033)	0,576 * (0,034)	0,252 * (0,026)	1,583 * (0,052)	0,576 * (0,034)	0,419 * (0,020)
Printing and publishing	Export	0,037 * (0,011)	0,104 * (0,010)	0,102 * (0,010)	0,046 * (0,008)	0,259 * (0,013)	0,102 * (0,010)	0,062 * (0,008)
	FDI	0,262 * (0,035)	0,427 * (0,031)	0,426 * (0,031)	0,261 * (0,025)	0,661 * (0,039)	0,426 * (0,031)	0,225 * (0,023)
Pharmaceuticals	Export	0,115 * (0,03)	0,209 * (0,049)	0,206 * (0,049)	0,003 (0,038)	0,098 *** (0,059)	0,206 * (0,049)	0,107 * (0,031)
	FDI	0,279 * (0,036)	0,409 * (0,059)	0,403 * (0,058)	0,167 * (0,045)	0,384 * (0,070)	0,403 * (0,058)	0,219 * (0,037)
House equipment and furnishings	Export	0,071 * (0,008)	0,107 * (0,015)	0,113 * (0,015)	0,096 * (0,013)	0,210 * (0,018)	0,113 * (0,015)	0,070 * (0,009)
	FDI	0,178 * (0,015)	0,283 * (0,026)	0,305 * (0,026)	0,252 * (0,024)	0,385 * (0,032)	0,305 * (0,026)	0,228 * (0,016)
Automobile	Export	0,052 * (0,012)	0,079 * (0,021)	0,105 * (0,022)	0,128 * (0,022)	0,164 * (0,026)	0,105 * (0,022)	0,060 * (0,012)
	FDI	0,070 * (0,023)	0,116 * (0,041)	0,143 * (0,042)	0,395 * (0,044)	0,221 * (0,051)	0,143 * (0,042)	0,113 * (0,024)
Transportation machinery	Export	-0,035 (0,028)	0,189 * (0,028)	0,209 * (0,028)	0,037 (0,031)	0,350 * (0,032)	0,209 * (0,028)	0,109 * (0,018)
	FDI	-0,164 * (0,049)	0,338 * (0,049)	0,369 * (0,050)	0,331 * (0,055)	0,517 * (0,057)	0,369 * (0,050)	0,161 * (0,031)
Machinery and mechanical equipment	Export	-0,015 * (0,005)	0,078 * (0,006)	0,093 * (0,006)	0,075 * (0,006)	0,198 * (0,007)	0,093 * (0,006)	0,098 * (0,004)
	FDI	0,070 * (0,012)	0,131 * (0,013)	0,151 * (0,013)	0,338 * (0,013)	0,362 * (0,017)	0,151 * (0,013)	0,208 * (0,010)
Electrical and electronic equipment	Export	0,013 (0,010)	0,117 * (0,013)	0,140 * (0,013)	0,098 * (0,013)	0,316 * (0,016)	0,140 * (0,013)	0,098 * (0,010)
	FDI	0,055 * (0,017)	0,258 * (0,023)	0,292 * (0,023)	0,379 * (0,022)	0,558 * (0,029)	0,292 * (0,023)	0,204 * (0,017)
Mineral industries	Export	-0,100 * (0,009)	-0,133 * (0,011)	-0,163 * (0,013)	0,083 * (0,010)	-0,268 * (0,016)	-0,163 * (0,013)	0,025 * (0,007)
	FDI	0,004 (0,023)	0,030 (0,03)	0,039 (0,034)	0,365 * (0,027)	0,012 (0,043)	0,039 (0,034)	0,126 * (0,018)
Textile	Export	-0,002 (0,011)	0,173 * (0,018)	0,181 * (0,019)	0,033 ** (0,016)	0,638 * (0,027)	0,181 * (0,019)	0,101 * (0,011)
	FDI	0,145 * (0,021)	0,327 * (0,037)	0,336 * (0,037)	0,171 * (0,032)	1,114 * (0,054)	0,336 * (0,037)	0,219 * (0,022)
Wood and paper	Export	0,024 * (0,006)	0,075 * (0,01)	0,099 * (0,01)	0,087 * (0,01)	0,210 * (0,013)	0,099 * (0,010)	0,086 * (0,006)
	FDI	0,061 * (0,015)	0,263 * (0,027)	0,298 * (0,027)	0,293 * (0,026)	0,536 * (0,035)	0,298 * (0,027)	0,218 * (0,017)
Chemicals	Export	0,041 * (0,006)	0,079 * (0,012)	0,128 * (0,012)	0,055 * (0,011)	0,153 * (0,015)	0,128 * (0,012)	0,119 * (0,008)
	FDI	0,099 * (0,009)	0,245 * (0,019)	0,316 * (0,020)	0,227 * (0,017)	0,391 * (0,024)	0,316 * (0,020)	0,278 * (0,012)
Metallurgy, iron and steel	Export	-0,038 * (0,005)	0,053 * (0,006)	0,084 * (0,006)	0,071 * (0,006)	0,209 * (0,009)	0,084 * (0,006)	0,056 * (0,004)
	FDI	-0,021 *** (0,013)	0,142 * (0,016)	0,203 * (0,017)	0,350 * (0,017)	0,492 * (0,024)	0,203 * (0,017)	0,150 * (0,012)
Electrical and electronic components	Export	0,037 * (0,01)	0,135 * (0,017)	0,205 * (0,018)	0,077 * (0,016)	0,365 * (0,019)	0,205 * (0,018)	0,128 * (0,011)
	FDI	0,100 * (0,018)	0,184 * (0,029)	0,266 * (0,030)	0,258 * (0,028)	0,402 * (0,034)	0,266 * (0,030)	0,226 * (0,019)

