Going multinational and ownership: evidence from French matched firms

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GOING MULTINATIONAL AND OWNERSHIP: EVIDENCE FROM FRENCH MATCHED FIRMS[1]

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Abstract

This paper estimates the impact of initiating production abroad on firms' home performance. The analysis covers French manufacturers over the 1996 – 2007 period, and uses propensity-score matching techniques to compare firms which start to invest abroad ("switchers") to similar domestic firms. The main particularity of our work is to distinguish the impact of initiating production abroad by firm ownership: we separately investigate the performance effect for independent switchers, switchers that own affiliates in France, and French- and foreign-owned switchers. Our first general result is that going multinational has a positive impact on sales, value added, employment, exports and profitability at home. However, we also find evidence that this impact is not independent of ownership. First, firms at the head of business groups are more likely to go multinational, even after controlling for size, Total Factor Productivity (TFP) and industry. Second, we find that parent companies and independent firms do not benefit from improved performance when going multinational: this may reflect that these firms face higher fixed costs than do affiliates of business groups when investing abroad (lack of experience in foreign markets, managerial costs, monitoring and coordinating affiliates, developing and/or adapting support functions etc.). Affiliates of domestic French business groups significantly improve their performance when switching, whereas the performances of foreign-owned firms and affiliates of multinational French groups remain relatively stable. This could show that firms which are already part of multinational groups have little to gain from going multinational themselves, since their group already provides them with skills and network effects, the security of supplies, and knowledge of foreign markets.

Key words : multinational, ownership, firm heterogeneity.

Résumé

Ce travail étudie l'impact de l'implantation à l'étranger sur les performances des entreprises françaises du secteur manufacturier au cours de la période 1996-2007. A l'aide d'une méthode d'appariement, les performances des firmes qui s'implantent pour la première fois sont comparées à celles des entreprises domestiques ayant des caractéristiques similaires. La particularité de notre travail est de caractériser l'effet de l'implantation à l'étranger selon l'appartenance à un groupe : nous étudions ainsi séparément l'effet sur les entreprises indépendantes, les entreprises françaises ayant une filiale en France et les entreprises filiales de groupes français et étrangers. L'étude montre que l'implantation à l'étranger a un impact positif en France sur le chiffre d'affaires, la valeur ajoutée, les effectifs, les exportations et la rentabilité. Cependant, il s'avère que le résultat dépend de l'appartenance à un groupe. Tout d'abord, les entreprises têtes de groupe ont une plus forte propension à s'implanter à l'étranger, une fois que l'on tient compte de la taille, de la productivité totale des facteurs (PTF) et du secteur. Ensuite, nous montrons que les têtes de groupes et les entreprises indépendantes n'améliorent pas leurs performances quand elles s'implantent à l'étranger. Ce résultat peut s'expliquer par le fait que ces entreprises supportent des coûts fixes d'implantation plus élevés que les filiales de groupe. Enfin, nous montrons que les entreprises françaises filiales de groupes français améliorent significativement leurs performances alors que celles des filiales de groupes étrangers restent relativement stables. Les entreprises déjà intégrées dans une multinationale pourraient obtenir des gains plus faibles de leur propre implantation à l'étranger dans la mesure où leur groupe leur offre déjà l'accès à un réseau international.

Mots clés : multinational, appartenance à un groupe, hétérogénéité des firmes.

JEL Codes : D23.

Introduction

In a speech of October the 15th 2009, the French Industry Minister, Christian Estrosi, suggested a premium for firms that relocate their activities in France. This suggestion once again highlights the debate over outward Foreign Direct Investment (FDI) and its impact on activities at home. The general assumption made here is that firms that go multinational destroy jobs at home.

However, the relevant literature yields no clear-cut predictions regarding the impact of FDI on home activities. This effect depends on the degree of complementarity between activities at home and abroad (Hanson *et al.*, 2005). In the case of substitution, we expect a negative impact; on the contrary, we may find a positive impact if new activities abroad have a multiplier effect on activities at home. This degree of complementarity between activities at home and abroad can be understood by analyzing the motives behind FDI. Most work makes the distinction between vertical and horizontal FDI: firms engage in vertical FDI when they fragment their production process in several countries, in order to exploit international factor price differences; firms engage in horizontal FDI when they duplicate the same activities in different countries, in order to penetrate new markets. This typology has the advantage of providing a simple and easy-to-understand framework: since vertical FDI contributes to the international division of labor, this kind of investment should reduce activities at home; on the other hand, horizontal FDI may well be associated with more intense activity by the parent, since the aim is to conquer new markets.

However, this distinction between horizontal and vertical FDI is limited. First, the two motives – conquering new markets and reducing costs – are not independent of each other. This is well illustrated by the investments of French automobile constructors in Eastern Europe: firms aimed to reduce their costs and penetrate new potential markets. Second, even if we were able to assign one motive only to each FDI, the respective impact of vertical and horizontal FDI is less clear-cut than it appears. For example, vertical FDI may well reduce home activities in the short-run, but could also improve productivity and thus allow the investor to gain export market share, or even penetrate markets to which the firm did not previously have access. The impact would then be positive in the long-run. Moreover, horizontal FDI may substitute local production for exports, but also generate new requirements at the parent company (such as support functions or supplies for the foreign

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affiliates), or increase home production if the FDI results in greater penetration of foreign markets. The definition of an investment as horizontal or vertical does not necessarily therefore help us to predict its impact in terms of sales, value added, exports or employment.

