Cherries for Sale:
The Incidence of Cross-Border M&A

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Abstract

This paper reconciles two opposing views regarding cross-border merger and acquisition activity: do multinationals seek target firms that are high-value "cherries" or underperforming "lemons." We show that foreign firms will be relatively more attracted to targets in the domestic country that had high productivity levels several years prior to acquisition, but then suffered a negative productivity shock (i.e., cherries for sale). With high *ex ante* productivity levels, target firms are able to invest in large export networks that are valuable to foreign multinationals because of locational differences and trade costs. Subsequently, domestic firms that experience reductions in productivity no longer find their established network as valuable to serve independently, increasing the surplus generated by a foreign acquisition. We build a sequential model with multilateral export behavior by heterogeneous firms, dynamic productivity and M&A activity. Microdata from French firms across 1999-2006 provide strong evidence that both the established export networks and productivity losses among target firms promote cross-border acquisitions.

1 Introduction

It is now well-known that a significant majority of foreign direct investment (FDI), especially between developed countries, is in the form of cross-border merger and acquisition (M&A) activity. This mode of international investment clearly has large policy ramifications as one nation's assets come under the control of an entity from another country. Policymakers may be concerned that foreign firms are acquiring a nation's most productive assets through such acquisitions. On the other hand, foreign control of assets may bring important beneficial spillovers to host countries, through higher wages, access to better technologies and higher productivity.

Recent academic literature has only begun to examine cross-border M&A activity and its subsequent economic effects. Theoretically, there are a number of recent studies that describe quite different incentives for cross-border M&A activity. Nocke and Yeaple (2007; 2008) provide models where acquisition of internationally mobile or non-mobile assets motivates M&A behavior. Neary (2007) develops a model where oligopoly firms have market power motives for M&A, and differences in comparative advantage across countries then leads to significant cross-border M&A activity. In yet another perspective, Head and Ries (2008) model M&A activity as managers looking worldwide for assets to control/manage, and some of these matches will probabilistically end up being cross-border M&As depending on respective market sizes and physical/cultural frictions.[1] Alongside the theoretical progress made toward understanding the motivation for M&A activity, several empirical studies have examined the effects of cross-border acquisitions, in particular with regard to labor market outcomes.[2]

A crucial issue for understanding both the motivation and effects of M&A activity is recognizing the types of target firms that are acquired, particularly, whether high-performing firms ("cherries") or low-performing firms ("lemons") are the targets. The classic notion in the finance literature is that M&A activity is one of natural selection, as well-performing firms take over the assets of poorly-performing firms (e.g., Manne (1965). Consistent with this view, Lichtenberg and Siegel (1987) find evidence that lemons are the primary targets in U.S. acquisitions in manufacturing. The cross-border M&A models mentioned above also often predict that lemons will be targets, including Nocke and Yeaple's (2007) M-industry version of their model and Neary (2007). However, recent empirical evidence suggests that acquiring firms, especially foreign firms, are acquiring cherries. This has been found using data for Chile (Ramondo (2009)), Indonesia (Arnold and Javorcik (2009)), the U.S. (Criscuolo and Martin (2009)), and Spain (Guadalupe et al. (forthcoming)). In

[1] Interestingly, there seems to be no established theoretical model of M&A activity (whether cross-border or not) in the finance or industrial organization literature.

[2] For example, see Huttunen (2007), Heyman et al. (2007), Bandick and Gorg (2010), and Hakkala et al. (2011) for studies examining the effect of cross-border M&A on wages and employment in target firms. The effects on productivity and R&D is a lengthier literature, with recent examples including Arnold and Javorcik (2009), Criscuolo and Martin (2009), Ramondo (2009), Bandick et al. (2010), and Guadalupe et al. (forthcoming).

many ways, a cherries story is more difficult to explain than a lemons story. Why would the assets of a high-performing firm be more valuable under the management of another firm? To our knowledge, Guadalupe et al. (forthcoming) is the only paper to date that has provided a possible rationale - foreign firms purchase cherries in the home country because they can earn a greater *ex post* return from investing in productivity improvements within a target firm that has a higher initial productivity. While this provides a plausible explanation for why we observe cherry-picking, there are a number of remaining questions. First, how do we reconcile the evidence of cherry-picking with the evidence in support of lemon-picking, and with the several sources of theoretical motivation for acquirers to purchase underperforming targets? Second, as firm productivities continue to change over time, what is the role of dynamics in target firm productivities for motivating cross-border M&A?

In this paper, we introduce a new motivation for cross-border acquisitions, as well as a resolution to the cherry and lemon stories. We argue that negative shocks to a firm's productivity make it a better target for cross-border M&A, consistent with acquirers seeking "lemons." We also argue that firms with initially high productivity levels establish larger export networks that are attractive to foreign acquirers, simultaneously motivating acquisition of firms that appear to be "cherries". To combine these separate incentives into a unified framework we construct a sequential model of exporting behavior that builds on Helpman et al. (2008) with endogenous export decisions, and then integrate varying firm productivities and a mergers and acquisition market within each country. In the first stage, firms receive random productivity draws and then select the foreign markets, if any, to which they will export. Importantly, these export relationships require substantial sunk (or beachhead) costs to establish. In stage 2, firms realize productivity shocks, and these productivity changes provide incentives for new M&A activity between firms. In the final stage, firms participate in the M&A market, where domestic targets are acquired based on both their current productivity level, and the export networks they established with their initial productivity level.

We show that foreign firms will be relatively more attracted to targets in the host country that had high productivity levels originally, but then suffered a negative productivity shock (cherries for sale). This is because the host-country target firms established costly export networks in the first period that were quite different from the foreign firms' own export networks (due to locational differences) and are, therefore, of high value to a foreign firm.[3] After a negative productivity shock, these export networks are no longer as high of value for the target firm to serve, creating a relatively larger surplus when a high-productivity foreign

[3]An equivalent interpretation is that established export networks are endogenously determined sources of (trade) cost synergies between firms in different locations. The Nocke and Yeaple (2007) model of cross-border M&A activity has a similar motivation of purchasing an (immobile) asset specific to the home country (i.e., home market access). However, they do not consider the endogenous formation of export networks, nor the systematic relationships between firm productivity and export decisions. Some versions of their model predict that the lowest productivity firms (lemons) will be the target firms for their market size, as opposed to high productivity firms that establish the largest markets through export networks.

firm purchases it. And, because other domestic firms established similar export networks to the domestic target firm, redundancy makes the target firm's export networks relatively less valuable to domestic acquirers as it is to comparable foreign firms. Thus we are able to describe cross-border M&A, while integrating the intuitive reasons to acquire observationally low- and high-productivity firms.