Source : EAE Industrie, LiFi

* means that the estimate is significant at 1%, ** at 5%, *** at 10%. No star means that the estimate is not significant.

Table 10. Export and FDI premia with quantile regression, 2001 – 2006

Variable	Premium	OLS estimates	Quantile regression estimates				
			0,10	0,25	0,50	0,75	0,90
TFP (Olley and Pakes method)	Export	0,081 * (0,003)	0,054 * (0,005)	0,071 * (0,003)	0,078 * (0,003)	0,093 * (0,004)	0,110 * (0,005)
	FDI	0,220 * (0,007)	0,171 * (0,012)	0,198 * (0,008)	0,222 * (0,008)	0,252 * (0,008)	0,267 * (0,009)
TFP (index method)	Export	0,002 (0,002)	0,017 * (0,002)	0,012 * (0,002)	0,009 * (0,002)	0,009 * (0,003)	-0,028 * (0,005)
	FDI	0,088 * (0,005)	0,082 * (0,004)	0,074 * (0,004)	0,078 * (0,004)	0,090 * (0,006)	0,070 * (0,011)
Labour Productivity	Export	0,101 * (0,003)	0,079 * (0,005)	0,093 * (0,004)	0,097 * (0,004)	0,114 * (0,004)	0,126 * (0,005)
	FDI	0,249 * (0,007)	0,206 * (0,012)	0,239 * (0,009)	0,259 * (0,007)	0,270 * (0,008)	0,275 * (0,009)
Employment	Export	0,069 * (0,003)	0,037 * (0,002)	0,066 * (0,003)	0,084 * (0,004)	0,076 * (0,003)	0,045 * (0,002)
	FDI	0,292 * (0,007)	0,101 * (0,006)	0,228 * (0,007)	0,319 * (0,009)	0,289 * (0,009)	0,184 * (0,008)
Sales	Export	0,239 * (0,004)	0,199 * (0,005)	0,191 * (0,004)	0,191 * (0,005)	0,243 * (0,006)	0,274 * (0,008)
	FDI	0,496 * (0,009)	0,385 * (0,011)	0,389 * (0,009)	0,421 * (0,010)	0,488 * (0,012)	0,567 * (0,016)
Value Added	Export	0,103 * (0,003)	0,080 * (0,005)	0,095 * (0,003)	0,099 * (0,003)	0,114 * (0,004)	0,130 * (0,005)
	FDI	0,258 * (0,007)	0,208 * (0,002)	0,024 * (0,009)	0,263 * (0,007)	0,284 * (0,007)	0,296 * (0,009)
Wages	Export	0,088 * (0,002)	0,082 * (0,003)	0,080 * (0,002)	0,081 * (0,002)	0,085 * (0,002)	0,093 * (0,003)
	FDI	0,216 * (0,004)	0,213 * (0,006)	0,205 * (0,005)	0,203 * (0,005)	0,209 * (0,005)	0,205 * (0,007)

Source : EAE Industrie, LiF

* means than the estimate is significant at 1% ** at 5% *** at 10% No star means that the estimate is not significant.