Along the same lines, the theoretical impact of FDI on productivity is ambiguous: the three links between productivity and FDI – scale effects, allocation of inputs, and technology transfers – can all play either a positive or negative role. For example, FDI may yield a more efficient allocation of inputs, but these gains could be negated by the appearance of new costs (via logistics or the monitoring of affiliates abroad) or more demanding quality control. Moreover, relocations can affect both high- and low-technology activities: it is therefore difficult to predict how skill intensity will change (regarding high- and low-skilled workers) in the parent company. Finally, the only clear-cut argument for productivity gains is the firm's more direct confrontation with its foreign competitors. However, even this argument may be unimportant if most of the firms that invest abroad are already exposed to this competition.

As theory produces no clear predictions, we turn to the data. Work here has been made possible by the development of rich individual-level datasets and the application of matching techniques, which allow us to establish the causal effect of FDI on performance. The general conclusion is that outward FDI does not have a negative impact on home activities. Using German data, Kleinert and Toubal (2007) find that firms investing abroad for the first time ("switchers") significantly increase their workforce. In Italian data, Barba Navaretti and Castellani (2004) find a positive impact of FDI on sales and productivity (but no significant effect on employment). Egger and Pfaffermayr (2003) find a positive relation with intangible investments and R&D activities for Austrian firms. Barba Navaretti *et al.* (2008) distinguish FDI in rich and developing countries using French and Italian data, and show that even setting up production affiliates in developing countries has no long-term effect on home activities. Finally, Hijzen *et al.* (2009) distinguish vertical and horizontal FDI, and separately analyze switchers in Manufacturing and Service industries. A positive impact of FDI is again found for home productivity and employment.

Our main contribution to this literature is to estimate the impact of investing abroad according to the switching firm's ownership. We see three reasons for doing so:

- **First, the nature of the investment could depend on the ownership, or more precisely the nationality of the controlling company**. Foreign-owned firms have fewer social, economic and cultural ties to France. They may therefore be more likely to close establishments and substitute foreign activities for local ones than are French-owned firms. These fears have been confirmed in some empirical work. In Indonesian data, Bernard *et al.* (2005) show that foreign-owned establishments are more likely to close local establishments than are Indonesian ones. Using French data, Pliquet and Riedinger (2008) find that affiliates of foreign groups are more likely to relocate in order to save costs than to penetrate new markets, compared to affiliates of French groups.

- **Second, firms probably did not have the same characteristics before going multinational**. Affiliates, in particular, are more likely to have better performance before switching: on the one hand, business groups tend to absorb firms which can generate cash quickly, and are already export-oriented so that the group can then save on fixed costs; on the other hand, belonging to a group provides advantages in terms of financing, skills, distribution networks, knowledge of foreign markets etc. As all switchers do not start from the same point, we may not expect them to enjoy the same gains: in particular, affiliates of multinational groups may have little to gain from switching, as they already profit from many of the advantages of being multinational.

- **Finally, investing abroad does not involve the same costs**. It seems likely that affiliates of business groups face fewer costs than do other firms when investing abroad, due to the financial and human support from their group. Moreover, their parent company will typically handle the costs of coordinating the group's activities or creating support functions (such as information systems and reporting). At the other end of the scale, independent firms suffer from both fewer resources and a lack of experience in managing and monitoring affiliates.

In order to examine these issues, we construct several sub-samples of switchers according to the framework in Figure I.

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Figure I: Decomposition of switchers
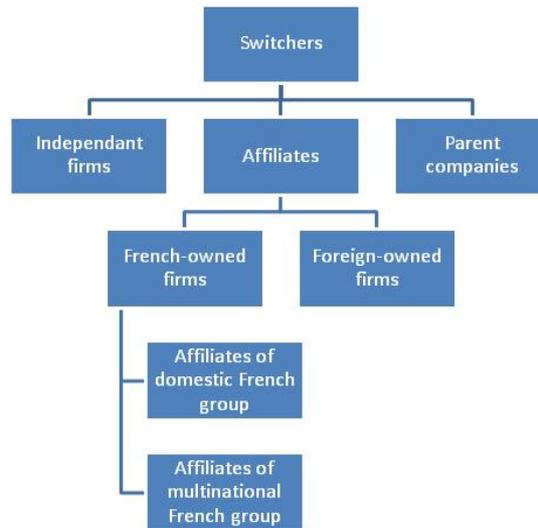
This paper is organized as follows. In Section 1, we present our methodology and the data, and in Section 2, we implement matching techniques in order to control for switchers' self-selection. In Section 3, we then estimate the impact of investing abroad on home performance, according to ownership.

Section 1. Methodology and data

1.1 Methodology

We here want to compare the performance trajectory of French firms under two different scenarios: going multinational or staying domestic. If we let Y be the firm's performance (sales, employment, productivity) and P a binary variable taking the value 1 if the firm invests abroad (and 0 otherwise), the impact of FDI on firm performance (DELTA) is given by:

$$DELTA = E(Y|P = 1) - E(Y|P = 0) \quad (1)$$

As we do not observe this second scenario $(Y|P = 0)$, we face a methodological problem. We can of course directly compare the performance of switchers and domestic firms, but this is subject to potentially serious bias. Notably, domestic firms and switchers may well have had different characteristics ex-ante: investing abroad is associated with considerable fixed costs, which only the most productive firms can afford (Helpman *et al.*, 2004). If the firms which decide to invest abroad already had better performance than non-

switching firms before changing, then they will probably continue to do so after switching. If we do not correct for this selection bias, we cannot identify the impact of outward FDI on firm performance.