We examine the hypotheses from the model using rich panel data on French firms over the period from 1999 through 2006. Our sample combines several sources of information about trade behavior, factor usages, and ownership status (by country origin) for each firm across time. Consistent with the predictions of the model, we find that French firms with large export networks, but which have had recent negative productivity shocks, are the most likely to be acquired by foreign firms. Importantly, domestic acquisitions in the French market do not follow these same patterns, as predicted by our model. Furthermore, we find that export networks are significant predictors of acquisition, even after controlling for the target firm's productivity level. Thus the incentives for cross-border M&A we derive from *ex ante* formation of export networks and productivity changes stand independent of the incentives to make *ex post* investments in (high) target firm productivities, as described by Guadalupe et al. (forthcoming).

The next section presents a sequential model of export investments, productivity changes, and M&A activity. This model generates several predictions that motivate our empirical strategy detailed in section 3. Section 4 provides details regarding the construction of the dataset, and section 5 provides the results from several distinct estimation strategies. The final section concludes.

2 Model

We build a model of a multi-country world with differentiated producers from each country operating in a single sector. The timing of the model occurs in three stages. In stage one, firms are born with a specific productivity and choose whether or not to make investments that allow them export to foreign markets. The multi-country trading environment follows Helpman et al. (2008). In stage 2, domestic firms realize a permanent shock to their productivity. We then focus on a single country, and examine the M&A activity. In stage 3, target firms are bought and sold in the domestic M&A market, including the possibility that foreign multinationals acquire domestic firms. Our goal is to demonstrate how the export networks established in stage 1, and the realization of productivity shocks among firms in stage 2, each influence cross-border M&A activity in stage 3.

Basics: Consumption & Production

The world is comprised of a mass of countries indexed by $j \in [1, J]$. There is a continuum of products in each country, and the representative consumer in each country j has the following utility function:

$$U = ln \left[\int_{l \in B_j} x_j(l)^\rho dl \right]^{1/\rho}, 0 < \rho < 1, \tag{1}$$

where $x_j(l)$ is the consumption of product l, B_j is the set of products available for consumption in country j, and ρ is a parameter determining the elasticity of substitution, defined as $\epsilon = 1/(1-\rho)$, which is common across countries. Letting Y_j denote the expenditure (or income) level of country j, its demand for product l is derived as

$$x_j(l) = \frac{p_j(l)^{-\epsilon} Y_j}{P_j^{1-\epsilon}}, \tag{2}$$

where $p_j(l)$ is the price of product l in country j, and P_j is the country's ideal price index, defined as

$$P_j = \ln \left[\int_{l \in B_j} p_j(l)^{1-\epsilon} dl \right]^{1/(1-\epsilon)}. \tag{3}$$

Each country has a mass M_j of risk-neutral firms, each producing a unique variety in a monopolistically-competitive sector. The cost of producing a unit of output for a firm in country j is $c_j a$, where a is a firm-specific measure of the number of bundles of the country's inputs required during production, and c_j is a country-specific measure of the cost of this bundle. The inverse of a represents the firm's productivity level. Each country has an identical cumulative distribution function, $G(a)$, with support $[a_L, a_H]$ that describes the distribution of a across firms.

In order for a firm in country j to sell its product in country $i \neq j$, it must incur both a one-time sunk cost, f_{ij}, and a transport cost, τ_{ij}, that is specific to the ij country pair.[4] We assume that transport costs are of the iceberg variety, where τ_{ij} units of a product must be shipped from country j in order for one unit of the product to arrive in country i, and $\tau_{ij} > 1$ for $i \neq j$ and $\tau_{jj} = 1$ for each country j. The sunk costs f_{ij} are given in terms of the amount of domestic factors that must be hired at costs c_j. For each country j, let T_j be set of potential export destinations ordered in terms of their continuously varying costs to establish an export network, $c_j f_{ij}$. We note for the reader that we are departing from Helpman et al. (2008) in specifying the costs to gain access to market i as a one-time sunk cost, rather than a recurring

[4] For convenience, we normalize $f_{jj} = 0$ for each country j.

per-period fixed cost. Given a continuum of monopolistically-competitive firms, each producing a distinct variety, we get the standard price mark-up for a firm producing in country j with productivity parameter a and selling in country i so that the price of variety l is given by $p_j(l) = \tau_{ij}\frac{c_j a}{\rho}$. From this, we can derive the operating profit a firm in country j receives from its sales of variety l to consumers in country i conditional on its productivity parameter a:

$$\pi_{ij}^{l}(a) = (1-\rho)\left(\frac{\tau_{ij}c_j a}{\rho P_i}\right)^{1-\epsilon} Y_i. \tag{4}$$

2.1 Stage 1: Export networks

With our assumption that $f_{jj} = 0$, firms will alway serve their own country in this model. However, since $f_{ij} > 0$, firms may not serve the entire all potential destinations, $i \in [1, J]$. Let δ be the common discount rate. A firm from country j with productivity parameter a, and expectations over productivity changes E_a, will only export to country i if

$$\frac{1}{\delta}E_a\left[\pi_{ij}^{l}(a)\right] > c_j f_{ij}. \tag{5}$$

Application of equation (5) across all markets $i \in [1, J]$ establishes the set of export destinations that a firm from country j with productivity parameter a will serve. We call this set of export destinations a firm's export network and denote it as $N_j(a)$. A clear implication is that firms with the same level of productivity, but from different countries will have different export networks because they face a different set of fixed costs, factor costs, and transport costs from their particular location.

Building from the Helpman et al. (2008) setup we allow the location of country i to grant an advantage in exporting to particular markets. For example, because of France's proximity to other European markets, French firms are likely to have an advantage relative to the U.S. in exporting to, say, Germany. Let $D_j^h(a, \bar{a})$ be the set of destination countries to which firms with productivity a in country j can profitably export, while firms with productivity $\bar{a}$ in country h cannot.[5]

The advantage that firms within some countries possess in establishing particular trade networks can make them attractive targets for cross-border M&A. Purchasing a firm with a large trade network allows a foreign acquirer to use the target's network as an export platform to countries that are otherwise unprofitable to serve. Thus the term $D_j^i(a, \bar{a})$ refers explicitly to endogenously determined (trade) cost synergies available during a merger between firms with productivity a and $\bar{a}$.

[5]For firms of equal productivity a, it follows immediately from equation (4) that country j has an advantage over country h in exporting to countries $i \in D_j^h(a, a)$ if $c_j^{\epsilon}\tau_{ij}^{\epsilon-1}f_{ij} < c_h^{\epsilon}\tau_{ih}^{\epsilon-1}f_{ih}$. Note that the sets $D_j^h(\cdot)$ are also ordered in terms of costs to establish export networks for all firm level productivities.