REFERENCES

- Arnold J. et Hussinger K. (2005), « Export behavior and firm productivity in German manufacturing: a firm level analysis », *Review of World Economics/Weltwirtschaftliches Archiv*, vol. 141, pp. 219–43.
- Aw, B.-Y., S. Chung et M.J. Roberts (2003), « Productivity, Output, and Failure: A Comparison of Taiwanese and Korean Manufactures », *Economic Journal*, 113:
- Bellone F., Musso P., Nesta L. et Quéré M. (2006), « Caractéristiques et performances des firmes exportatrices françaises », *Revue de l'OFCE*, n°98
- Bellone F., Musso P., Nesta L. et Quere M. (2008), « The U-Shaped Productivity Dynamics of French Exporters », *Review of World Economics*, Vol. 144 (4), pp.636-659.
- Bernard A.B et Jensen J. (1995), « Exporters, Jobs, and Wages in U.S. Manufacturing: 1976-1987 », *Brookings Papers on Economic Activity. Microeconomics*, Vol. 1995, pp. 67-119.
- Bernard A.B. et J.B. Jensen (1999), « Exceptional Exporter Performance: Cause, Effect, or Both? », *Journal of International Economics*, 47(1), pp. 1-26.
- Bernard A.B. et J. Wagner (2001), « Export Entry and Exit by German Firms » *Review of World Economics*, 137(1), pp. 105-123.
- Bernard A.B. et J.B. Jensen (2004), « Exporting and Productivity in the USA, » *Oxford Review of Economic Policy*, 20(3), pp. 343-357.
- Bernard A.B. et J.B. Jensen (2004), « Why Some Firms Export? », *Review of Economics and Statistics*, 86(2), pp. 561-569.
- Bernard A.B., J. Eaton, J.B. Jensen, et S. Kortum (2003), « Plants and Productivity in International Trade, » *American Economic Review*, 93(4), pp. 1268-1290.
- Bernard A.B., J.B. Jensen, S.J. Redding et P.K. Schott. 2007. « Firms in International Trade », *Journal of Economic Perspectives*, 21(3).
- Brainard L. (1997), « An empirical assessment of the proximity-concentration trade-off between multinational sales and trade », *American Economic Review*, 87, pp.520–544.
- Castellani D. et Zanfei A. (2007), « Internationalisation, innovation and productivity: how do firms differ in Italy? », *The World Economy*, 30(1), pp.156-176.
- Clerides S., S. Lach, et J. Tybout (1998), « Is Learning-by-Exporting Important? Micro Dynamic Evidence from Colombia, Mexico, and Morocco », *Quarterly Journal of Economics* 113(3), pp. 903–947.
- Crozet M., I. Méjean et S. Zignago (2008), « Plus grandes, plus fortes, plus loin ... performances relatives des firmes exportatrices », CEPII, Working Paper No 2008-26.
- De Loecker J. (2007), « Do Exports Generate Higher Productivity? Evidence from Slovenia » *Journal of International Economics*, 73, September 2007, 69–98
- Doms, M. et J.B. Jensen (1998), « Comparing Wages, Skills, and Productivity between Domestically and Foreign-Owned Manufacturing Establishments in the United States » in R.E. Baldwin, R.E. Lipsey, et J.D. Richardson. (eds.), *Geography and Ownership as Bases for Economic Accounting*, Chicago, University of Chicago Press.
- Dovis M. (2007), *Ouverture aux échanges internationaux et productivité totale des facteurs : une analyse au niveau des firmes*, Thèse de doctorat.
- Eaton J. Kortum S. Kramarz F. (2004), « Dissecting Trade: Firms, Industries, and Export Destinations », *American Economic Review, Papers and Proceedings*, 93, 150-154.
- Eaton J., Kortum S. et Kramarz F. (2008), « An Anatomy of International Trade: Evidence from French Firms », www.crest.fr/ckfinder/userfiles/files/Pageperso/-kramarz/EKK_Em.pdf.