We would want to compare switchers to domestic firms that have the same ex-ante observable characteristics. We will select these domestic firms via matching techniques: these consist in identifying the variables that are the most strongly correlated with the outcome (here setting up production affiliates abroad), and then finding domestic firms which have similar values for these key variables. In this way, any subsequent difference between the two groups is argued to come only from their different choices of internationalization. In order to ease the comparison of firms over a large number of parameters, Rosenbaum and Rubin (1983) recommend using "propensity scores" (PS), which capture the probability of participating in a program (here setting up affiliates abroad) given a vector X of observable characteristics. Instead of comparing firms for each variable in the vector X, we only compare them according to one single score, which contains all the information in X. In our case, this score corresponds to the propensity of investing abroad, which we estimate via a probit model. Once the scores have been estimated for each firm, we match switchers to domestic firms that have similar scores. Note that this propensity-score matching procedure is robust only if switchers and the firms in the control group have the same characteristics ex-ante, for all variables in the vector X. If this condition holds, the selection bias has been eliminated and we can measure DELTA.

Once we have constructed the control group, we can estimate the impact of FDI on home performance using a "Difference In Difference" (DID) estimator. This estimator measures the change in the mean gap between switchers and domestic firms, from ex-ante to ex-post. With Y being the firm's performance, we have:

$$DID = \left(\overline{Y}_{i1} - \overline{Y}_{i0}\right) - \left(\overline{Y}_{j1} - \overline{Y}_{j0}\right) \qquad (2)$$

Here 0 corresponds to the ex-ante period (and 1 to the ex-post period), and switchers are denoted by *i* (and domestic firms by *j*). The expression $\overline{Y}_{i1}$ represents the mean level in the switchers' performance in the ex-post period.

This estimator has the advantage of eliminating the influence of the unobservable (time-invariant) determinants of the firms' performance, such as technology or management. The disadvantage of this estimator is that it requires more data, as we need to have information on ex-ante firm performance.

1.2 Data

We match two sources of information over the 1996 – 2007 period: the French manufacturing census (known as the "Enquêtes Annuelles Entreprises" or EAE) and the "Liaisons Financières" (LiFi) survey, both of which are provided by the French Statistics Office (INSEE). The EAE provides information for all manufacturers with more than 20 employees, with respect to sales, employment, capital, value-added and exports. The LiFi survey allows us to identify which firms carry out FDI. It should be noted that we only have information on the French part of multinational groups, and that we only consider the performance of the parent company in France, and not the performance of the entire group.

In order to estimate the impact of FDI on home performance, we consider the change in performance of French firms. To this end, we organize our data in cohorts, following Hijzen *et al.* (2009): we define a cohort as a six-year window centered on T, where T is the year in which domestic firms choose whether to invest abroad or not. Following this definition, we define switchers as firms that were domestic for at least three years, decide to invest abroad at T, and stay multinational for at least three years. This definition has two major consequences: first, switchers can be firms that invest abroad for the first time or firms that have already invested abroad in the past; second, we do not impose that switchers stay multinational over the whole period. If we did, we would risk considering only firms whose investment is successful, which would introduce a bias into our analysis. Therefore, this notion of cohorts has the advantage of yielding the largest possible definition of switchers, while retaining a large enough window in which to examine their performance (three years before compared to three years after the investment).

The question then arises of whether we should compare these switchers to firms that stay domestic over the whole period, or just firms that stay domestic up to T+1 (or later)? Following Hijzen *et al.* (2009) and Barba Navaretti *et al.* (2004), we opt for the second option. We therefore do not compare switchers to firms that never invest abroad, but rather

to firms that might invest abroad later. This makes sense, as the choice to invest abroad is always open to a company: the question is whether it should invest now or later, rather than whether it should invest now or never.

One particularity of the research here is to distinguish the impact of FDI according to the investor's ownership status. The LiFi survey informs us whether the firm is independent, is a parent company, or is controlled by another firm. In the latter case, we can identify the parent company, which has its own unique identification number,[1] and its localization. This information is useful in two ways: first, we can distinguish French- from foreign-owned affiliates; second, we can check that no switcher is matched with a domestic firm within the same business group. The comparison of two firms within the same group may bias our results, as their performances and internationalization strategies will probably not be independent. Our matching procedure is carried out such that we do not match any two firms that belong to the same business group.

Table 1 shows the composition of each cohort between 2000 and 2004. These figures pertain to the sample after having eliminated missing values, and switchers that establish commercial (rather than production) affiliates or have more than 10 affiliates in T.[2]

Table 1: Cohort composition

Cohort	2000	2001	2002	2003	2004	Total
Domestic firms	9 578	9 603	9 394	9 340	9 228	47 143
Switchers	16	43	47	16	39	161
Independent	1	7	11	2	9	30
Parent companies	3	7	6	3	7	26
French-owned affiliates	7	20	23	5	18	73
Foreign-owned affiliates	5	9	7	6	5	32
Total	9 594	9 646	9 441	9 356	9 267	47 304

Sources: EAE for industry information, LiFi census - Authors' calculations.