2.2 Stage 2: Shocks in firm productivity

After firms have incurred the sunk costs to establish their trade networks they are all subject to productivity shocks. We model firm productivity changes over time as a random walk. For any firm with initial productivity a, in stage two the firm has productivity $a' = a + \lambda$, where the productivity shocks across firms, λ, are i.i.d. draws from a continuous distribution with mean zero. Upon realizing a productivity shock, firms maintain their export network established in stage 1, $N_j(a)$, but serve their network with its realized productivity a'. Let $L_j^i(a)$ be the remaining liability from financing the sunk costs needed to establish an export network from country j to country i.[6] The discounted stream of expected profits earned by a firm once its productivity shock is realized is

$$V^l(a', N_j(a)) = \int_{N_j(a)} \frac{1}{\delta} \left(E_{a'}[\pi_{ij}^l(a')] - L_j^i(a) \right) d(i). \tag{6}$$

Put another way, equation (6) represents the reservation price of a target firm on the M&A market. No firm will accept an acquisition price that is less than what it could earn on its own by serving markets $N_j(a)$ with its productivity level a'.

2.3 Stage 3: Merger & Acquisition

Domestic firms can sell their assets, including access to foreign consumers via their established trade networks, to both foreign and domestic acquirers. Upon acquisition of a firm, the acquirer can substitute its own productivity, A, for the realized productivity of the target firm, a'.[7] In addition to integrating technologies, once a merger is completed, the acquiring firm can select the location of production. In particular the acquiring firm chooses the source country for exports based on the relative differences in trade costs among their established networks. Denote $s^i(a', A)$ as the source of production that minimizes the cost of serving market $i \in N_j(a) \cup N_h(A)$. The integration of the acquiring firm's technology, and the relocation of production within the merged firm, require fixed costs given by I.[8] Targets meet potential acquirers randomly, where the arrival of acquirers is described by a Poisson process with a parameter μ.[9]

[6] We allow firms to finance the creation of export networks in competitive capital markets, and allow the unpaid portion of debts to remain the firms' balance sheets at the time of acquisition. While this assumption allows us to maintain generality, all of are results are qualitatively identical if target firms have fully incurred the cost of export creation (i.e., $L_j^i(a) = 0$) because the strike price during acquisition will adjust according to the liabilities held by the target.

[7] Without loss of generality, we assume that the acquiring firm productivity, A, dominates the productivity of the target firm. See Nocke and Yeaple (2008) for evidence that high productivity firm select into cross-border acquisition activity.

[8] For now we specify the integration cost I as being independent of target firm characteristics. Guadalupe et al. (forthcoming) do show that the investments acquirers make to updated the target firm's technology and export capacity following acquisition are complementary to its productivity level. Also, Heyman et al. (2007) argue that that integration of the acquiring firm technology is a skill-bias activity. We will account for these facts in the empirical analysis below. Yet we maintain the assumption that I is independent of a here to highlight the role of trade networks and productivity shocks in the M&A market.

[9] For simplicity we model the arrival rate of potential acquires to be constant over time. Harford (2005) provides evidence that the timing of M&A activity occurs in waves. We will account for the potential for the arrival rate of acquirers to be

Upon acquisition the merged firm produces two unique varieties that can be sold on the export networks established by the acquirer and target. For any potential target with initial productivity a and trade network $N_j(a)$, an acquisition by a firm having productivity A from county h with export network $N_h(A)$ will create a conglomerate earning a discounted flow of total profits

$$\delta Z(A, N(a)) = \int_{N_j(a) \cup N_h(A)} E_A[\pi^m_{is^i(a',A)}(A) + \pi^l_{is^i(a',A)}(A)]d(i) + \int_{D^j_h(A,a)} E_A[\pi^l_{ih}(A)]d(i) + \int_{D^h_j(a,A)} E_A[\pi^m_{ij}(A)]d(i) \ . \quad (7)$$

The first term in (7) is the profit earned by continuing to sell the acquiring and target firms' products on their existing networks from the least costly source of production.[10] The last two terms in the value of a merged firm are the additional profits that can be earned by selling the target (acquiring) firm's product on the export network of the acquiring (target) firm that was otherwise not profitable to serve from their respective locations.

Let $Q_j(A, a')$ be the strike price a firm with productivity A pays to acquire a target firm a in country j. The price of an acquisition is determined non-cooperatively and divides the surplus created by a merger, with a fraction β retained by the acquirer and a fraction $1 - \beta$ gained by the target firm. The probability that any acquisition takes place is given by the likelihood that the value of the merged firm in (7), net the acquisition price, is greater than the reservation value of the target firm in (6).

As our interest is in cross-border M&A, we define the probability that a domestic firm with initial productivity $\hat{a}$, manufacturing variety l, in country j is acquired by a foreign firm from country h at time t as $Y^l_{hjt}(\hat{a})$ which is given by

$$Y^l_{hjt}(\hat{a}) = Pr\left[\ Z(A, N_j(\hat{a}), N_h(A)) \ - Q_j(A, \hat{a}') - I > \ Q_j(A, \hat{a}') - V(A, N_j(\hat{a})) \mid G(a), M_h, \mu \right], \quad (8)$$

where $G(a)$ is the (symmetric) distribution of firm productivities in the acquiring country, and M_h is the

non-homogeneous in the empirical analysis below.

[10] Our primary goal is to highlight how export networks established by firms, and changes in their productivity, influence the likelihood of them being acquired by foreign firms. In doing so we have abstracted from strategic incentives to acquire competitors within imperfectly competitive markets. The combined profits earned by a merged firm over its different products may not be simply the sum of operating profits captured by the first two terms in (7). An analysis of strategic motivations for cross-border M&A is provided by Neary (2007). While strategic incentives for mergers in an oligopolistic sector are outside the scope of this paper, we note that a merger is likely to consolidate market power in additions to creating (trade) costs synergies. Thus the we are likely to underestimate the probability of acquisition, rather than overstate the motives.

corresponding mass of firms. Substituting from above we obtain

$$Y^l_{hjt}(\hat{a}) = Pr\Bigg\{ \int\limits_{N_j(\hat{a})\cup N_h(A)} E_A[\pi^m_{is^i(\hat{a}',A)}(A) + \pi^l_{is^i(\hat{a}',A)}(A)]d(i) + \int\limits_{D^j_h(A,\hat{a})} E_A[\pi^l_{ih}(A)]d(i) + \int\limits_{D^h_j(\hat{a},A)} E_A[\pi^m_{ij}(A)]d(i)\ . > \int\limits_{N_j(\hat{a})} \Big(E_{\hat{a}'}[\pi^l_{ij}(\hat{a}')] - L^i_j(\hat{a})\Big)d(i) + \frac{I}{\beta} \ \Big|\ G(a), M_h, \mu \Bigg\}\ . \quad (9)$$

The criterion for M&A activity to take place in equation (9) provides several predictions about the incidence of cross-border mergers. The first prediction concerns the effects of productivity shocks realized by potential targets in the domestic market.