- Fontagné L. et Pajot M. (1998), « Investissement direct à l'étranger et commerce international : le cas français », *Revue économique* 49(3), pp. 593-606.
- Girma S., D. Greenaway et K. Wakelin (2001), « Who Benefits from Foreign Direct Investment in the UK? », *Scottish Journal of Political Economy*, 48(2), pp. 119-133.
- Girma S., D. Greenaway, et R. Kneller (2003), « Export Market Exit and Performance. Dynamics: A Causality Analysis of Matched Firms », *Economics Letters* 80 (2), pp. 181–187.
- Girma S., D. Greenaway, et R. Kneller (2004) « Does Exporting Increase Productivity?: A Microeconometric Analysis of Matched Firms », *Review of International Economics* 12 (5), pp. 855–866.
- Girma S., Kneller, R., Pisu, M. (2005), « Export versus FDI: an empirical test. » *Review of World Economics*, 141, 193–218.
- Girma S., Goerg, H. et Strobl, E. (2004), « Exports, international investment, and plant performance: evidence from a non-parametric test », *Economics Letters*, vol. 83, pp. 317–24.
- Globerman S., J. Ries et I. Vertinsky (1994), « The Economic Performance of Foreign Affiliates in Canada, » *Canadian Journal of Economics*, 27(1), pp. 143-156.
- Good D.H., Nadiri I. et Sickles R.C. (1997), « Index Number and Factor Demand Approaches to the Estimation of Productivity », dans Pesaran, M. H. And Schmidt, P. (eds.) *Handbook of Applied Econometrics : Microeconometrics*, Blackwell, Oxford.
- Greenaway D. et Kneller R. (2007), « Firm Heterogeneity, Exporting and Foreign Direct Investment », *The Economic Journal*, 117, pp.134-161.
- Head K., Ries, J. (2003), « Heterogeneity and the FDI versus export decision of Japanese manufacturers », *Journal of the Japanese and International Economies*, 17, 448–467.
- Helpman E. et Krugman P. (1985), *Market Structure and Foreign Trade*, MIT Press
- Helpman E. Melitz M. et Yeaple S. (HMY), 2004. « Export Versus FDI with heterogeneous Firms », *The American Economic Review*, 94(1).
- Irac D. (2008), « Total factor productivity and the decision to serve foreign markets: Firm level evidence from France », *Banque de France, Working paper n°205, avril*.
- ISGEP (International Study Group on Exports and Productivity) (2008). « *Understanding cross-country differences in exporter premia : comparable evidence for 14 countries* » *Review of World Economics*, 144(4):596-635.
- Isgut A. et A. Fernandes (2007), « Learning-by-Exporting Effects: Are They for Real? » *MPRA Paper 3121*, University Library of Munich, Germany.
- Kimura F. et Kiyota K. (2004), « Exports, FDI and productivity of firm: cause and effect », *Faculty of Business Administration, Yokohama National University, Working Paper 216*.
- Koenker R. et G. Basset (1998), « Regression Quantiles », *Econometrica*, Vol. 46, No. 1, pp. 33-50.
- Koenker R. et K.H. Hallock (2001), « Quantile Regression », *Journal of Economic Perspectives*, Vol. 15, No. 4, pp. 143-156.
- Lileeva A. et D. Trefler (2007), « Improved Access to Foreign Markets Raises Plant-Level Productivity for Some Plants » *NBER Working Paper No. 13297*.
- Mayer T. & G.I.P. Ottaviano (2007), « The happy few: the internationalisation of European firms », *Bruegel Blueprint Series*.
- Melitz, M. J. (2003), « The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity » *Econometrica*, 71 (6), pp. 1695-1725.
- Mucchielli J.-L., Chédor S., Soubaya I. (2000), « Commerce intra-firme et investissements directs étrangers : une analyse empirique sur données individuelles de firmes françaises », *Revue Économique*, n°51(3).
- Nefussi B. (2007) : « Les groupes absorbent des sociétés à fort potentiel », *Insee Première*, n°1144 - Juillet.

- Pliquet E., Riedinger N. (2008), « Les implantations à l'étranger des entreprises industrielles françaises », *SESSI, Le 4 pages des statistiques industrielles*, n°246, mai.
- Tomiura, E. (2007), « Foreign outsourcing, exporting, and FDI: A productivity comparison at the firm level », *Journal of International Economics*, 72, pp. 113–127
- Van Biesebroeck, J. (2005), « Exporting Raises Productivity in sub-Saharan African Manufacturing Firms » *Journal of International Economics* 67(2), pp. 373-391.
- Van Biesebroeck J. (2008), « The Sensitivity of Productivity Estimates: Revisiting Three Important Productivity Debates » *Journal of Business and Economic Statistics* 26(3), pp. 321-238.
- Wagner J. (2002), « The Causal Effects of Exports on Firm Size and Labor Productivity: First Evidence from a Matching Approach ». *Economics Letter*, 77 (2), pp. 287–292.
- Wagner J. (2005), « Exports, foreign direct investment and productivity: evidence from German firm level data », HWWA Discussion Paper No. 218.
- Wagner J. (2007), « Exports and Productivity: A Survey of the Evidence from Firm-Level Data », *The World Economy* 30 (1), pp. 60–82.
- Yasar M., Nelson C.H., Rejesus R. (2006), « Productivity and Exporting Status of Manufacturing Firms: Evidence from Quantile Regressions », *Review of World Economics*, 142 (4), pp. 675-694.
- Yasar M., Morrison Paul Catherine J. (2007), « International linkages and productivity at the plant level: Foreign direct investment, exports, imports and licensing », *Journal of International Economics*, 71, pp. 373–388.