We find 161 switchers, 135 of which are part of a business group. These 135 switchers correspond to 127 different groups, so our results are not biased by switchers belonging to the same business group (this introduces correlation between switchers' performances). This subsample of switchers (independent, parent companies, French-owned

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[1] A fictive number is made up for foreign companies.
[2] Commercial affiliates have little chance of reducing home activities. This is why we prefer to focus on switchers that establish production units abroad (the distinction between commercial and production affiliates can be established using the LiFi survey, which provides information about the industry of each affiliate). Switchers with more than 10 affiliates in T are considered as outliers. Dropping them removes 15 switchers from the sample.

and foreign-owned affiliates) have approximately the same proportion of investments in developing countries (between 22% and 35%). This means that the distinction between rich and developing countries is not likely to influence the impact of outward FDI according to ownership.

Section 2. Selection bias and the matching procedure

2.1 Self-selection

As noted above, we need to take into account the endogeneity of the decision to invest abroad: firms have to reach a critical size before going multinational. This phenomenon is known as self-selection (Helpman *et al.*, 2004). One simple way of measuring this selection bias is to estimate the premia of switchers several years before their investment. To this end, we estimate the following econometric model on our panel of cohorts:

$$ln\, X_t = C + \alpha \times PRIMO + \sum_t \delta_t \times AN + \sum_s \gamma_s \times NAF + \sum_r \varphi_r \times REG + \varepsilon_t \qquad (3)$$

Here X represents a characteristic of the firm (sales, value added, employment, tangible assets, mean wage, export intensity (exports over sales), or productivity[3]), and PRIMO is a binary variable that takes the value of 1 for switchers, and 0 otherwise. The associated coefficient α represents the premium of switchers compared to firms that stay domestic. We also include control variables, such as industry (the two-digit French activity nomenclature, NAF), year and region. We estimate the same equation with one and two lags.

We find that switchers' premia are very significant (see Table 2). Two years before their investment, switchers are already larger, more productive and have more capital than domestic firms, regardless of their industry, region or cohort. This is consistent with the hypothesis that firms self-select into foreign markets, and there are even signs that they do so consciously: switchers have greater skill intensity (a premium of 12.2% for the mean wage in T), and their investment seem to be correlated with innovation, as the coefficient for the intangible assets-value added ratio is positive and significant.

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[3] We measure productivity via two different indicators: labor productivity (value added over employment) and Total Factor Productivity (TFP) using the Olley and Pakes (1996) method.

Table 2: Switchers' premia prior to their investment, between T-3 and T.

Variable	Switchers' premia		
	T	T-1	T-2
Total Factor Productivity	0.387***	0.393***	0.388***
Labour productivity	0.275***	0.295***	0.292***
Sales	1.289***	1.253***	1.220***
Value added	1.187***	1.154***	1.124***
Workforce	0.911***	0.859***	0.832***
Tangible assets / workforce	0.304***	0.287***	0.329***
Mean wage	0.122***	0.123***	0.117***
Intangible assets / value added	0.552***	0.436***	0.432***

Sources: EAE for industry information, LiFi survey - Authors' calculations.
*Note: *, ** and *** reflect significance at the 10%, 5%, and 1% levels*
respectively (robust standard errors).

We can also distinguish switchers' premia according to their ownership status (see Table 3 in the Appendix). The most interesting result here is that independent firms and affiliates of French domestic groups do not exhibit significant performance premia ex-ante. The largest premia are found for foreign-owned firms and affiliates of French multinational groups. There are two potential explanations: first, multinationals only absorb large and productive firms in order to save on fixed costs and enjoy scale effects; second, affiliates of multinationals profit from network effects, access to additional human and financial resources, and extended knowledge of foreign markets, and thus may be able to improve their performance after entering the group.

2.2 Estimating the propensity score

We have just seen that there is a significant performance gap between domestic firms and switchers, that this gap existed prior to switchers investing abroad, and that it is correlated with firm ownership. To correct for this selection bias, we estimate the probability of investing abroad, we then use the estimated scores to match switchers with domestic firms that have the same ex-ante characteristics. As such, we construct a control sample, which will allow us to isolate the impact of FDI on firm performance.

The propensity scores are estimated using a pooled probit model with one lag. We include the following regressors:

- Number of production plants;
- Total Factor Productivity (TFP);

- Sales and sales-squared;

- The growth rate of sales (between T-2 and T-1);

- Workforce;

- The growth rate of the workforce (between T-2 and T-1);

- Export intensity;

- Capital intensity;

- Labor costs per employee;

- Intangible assets - value added ratio;

- Profitability, as measured by the net profit – sales ratio.

All of these variables are measured in logarithms, apart from export intensity and profitability. Our model includes dummies for industry, year, region, and ownership status (with the omitted category being independent firms).

As expected, TFP, the number of production establishments, sales, profitability and export intensity are significant determinants of the propensity to invest abroad (see Table 4). The positive and significant coefficient on intangible assets highlights the driving role of innovation and patents. The increase in the workforce before switching suggests a preparation phase, during which firms increase their production capacities and/or anticipate new tasks at the parent company. As expected, ownership also appears as a decisive determinant of the propensity to invest abroad:

- Firms at the head of a French business group are more likely to go multinational. However, this is not the case for their affiliates, even when other firms within the same group already have foreign affiliates.

- On the other hand, the propensity to invest abroad is significantly lower for foreign-owned affiliates. This is unsurprising as these firms are generally focused on serving the local markets.