Proposition 1 *Domestic firms are more likely to be acquired after realizing a persistent negative shock to their productivity level.*

Proof. Note that the surplus generated by a merger is strictly increasing the productivity of the acquiring firm. Define $\bar{A}^j_h(a)$ as the productivity of the marginal acquiring firm in country h, which is indifferent between acquiring and not acquiring a target with productivity a in country j. That is, $\bar{A}^j_h(a)$ satisfies

$$\int\limits_{N_j(a)\cup N_h(\bar{A}^j_h)} E_{\bar{A}^j_h}[\pi^m_{is^i(a',\bar{A}^j_h)}(\bar{A}^j_h) + \pi^l_{is^i(a',\bar{A}^j_h)}(\bar{A}^j_h)]d(i) + \int\limits_{D^j_h(\bar{A}^j_h,a)} E_{\bar{A}^j_h}[\pi^l_{ih}(\bar{A}^j_h)]d(i) + \int\limits_{D^h_j(a,\bar{A}^j_h)} E_{\bar{A}^j_h}[\pi^m_{ij}(\bar{A}^j_h)]d(i)\ . \equiv \int\limits_{N_j(\hat{a})} \Big(E_{a'}[\pi^l_{ij}(a')] - L^i_j(a)\Big)d(i) + \frac{I}{\beta} \quad (10)$$

For any target firm the probability of meeting a potential acquirer is given by μ. Let M_W be the mass of firms worldwide, so that the probability that the acquirer a target firm meets is from country h is given by $\frac{M_h}{M_W}$. Lastly, the proportion of firms in country h for which the surplus generated through acquisition is non-negative is given by $1 - G\left(\bar{A}(\hat{a})\right)$. Thus the probability of a target firm with realized productivity $\hat{a}$ being acquired by a firm from country h is

$$Y^l_{hjt}(\hat{a}) = \mu\frac{M_h}{M_W}\left[1 - G\left(\bar{A}^j_h(\hat{a})\right)\right].$$

An application of the implicit function theorem to the indifference condition of the marginal acquirer in (10)

demonstrates that $\frac{d\bar{A}(a)}{d\lambda} > 0$ for any country pair. Then calculating directly we establish the result:

$$\frac{dY_{hjt}^{l}(\hat{a})}{d\lambda} = -\mu \frac{M_h}{M_W} g\left(\bar{A}_h^j(\hat{a})\right) \frac{d\bar{A}_h^j(a)}{d\lambda} < 0.$$

■

When any target firm suffers a persistent negative shock to its own productivity, the expected stream of profits it can earn over its entire trade network suffers, which increases the surplus generated during acquisition by a relatively high productivity firm. Regardless of the shocks that targets realize, firms in the domestic M&A market have heterogeneous productivity levels initially. Differences in productivity levels cause them to establish different export networks; see equation (5). These initial investments in the capability to serve foreign markets also influence cross-border M&A activity.

Proposition 2 *Domestic firms that set up large export networks are subsequently more likely to be acquired by foreign multinational firms. Furthermore, domestic targets with large export networks are relatively more likely to be acquired by foreign multinationals from locations that exhibit different trade costs across destinations than the domestic country.*

Proof. Define $\mathcal{I}_j(a) \equiv \sup N_j(a)$ as the country that is the most costly to enter for firm a in country j. Similarly $\mathcal{D}_j^h(a,\bar{a}) \equiv \sup D_j^h(a,\bar{a})$ as the destination market that is the most costly for firm a in country j to enter, that is not profitable for firm $\bar{a}$ in country h to serve. Since firms will always export to markets with relatively low entry costs, $c_j f_{ij}$, Proposition 2 is equivalent to (i) $\frac{dY_{hjt}^{l}(\hat{a})}{d\mathcal{I}_j(\hat{a})} > 0$ and (ii) $\frac{dY_{hjt}^{l}(\hat{a})}{d\mathcal{D}_j^h(\hat{a},A)} > 0$.

An application of the implicit function theorem to the identity in (10) establishes that $\frac{d\bar{A}(a)}{d\mathcal{I}_j(a)} < 0$ and $\frac{d\bar{A}(a)}{d\mathcal{D}_j^h(a,\bar{a})} < 0$ for any pair of firms and any country pair. Then calculating directly we obtain

$$\frac{dY_{hjt}^{l}(\hat{a})}{d\mathcal{I}_j(a)} = -\mu \frac{M_h}{M_W} g\left(\bar{A}_h^j(\hat{a})\right) \frac{d\bar{A}_h^j(a)}{d\mathcal{I}_j(a)} > 0,$$

and similarly

$$\frac{dY_{hjt}^{l}(\hat{a})}{d\mathcal{D}_j^h(a,\bar{a})} = -\mu \frac{M_h}{M_W} g\left(\bar{A}_h^j(\hat{a})\right) \frac{d\bar{A}_h^j(a)}{d\mathcal{D}_j^h(a,\bar{a})} > 0.$$

■

The result in Proposition 2 is particularly important in that it describes not only the probability of takeover, but the likelihood that the acquisition is in the form of cross-border M&A. While the surplus generated by any merger (foreign or domestic) is greater when targets suffer productivity losses, multinationals from different locations than the target firm country are more likely to benefit from its established networks.

3 Empirical Strategy

The model above highlights the role export networks and changes in firm-level productivity in promoting cross-border M&A activity. In this section we describe the our empirical strategy for detecting the effects of these firm characteristics. The outcome variable of interest, $Y_{d,c,t}$ is the probability that a domestic firm d in sector s is acquired by a foreign firm from location h during period t. We specify the probability of foreign acquisition as follows

$$Y_{d,h,t} = f\left(\Delta \ln TFP_{d,t-1},\ ExpNet_{d,t-2},\ X_{d,h,t},\ \tau_t,\ \mu_s,\ \eta_d \right) , \tag{11}$$

and estimate the effects of export networks and productivity changes using a fixed-effects logit regression. The model predicts that export networks are relatively more valuable to foreign acquires than to domestic acquirers. To evaluate this prediction we also estimate (11) using a multinomial logit specification that highlights the effect of export networks and productivity changes in motivating acquisition by foreign multinationals versus domestic firms.