2.3 Matching procedure

We can now retrieve the estimated scores for each firm from Table 4, and use them to match switchers to domestic firms with similar characteristics. To this end, we use the "nearest neighbor" technique by matching each switcher to the two domestic firms that have the closest scores. Having two control firms for each switcher is one way of reducing the weight of outliers in the sample. However, as there might not be two "neighbors" (or even one) for each switcher, we only keep pairs for which the gap between the two scores is less than 0.04.[4] This constraint eliminates 11 switchers but significantly improves the global quality of the match. Furthermore, we ensure that matched firms are in the same industry, the same cohort, have the same ownership status (using the same classification as that used for the probit model), but do not belong to the same business group. We finally bring together all of the matched switchers and control firms. These represent respectively 150 and 297 firms.

We need to check that our matching procedure has correctly eliminated the selection bias, so that switchers and control firms have the same ex-ante characteristics (here in T-1). Table 5 (see Appendix 1) shows the mean characteristics for the two groups, for all of the variables that were used in the probit model. We can see that these characteristics are very similar, as the mean gap between switchers and control firms is never greater than 10% (except for workforce growth and production plants). We also carry out Kolmogorov-Smirnov (KS) tests to check that the distribution of each variable is similar in the two groups. The results of these tests are shown in the last column of Table 5. These confirm that the two samples have very similar characteristics for all of the variables. This implies that our matching procedure has eliminated the selection bias.

Section 3. The impact of going multinational

We can now evaluate the impact of outward FDI on home activities using the "Difference in Difference" (DID) estimator. As explained above, this estimator measures the change in the gap between switchers and control firms, from the period preceding the

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[4] We choose this threshold in order to eliminate bad pairs, but also to retain a large enough sample. Our results remain unchanged whether we have one , two or three controls for each switcher.

investment to the period following it. The main advantage of this technique is that it controls for firms' unobservable and time-invariant characteristics, as it takes into account any differences between the two samples prior to switching.

We begin by analyzing the performance of all switchers, and then carry out separate analyses by ownership status. As in Figure I, we first distinguish between independent firms, parent companies and firms controlled by a business group; we then separate foreign-owned and French-owned firms; and finally affiliates of domestic French groups (no firm within the group has an affiliate abroad at T-1), and affiliates of multinational French groups (at least one firm within the group has an affiliate abroad at T-1).

Before setting out the econometric model, we illustrate graphically how the DID estimator works. Figure II depicts the mean change in the workforce of switchers and control firms, between T-1 and T-3 (with the firms being matched in T-1).

Figure II: Mean change in the workforce of switchers and domestic firms, between T-1 and T-3
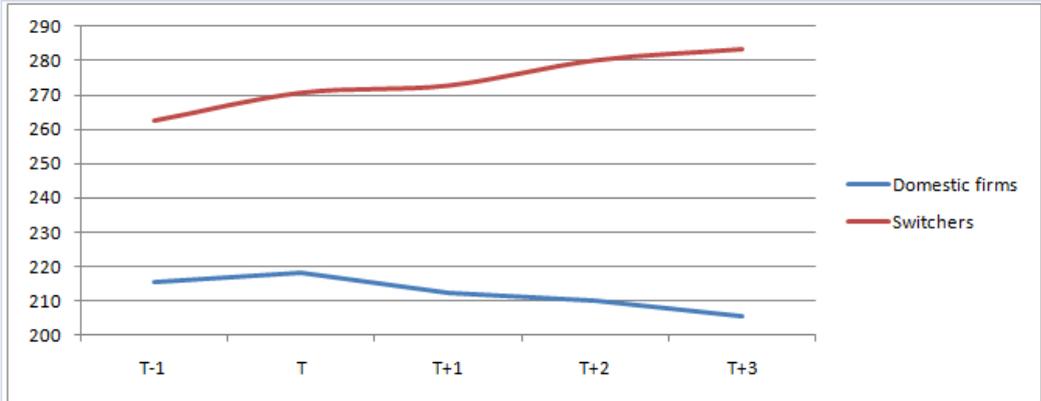
Sources : EAE for the industry, LiFi survey - Authors' calculations.

On average, switchers have a 22% larger workforce than do control firms in T-1. This gap rises to 38% in T+3. This difference of 16 percentage points corresponds to the DID estimator: it does not estimate the gap between switchers and control firms, but rather the change in this gap between the pre- and post-investment periods. Here, we can see that switchers behave very differently from their domestic clones in terms of workforce, and this is especially true for parent companies and affiliates of domestic French groups (see Figure III in the Appendix).

The DID estimator is calculated from the following regression:

$$\ln X_t = C + \beta \times PRIMO + \sum_t \delta_t \times LAG_t + \sum_t \gamma_t \times PRIMO \times LAG_t + \varepsilon_t \qquad (5)$$

where PRIMO equals 1 for switchers, and 0 otherwise, and the LAG_t are time dummies (the reference period being T-1). We finally interact the LAG and PRIMO variables in order to estimate the change in the gap between switchers and domestic firms for all years after T-1. The coefficients on these last variables correspond to the DID estimator (see Table 6 in the Appendix for a representation of this equation). The standard errors are bootstrapped using 100 replications.

In T+3, the DID estimator is positive and significant for all variables except productivity, capital intensity and wages (see Table 7). As such, sales, workforce, value-added, exports and profitability all grow faster for switchers than for firms which decided to stay domestic. There is therefore both complementarity between outward FDI and exports, and between outward FDI and home employment. This first finding does not support the hypothesis that outward FDI globally destroys home activities. However, we find no evidence for learning effects, as the impact on home productivity is neutral.

We now decompose equation (5) by ownership. We introduce ownership dummies (with the reference being independent firms) and estimate the following equation:

$$\ln X_t = C + \sum_c \alpha_c \times OWNERSHIP_c + \sum_c \beta_c \times PRIMO \times OWNERSHIP_c +$$
$$\sum_t \delta_t \times LAG_t + \sum_{ct} \gamma_{ct} \times PRIMO \times OWNERSHIP_c \times LAG_t + \varepsilon_t \qquad (6)$$

The results of this decomposition appear in the second part of Table 7. We see that mostly affiliates of business groups enjoy a significant and positive impact of outward FDI for all variables. Independent firms and parent companies have positive effects only for sales or employment.

Table 7: DID estimator in T and T+3

Variable	Period	All switchers	Parent companies	Independent firms	Affiliates	Foreign-owned affiliates	French-owned affiliates	Affiliates of domestic French group	Affiliates of multinational French group
						IMPACT OF SWITCHING ACCORDING TO OWNERSHIP			
Workforce	T	0.0382**	0.0299	0.0130	0.0478**	-0.00849	0.0739***	0.0924**	0.0588
	T+3	0.0929***	0.132*	0.0531	0.0962***	0.0373	0.123***	0.182***	0.0762
Sales	T	0.0197	-0.0204	0.0556*	0.0178	-0.0203	0.0354	0.0167	0.0505
	T+3	0.0764**	0.0894	0.142**	0.0533	0.0226	0.0676	0.0895	0.0498
Value added	T	0.0508*	-0.0455	0.0738*	0.0653*	-0.0298	0.109**	0.0716	0.140*
	T+3	0.103**	0.110	0.0523	0.118**	0.0691	0.140**	0.196**	0.0946
Export intensity	T	0.0175*	-0.0092	0.0315*	0.0192*	0.0286**	0.0149	0.0166	0.0135
	T+3	0.0181	0.0132	-0.0062	0.0266**	0.0110	0.0339**	0.0451*	0.0248
Profitability	T	0.0008	0.0053	0.0264***	-0.0080	-0.0301	0.0022	-0.0047	0.0078
	T+3	0.0276***	0.0193	0.0522	0.0219**	0.0143	0.0254**	0.0242**	0.0264*
Capital intensity	T	0.0243	-0.00528	0.0056	0.0366	0.0029	0.0522	-0.0484	0.134
	T+3	-0.0941*	-0.0929	-0.0653	-0.103	-0.0276	-0.138	-0.147**	-0.131
Mean wage	T	-0.00849	-0.00191	0.0263	-0.0206	-0.00557	-0.0276*	-0.0462*	-0.0125
	T+3	-0.0181	-0.0207	0.0567	-0.0403*	-0.0261	-0.0469*	-0.0794*	-0.0206
TFP	T	0.0192	-0.0566	0.0576	0.0244	-0.0307	0.0499	-0.0069	0.0960*
	T+3	0.0434	0.0497	0.0328	0.0464	0.0183	0.0578	0.0676	0.0494

Sources: EAE for industry information, LiFi survey - Authors' calculations.

*Note: *, ** and *** reflect significance at the 10%, 5%, and 1% levels respectively (bootstrapped standard errors with 100 replications).*

Legend : In T+3, French-owned switchers employed 12.3% more staff than if they had delayed their investment.

Independent firms may suffer from their lack of skills and experience. In particular, managing and monitoring affiliates is a new challenge for these firms, so they might take time to establish an efficient parent / affiliates relationship. The neutral impact for parent companies might come from the fact that these firms face additional costs when investing abroad, such as framing and co-ordinating all activities within the group. In particular, the development of new support functions might explain why parent companies experience greater growth of their workforce when going multinational.

We now look at affiliates. We decompose our results according to the nationality of capital (French or foreign), and the group's degree of internationalization for affiliates of French groups. We find that the positive impact of outward FDI is only significant for affiliates of French business groups. There are two potential explanations for this difference between French- and foreign-owned firms:

- Affiliates of foreign groups have fewer economic, social and cultural ties with the national economy, so they are more likely to close establishments or substitute foreign activities for local ones.
- These affiliates had strong ex-ante premia, and probably already enjoyed network effects and good knowledge of foreign markets before switching, so their scope for improved performance after their investment may have been smaller.

This last argument is supported by the finding that affiliates of multinational French groups did not improve their performance either (and are also characterized by strong ex-ante performance premia). In other words, the positive impact of going multinational may mostly come from closer contacts with foreign clients, suppliers and competitors, and then only benefit firms which did not enjoy these advantages ex-ante, i.e. firms which did not already belong to a multinational group.[5]

Conclusion

This paper has shown that going multinational has a positive impact on home activities, but also that this impact depends significantly on switchers' ownership status. Parent companies and independent firms do not increase their performance ex-post, probably because of higher fixed costs when investing abroad (additional coordination costs for the former, and lack of resources and experience for the latter). Affiliates of multinational groups do not improve their performance either, perhaps because their margin for improving their performance is only small. Finally, it is mostly the affiliates of domestic French groups which experience a significant positive impact from going multinational. It would be of interest to check whether this improved performance goes hand in hand with additional learning from foreign clients, suppliers and competitors.

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[5] A word of warning is that conclusions result from analyses where we have relatively few observations for each category of switchers, and we do not control for the localization of FDI (rich countries versus developing countries) or the motivation for switching (horizontal versus vertical FDI).

BIBLIOGRAPHY

Bandick, R. (2009), "Foreign acquisition, Wages and Productivity", ETSG working paper.