Negative productivity shocks lower the value of a firm continuing to operate on its own, making them more likely to be targets for acquisition; i.e., the model predicts that the effect of $\Delta \ln TFP_{d,t-1}$ is negative.[11] On the other hand, the established export network of a firm makes it attractive as a target for acquisition so that the predicted effect of $ExpNet_{d,t-2}$ is positive. In the theory above we characterized export behavior by firms as the decision of whether or not to export. In practice firms may make different levels of investment in export capacity. To account for potential heterogeneity in export capabilities across target firms we also include observations of export intensity, which are equal to the fraction of total firm revenues earned from abroad. The model also predicts that export networks established by a target that are out of reach of a foreign acquirer further increase the surplus generated by a cross-border merger. To test this prediction we will estimate the regression in (11) with the sample split across country origins. Multinationals that originate in markets that are far from the domestic market (i.e., France) are expected to value export networks more intensively that those that originate in closer markets.

The vector $X_{d,h,t}$ contains several control variables that might promote cross-border M&A activity independently. Guadalupe et al. (forthcoming) show that the TFP *level* of a domestic target firm is positively associated with the likelihood of foreign acquisition because of *ex post* investments in technologies. They argue that these investments are complementary to the productivity of a target firm, independent of their previously established export networks and *ex ante* shocks to TFP. Thus we control for the log TFP level

[11] Note that the value of $\Delta \ln TFP_{d,t-1}$ is constructed by taking the difference of firm-level TFP between time periods $t-1$ and $t-2$. Thus observations of $\Delta \ln TFP_{d,t-1}$ are taken from years in advance of acquisition.

of a target firm d the year prior to acquisition. Controlling for firm productivity levels will also capture the potential for high productivity firms to create other valuable assets that would do not want to spuriously attribute to investments in export capacity. We include controls for the skill intensity of the workforce of target firms. Heyman et al. (2007) show that foreign acquirers seek targets with relatively high skill, suggesting that integration of the acquiring firm technology may be a skill-bias activity. In accord with their findings we expect that a more skill intensive workforce will increase the likelihood of foreign takeover. Firms may possess other intangible assets that make them attractive as targets as well. For example, Blonigen and Taylor (2000) argue that firms can use M&A to substitute for costly research and development. Lee (2011) argues that cross-border M&A is motivated by firms seeking specific technologies, and Nocke and Yeaple (2008) highlight the incentives for takeover of firms which possess strong market potential. We include a set of intangible assets, such as R&D expenditure and goodwill, to account for these distinct motivations for foreign acquisition.

The term τ_t is a time trend that captures aggregate features of the economy that may promote M&A activity. For example, the timing of acquisitions typically ebbs and flows in merger waves, even if motivated by economic fundamentals. See Harford (2005). We include sector fixed effects, μ_s, to capture any remaining differences in the volume of M&A activity across industries. Finally, the term η_d is a firm-specific fixed effect that we introduce when we estimate effects of trade networks and productivity changes using the sample of only firms that are acquired. Note that when firm-level fixed are included the sector-specific fixed effect is dropped due to the low number of acquisitions in each of the highly disaggregated sectors included in the sample. Without firm-level fixed effects, the appropriate counter-factual is the observed trade networks and changes in TFP for acquired firms relative to non-acquired firms. In specifications that include firm fixed effects we exclude non-acquired firms and examine differences target firm characteristics before and after the time of acquisition.

4 Data

The proposed sample is built from several micro-datasets that are provided by different French administrations. These data are matched using the firm tax-register number which identifies uniquely a firm located in France. Our period of analysis is 1999-2006.

4.1 Data Sources and Construction

We identify firms involved in a merger or acquisition using the "extended" LIFI (LIaison FInancière) data, a dataset that has information on the ownership and nationality of the parent company of firms located in

France. A firm classified as French independent is a resident in France and is not owned by a group. A French affiliate is resident in France and owned by a French parent. A foreign affiliate is a firm that is located in France but owned by a foreign group.[12] We use LIFI to identify the year of a takeover and the foreign status of the acquiring firm. We define a firm as having undergone a foreign M&A if the group owner in time t is foreign, while the group owner in $t-1$ is French. Similarly, a firm undergoes a domestic M&A if it changes ownership but the group owner remains French.

The data is merged to the EAE (Enquete Annuelle d'Entreprise) annual business survey dataset, containing information from firms' income statements and balance sheets. It also reports the location of firms in France and their 4-digit sector of principal activity (APE). The survey has information on firms with more than 25 employees. Importantly, the EAE dataset is exhaustive above this reporting threshold. In order to compute total factor productivity (TFP), we restrict the data to the manufacturing sectors. We compute firm-level TFP using the procedure described by Olley and Pakes (1996). Accordingly, we control for the simultaneity bias that arises from the endogeneity of a firm's input selection.

Information on the value of intangible and tangible assets are taken from the BRN (Bénéfice Réel Normal - ordinary actual profit), a mandatory tax form for any firm with revenue larger than 763,000 euros in manufacturing. We compute the share of intangible assets as the ratio of intangible assets to total assets.

Data regarding workers and occupations come from the "DADS Panel"–Declaration Annuelle de Données Sociales, an employer-employee dataset collected by the INSEE (*Institut National de la Statistique et des Etudes Economiques*).[13] The DADS report mandatory information on all declared employees including the number of yearly hours worked, wages and occupation. The French classification of occupations identifies skilled and unskilled workers. Skill groups correspond to the 2-digit French Classification of Occupations and Social Categories. We divide these categories into two groups : skilled non-production workers (executives, technicians, intermediate administrative occupations, clerks) and production workers. We compute the skill intensity at firm-level as the share of hours worked by skilled non-production workers in the total number of hours worked.

The last source of data contains information about firm-level trading behavior, which we use to construct our variable related to trade networks, is taken from the French customs (Douanes). We observe the yearly value of exports of each firm at the product-level, in each destination market.[14] We have approximately

[12] An affiliate is foreign owned if the foreign firm controls more than 50% of its shares or voting rights. The results are insensitive to the specified cutoff for an acquisition to take place, as the median share of voting shares owned by a group is 99%.

[13] This data is a yearly notification of social data filled by any firm with employees. Information on age, gender, experience, occupation, sector, region, firm identifier, plant size, compensation.

[14] We use the 8-digit Combined Nomenclature, a European extension of the 6-digit Harmonized System. The database reports for each firm the bilateral free-on-board value and quantity of exports. Beyond the borders of the European Union (EU), shipments valued at less than 1,000 euros are subject to a simplified declaration procedure and do not appear in our data. Within the borders of the Single European Market, the reporting threshold is based on each firm's cumulated yearly export value (all destinations within the EU). This threshold has increased over time, up to 100,000 euros in 2002 and 150,00 euros in

200 possible destinations and 8,000 different product categories. We define a export network as either the number of countries to which a firm exports. We will also estimate the model where export networks are defined by the number of product-destination pairs for each firm. A description of the sample construction from the various sources of data is provided in the Appendix.