Barba Navaretti, G., D. Castellani (2004), "Investments Abroad and Performance at Home", *CEPR Discussion Paper*, No. 4284.

Barba Navaretti, G., D. Castellani and A. Disdier (2010), "How Does Investing in Cheap Labour Countries Affect Performance at Home? ", *Oxford Economic Papers*, vol. 62, n° 2, pp. 234-260

Bernard, A. and Sjöholm, F. (2003), "Foreign owners and plant survival", *NBER Working Paper 10039*.

Egger, P. and M. Pfaffermayr (2003), "The Counterfactual to Investing Abroad: An Endogenous Treatment Approach of Foreign Affiliate Activity", *University of Innsbruck, Working Paper*, 2003/02.

Hanson, G.H., R.J. Mataloni, and M.J. Slaughter (2005), "Vertical Production Networks in Multinational Firms", *Review of Economics and Statistics* vol. 87(4), pp. 664-679.

Helpman, E., M. Melitz and S. Yeaple (2004), "Exports vs. FDI with heterogeneous firms", *American Economic Review*, Vol. 94, pp. 300-316.

Hijzen, A., S. Jean and T. Mayer (2009), "The Effects at Home of Initiating Production Abroad: Evidence from Matched French Firms", *CEPII working Paper*, n °2009-39.

Kleinert, J. and F. Toubal (2007), "The impact of locating production abroad on activities at home: evidence from German firm-level data", University of Tübingen, Mimeo.

Olley, S. and A. Pakes (1996), "The Dynamics of Productivity in the Telecommunications Equipment Industry", *Econometrica*, 64, pp. 1263-97.

Pliquet E. and N. Riedinger (2008), "Les implantations à l'étranger des entreprises industrielles françaises, entre délocalisations et conquêtes de nouveaux marchés ", *le 4 pages du Sessi*, n° 248, mai.

Rosenbaum, P. and D. Rubin (1983), "The Central Role of the Propensity Score in Observational Studies for Causal Effects", *Biometrika*, Vol. 70, pp. 41-55.

Rosenbaum, P. and D. Rubin (1985), "Constructing a Control Group Using Multivariate Matched Sampling Methods that Incorporate the Propensity Score", *The American Statistician,* Vol. 39(1), pp. 33-38.

Appendix : Tables and Figures

Table 3: Switchers' premia two years before their investment, according to their ownership status

VARIABLE	Independent switchers	Parent companies		Affiliates of domestic French groups		Affiliates of multinational French groups		Foreign-owned firms	
		Domestic	Switchers	Domestic	Switchers	Domestic	Switchers	Domestic	Switchers
Sales	0.767***	0.614***	1.256***	0.488***	1.663***	1.211***	2.302***	1.557***	2.507***
Value Added	0.635***	0.448***	1.041***	0.359***	1.515***	0.987***	1.986***	1.290***	2.292***
Labour productivity	0.112	0.103***	0.363***	0.0140*	0.562***	0.112***	0.303***	0.208***	0.408***
Workforce	0.523***	0.345***	0.678***	0.345***	0.954***	0.876***	1.682***	1.082***	1.885***
Mean wage	0.0568	0.0513***	0.122***	-0.0371***	0.230***	0.00413	0.126***	0.0841***	0.100**
TFP	0.201***	0.137***	0.422***	0.0574***	0.638***	0.205***	0.492***	0.300***	0.626***
Tangible assets / workforce	0.246*	0.193***	0.490***	0.133***	0.809***	0.422***	0.508***	0.770***	0.715***
Intangible assets / value added	0.0697	0.303***	0.822***	0.200***	0.569***	0.344***	0.823***	0.437***	0.724***

Performance of swtchers compared to independant domestic firms, in T-2

Sources: EAE for industry information, LiFi survey - Authors' calculations.

*Note: *, ** and *** reflect significance at the 10%, 5%, and 1% levels respectively (robust standard errors).*

Table 4: Propensity to invest abroad

Variable		Coefficient	Standard error	Significativity
ln (production establishments)		0.108	(0.045)	**
ln (sales)		1.412	(0.387)	***
Δ ln (sales)		-0.060	(0.019)	
[ln(sales)]²		-0.140	(0.141)	***
ln (employment)		0.069	(0.075)	
Δ ln (employment)		0.355	(0.169)	**
ln (TFP)		0.206	(0.114)	*
ln (tangible assets / employment)		-0.023	(0.037)	
ln (labour cost / employment)		0.171	(0.148)	
Export / sales		0.600	(0.112)	***
ln (intangible assets / value added)		0.047	(0.020)	**
Profitability		0.871	(0.411)	**
Ownership (reference: independent firms)	Parent company	0.324	(0.102)	***
	Affiliate of a domestic French group	-0.016	(0.090)	
	Affiliate of a multinational French group	-0.0004	(0.101)	
	Foreign-owned affiliate	-0.419	(0.113)	***

Sources: EAE for industry information, LiFi survey - Authors' calculations.

*Note: *, ** and *** reflect significance at the 10%, 5%, and 1% levels respectively (robust standard errors).*

Table 5: Mean characteristics of switchers and control firms, in T-1

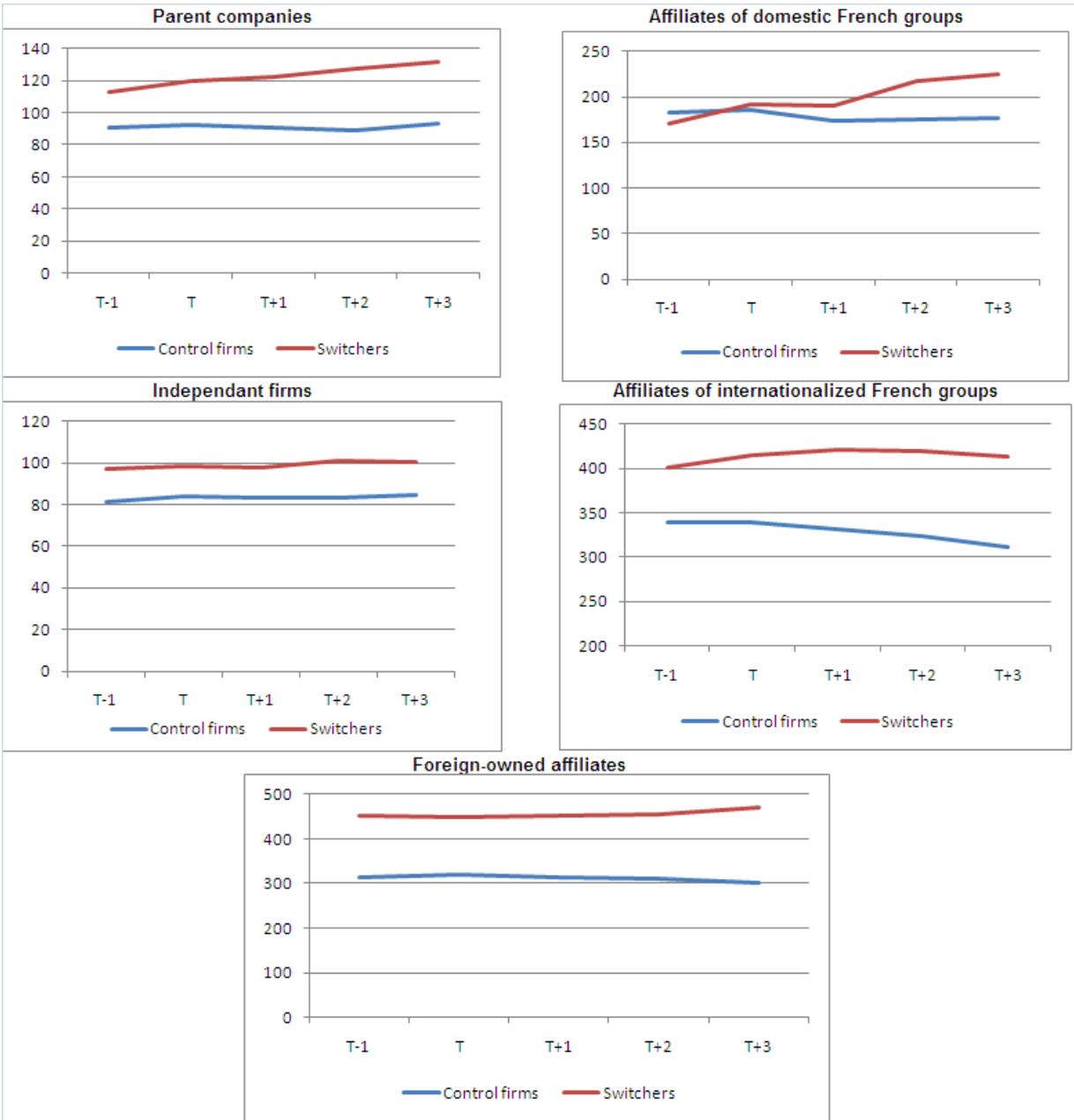| Variable	Characteristics before matching			Characteristic after matching			Matching
	Mean for switchers	Mean for control firms	Difference (%)	Mean for switchers	Mean for control firms	Difference (%)	KS test (p-value (%))
Number of firms	161	46 532		150	297		
ln (production plants)	0.649	0.290	55%	0.639	0.544	15%	69%
ln (sales)	10.19	8.939	12%	10.13	9.971	2%	10%
Δ ln (sales)	0.076	0.035	54%	0.067	0.073	-9%	57%
Value added	9.175	8.003	13%	9.113	8.963	2%	27%
ln (employment)	4.992	4.183	16%	4.978	4.825	3%	32%
Δ ln (employment)	0.052	0.020	61%	0.049	0.065	-32%	70%
ln (TFP)	4.471	4.060	9%	4.414	4.392	1%	44%
ln (tangible assets / employment)	3.625	3.417	6%	3.604	3.560	1%	15%
ln (labour cost / employment)	3.591	3.432	4%	3.575	3.551	1%	59%
exports / sales	0.361	0.161	55%	0.338	0.331	2%	34%
ln (intangible assets / value added)	-3.05	-3.52	-15%	-3.03	-3.18	-5%	26%
Profitability	0.046	0.028	40%	0.042	0.048	-13%	55%

Sources : EAE for the industry, LiFi - Authors' calculations.

Table 6: "Difference-in-Difference" Estimator

	Before switching	After switching	Difference
Switchers	$C + \beta$	$C + \beta + \delta + \gamma$	$\delta + \gamma$
Control firms	C	$C + \delta$	δ
Difference between switchers and control firms	β	$\beta + \gamma$	γ

Taken and adapted from Bandick (2009)

Figure III: Mean evolution of employment for switchers and control firms, between T-1 and T+3, according to ownership

Sources: EAE for industry information, LiFi survey - Authors' calculations.