4.2 Descriptive statistics

Figures 1a and 1b show the geographical origins of foreign multinationals acquiring firms in France in 2006. In Figure 1a, we report the share of the number of targets from each countries to the total number of acquired firms. Most of the acquiring firms are located in the European Union with the notable exception of U.S firms. Considering only those firms that have been acquired during the sample period, we show that about one fifth of M&A involves a US parent. The second origin of the acquiring group is Germany (one sixth), followed by Belgium and the UK. In Figure 1b, we use employment to characterize the distribution of operations and report the share of employment by origin country in acquired firms' total employment. The pattern of employment across geographical origins is similar to the simple counts of foreign acquisitions, suggesting that cross-borders M&A are tied real economic activities in the global economy.

Our goal is to relate changes in productivity levels and export networks established by target firms to the incidence of acquisition. We estimate *detrended average levels of TFP* using the procedure detailed by Olley and Pakes (1996), with averages and trends removed by regressing estimated TFPs on 4-digits sector fixed effects and a linear time trend. The residuals of the regression and a confidence interval are then plotted in Figure 2 for each year before and after the incidence of foreign acquisition. To calculate export networks for each firm we use the customs data and define a network as the number of product-destination pairs per firm. In Figure 2 we also plot observed firm-level export networks over time.

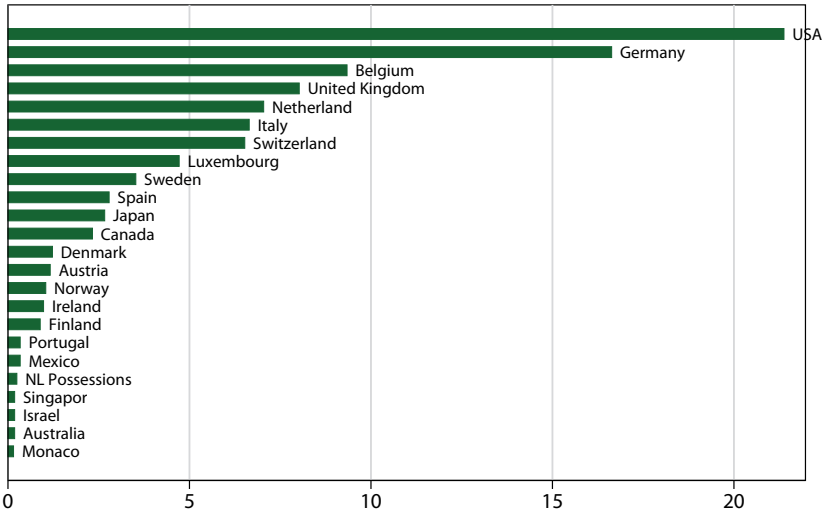
Across the sample of acquired targets, Figure 2 demonstrates that firm productivity levels were falling relative to detrended sector averages in years prior to acquisition. The top and bottom bands around the average line correspond to firms at the 90th and 10th percentiles, respectively. Regardless of where firms lie in the productivity distribution, those that are acquired realize negative TFP shocks in years prior to acquisition. Two years after acquisition productivity levels begin to rebound. The second panel in Figure 2 shows that acquired firms tend to add to their export network once they have been purchased by a foreign parent.[15] While our focus is on the number of export networks established prior to acquisition, the upward trend following acquisition will be important to our how we specify the control group and support

2003.

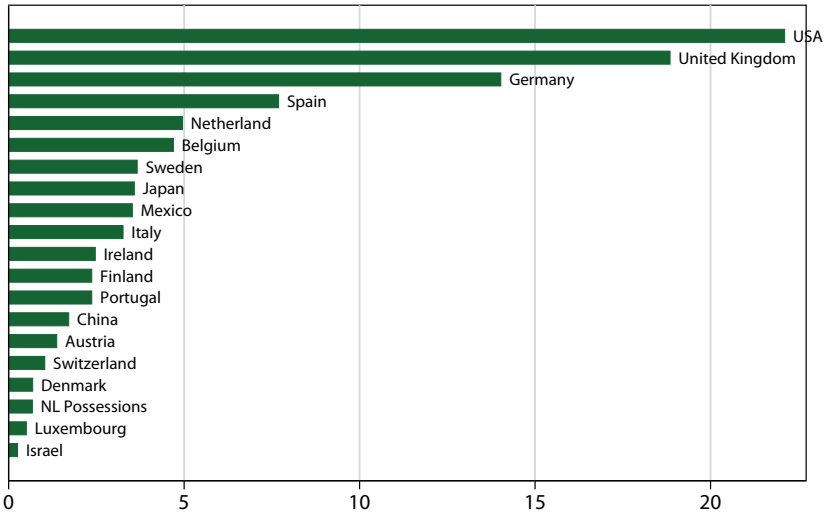
[15]The creation of additional product-firm destinations following acquisition is consistent with the evidence provided by Guadalupe et al. (forthcoming) from Spain, with foreign parent firms making investments in the production platform of the affiliate upon acquisition.

Figure 1: Geographical Origin of Foreign Groups, 2006 (% total)

(a) Number of Foreign M&A

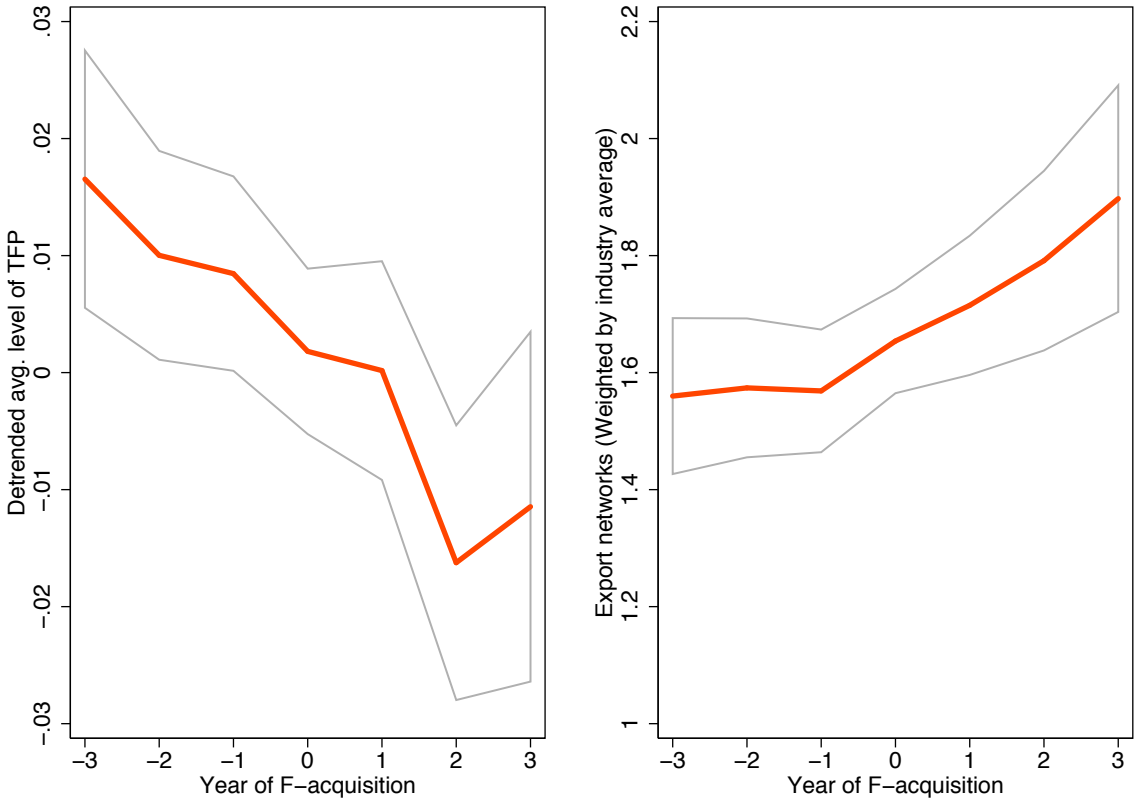


(b) Employment in Foreign M&A



Source: LIFI, authors' own computation

Figure 2: Detrended TFP level and Export Networks Margins for foreign acquisitions targets



Source: Authors calculations based on "LIFI" and "EAE" data.

Table 1: Percent premium for group membership compared to independent firm

	Foreign (%)	French (%)	Difference (p.p.)
TFP	3.83	1.76	2.07
Export Network	11.58	7.57	4.00
Export Value	24.56	11.93	12.63
Import Network	14.51	7.15	7.36
Import Value	25.83	12.68	13.15
Value Added	6.01	2.74	3.27
Employment	5.32	2.56	2.78
Wages	6.32	2.10	4.23
Source: Customs, EAE, LIFI, authors' calculation			

the identification strategy. Note that for empirical specifications which include firm-level fixed effects the increase in export networks following acquisition works against us finding that previously established export networks motivate M&A activity.

Generally we want to verify that the French sample of firms is consistent with stylized facts concerning multinational firms with regard to other firm characteristics. In Table 1 we compare TFP levels, employment and trade volumes between foreign-owned and domestic firms. In line with previous studies foreign-owned firms (unconditionally) exhibit higher productivity, employ more workers, pay higher wages, and trade more than their domestic counterparts. Table 2 reports the size of firm export networks across ownership classifications. The group of firms that are always French has an average export network of 28 to 32 pairs of product-destinations. This is far below the average export networks of firms belonging to the group of "Foreign M&A" (58 to 70 pairs). We find that affiliates that have always been owned by foreign groups have on average the largest export network (82 to 88 product-destinations). In Figure 3 we plot the distribution of firm productivities and it is clear that sample of acquired firms dominate non-acquired firms in terms of productivity. Finally, Table 3 provides simple summary statistics for all the variables used in estimation.

5 Results

This section provides evidence that multinationals look for "cherrie on sale" when they enter a foreign market via cross-border M&A. The section is divided into five parts corresponding to our different empirical strategies: (i) we focus on the export networks and productivity changes at acquired targets relative to similar firms that are never acquired; (ii) we incorporate firm-level fixed effects into the empirical model and compare the export networks and productivity shocks before and after acquisition among the set of target firms; (ii) we reconsider the effects of export networks defined as the number of product-destination pairs, rather than just the number of countries exported to; (iv) we compare firm characteristics across those that

Table 2: Export networks by Ownership Status

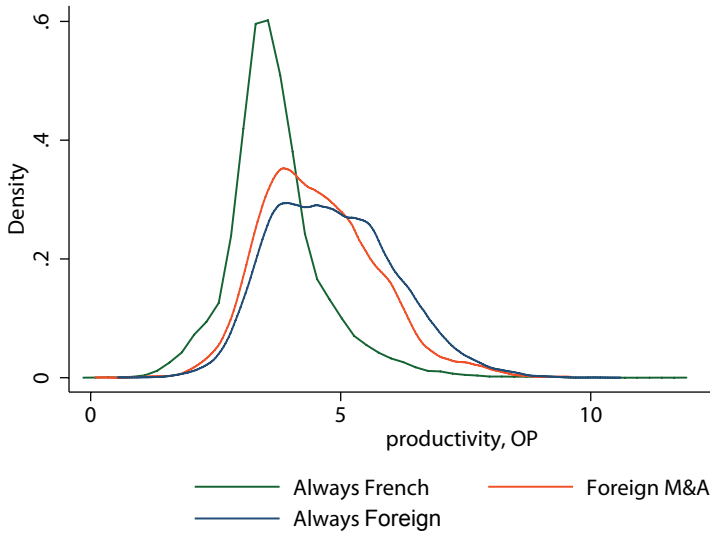
Year	Always Foreign	FM&A	Always French
1999	4.41	4.11	3.34
2000	4.46	4.11	3.38
2001	4.46	4.09	3.36
2002	4.48	4.09	3.35
2003	4.45	4.07	3.31
2004	4.45	4.14	3.39
2005	4.44	4.15	3.37
2006	4.48	4.25	3.48

Source: EAE, LIFI, authors' calculation.
Values indicate log of number of product-destinations.

Table 3: Summary Statistics

	Observations	Mean	Std. Dev.
	(a) Estimation Sample 1 (Table 4)		
Foreign Affiliates (1/0)	32599	0.092	0.288
$\ln(\text{Export Network})_{it_{-2}}$	32599	1.798	1.224
$\text{Export Intensity}_{it_{-2}}$	32599	0.000	0.002
$\Delta \ln(\text{TFP})_{it_{-1}}$	32599	0.030	0.230
$\text{TFP}_{it_{-1}}$	32599	3.941	1.042
$\Delta \ln(\text{TFP})_{it_{-}}$	25173	0.037	0.230
$\text{Share of Intangible}_{it_{-1}}$	32599	0.109	0.160
$\text{Share of Skill}_{it_{-1}}$	32599	0.306	0.190
Ile de France	32599	0.195	0.397
	(b) Estimation Sample 2 (Table 5)		
Acquired Targets (1/0)	2655	0.473	0.499
$\ln(\text{Export Network})_{it_{-2}}$	2655	2.333	1.115
$\text{Export Intensity}_{it_{-2}}$	2655	0.001	0.002
$\Delta \ln(\text{TFP})_{it_{-1}}$	2655	0.040	0.237
$\text{TFP}_{it_{-1}}$	2655	4.493	1.094
$\Delta \ln(\text{TFP})_{it_{-2}}$	2156	0.049	0.247
$\text{Share of Intangible}_{it_{-1}}$	2591	0.135	0.193
$\text{Share of Skill}_{it_{-1}}$	2637	0.369	0.208
Ile de France	2655	0.247	0.432

Figure 3: Productivity distributions of Firms by Ownership Classification: 1999-2006



Source: Authors' calculations based on "LIFI" and "EAE" data.

are targets for domestic versus multinational acquirers; and (v) we provide evidence that the role of export networks varies across the acquiring firm's country of origin, as predicted by the model.

5.1 Evidence comparing Targets to Non-Acquired Firms

The estimation results from the fixed-effects logistic regression are given in Table 4. The reported values correspond to the marginal effects evaluated at sample means. All specifications include 4-digit sector fixed effects and a time trend. Here the treatment group is composed of domestic firms that have become foreign owned during the sample period. The control group includes French firms that did not change their ownership over 1999-2006. We accordingly drop all observations for i) firms acquired by French firms after becoming foreign owned, ii) independent firms acquired by French groups, iii) firms that have always been foreign owned from 1999-2006, and iv) French groups acquired by French groups. The corresponding sample is composed of 35,447 observations.

Looking across each specification in Table 4 we find strong evidence that previously established export networks provide significant motivation for cross-border M&A activity. In column (1) we include only the export characteristics of a firm, defined as the number of countries to which a firm exports. In columns (4)-(6), we introduce other firm level characteristics that may independently motivate foreign acquisition. Even after controlling for these other firm-level characteristics the established trade networks have a significant impact on the likelihood of acquisition. The effect of the export characteristics of target firms is quantitatively significant as well. Based on the preferred estimates from columns (5) and (6) that include full sets of

Table 4: Results from FE Logistic estimation - No Firm FEs

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(\text{Export Network})_{it-2}$	0.028***			0.011***	0.007***	0.008***
	(11.954)			(4.573)	(3.255)	(2.864)
$\Delta \ln(\text{TFP})_{it-1}$		-0.001	-0.018***	-0.013***	-0.013***	-0.012*
		(-0.134)	(-3.745)	(-2.863)	(-2.901)	(-1.763)
$\ln(\text{TFP})_{it-1}$			0.039***	0.032***	0.032***	0.037***
			(14.486)	(11.136)	(11.357)	(10.625)
$\text{Export Intensity}_{it-2}$	2.009**			1.570**	1.709**	2.237
	(2.064)			(2.091)	(2.038)	(1.446)
$\text{Share of Intangible}_{it-1}$					0.026*	0.033**
					(1.957)	(2.030)
$\text{Share of Skill}_{it-1}$					0.106***	0.117***
					(7.335)	(6.550)
Ile de France					-0.016**	-0.016**
					(-2.526)	(-2.139)
$\Delta \ln(\text{TFP})_{it-2}$						-0.002
						(-0.296)
Sector FE	yes	yes	yes	yes	yes	yes
Trend	yes	yes	yes	yes	yes	yes
Observations	32,599	32,599	32,599	32,599	32,599	24,876
Pseudo R^2	0.135	0.105	0.159	0.163	0.175	0.174

Student ts are in parentheses. These are based on robust standard errors that are clustered at firm-level. ***, **, * significantly different from 0 at 1%, 5% and 10% level, respectively.

controls, targets with a 10% larger established export network than average are 7-8% more likely to be acquired. We report estimates from specifications that use two-year lags in export networks to capture previous investments in the ability to serve other markets. We obtain identical results if we use further lagged observations of established networks, suggesting that the effects of the export potential of a firm are highly persistent.[16]

It is worth noting that the positive effect of export networks is maintained even when we introduce measures of firm TFP levels. The well-known stylized fact is that high-productivity firms invest in exporting capacity more than those with lower productivity, as they are better able to cover fixed exporting costs.[17] However, the fact that we find a positive and robust impact of previous exporting behavior after controlling for TFP levels is consistent with our assertion in the theory above that investments in export capacity are, at least in part, sunk costs. Targets are more attractive for having established export networks, even after controlling for difference in their ability to due so in the future.

The second hypothesis from the model is that negative productivity shocks increase the surplus generated by a merger, further motivating cross-border M&A. In column (2) we include only the measured change in

[16]We continue to report estimates based on two-year lags to maintain the size of the sample, as further lags necessitate that acquisitions early in the sample be omitted.

[17]See for example Bernard and Jensen (1999).

productivity experienced in the previous year. As expected, without controlling for differences in the potentially valuable assets held by the target (such as export networks), productivity shocks have no estimated impact on the likelihood of foreign acquisition. Once we account for other firm-level characteristics we obtain a strong and robust negative impact of productivity shocks on the probability of being acquired by a foreign multinational.

The negative coefficient on the lagged changes in productivity in columns (4)-(6) suggest that a 1% percent reduction in the growth rate of firm-level TFP, relative to sector averages, increases the likelihood of foreign acquisition by approximately 1%. There is substantial variation in TFP across firms, as well as substantial changes in firm-level productivity over time. In particular, taking the information from Table 3, a one-standard deviation shock to firm productivity is 0.23. For the average TFP level this is equivalent to approximately a 6% change in productivity, and correspondingly a 6% increase in the likelihood of acquisition. Thus the productivity shocks observed in our sample have a substantial impact of the likelihood of foreign acquisition.

All of the estimated effects of other firm-level characteristics are in line with previous findings. Firms with a relatively more skill-intensive workforce are more likely to be acquired, as are those with a substantial share of intangible assets. The positive coefficient on TFP levels is consistent with the previous evidence from many other countries, including Chile, Indonesia, the U.S., and Spain.

5.2 Evidence looking within Acquired Targets.

In this section, we incorporate firm-level fixed effects to estimate the impact of target firm characteristics on the probability of switching from French to foreign ownership status. One may be concerned that the positive effect reported in the previous section for established export networks is actually due to the formation of other valuable assets excluded from the regression, and that are correlated with investments in export activity. Using the fixed effects methodology controls for unobserved M&A determinants that are specific to the firm and time invariant. The sample reduces to 502 switchers and 2,655 observations over the sample period. Again, the treatment group in the sample is the set of firms acquired by foreign multinationals, but the control group for this empirical strategy is composed of French firms before the year of acquisition.

Table 5 provides additional support for the positive impact of previously established export networks, and the effects of negative productivity shocks, in promoting cross-border M&A activity. The inclusion of firm-level fixed effect precludes calculations of marginal effects, but looking within acquired targets the coefficient on the number of previously established export destinations continues to be positive an significant, consistent with the positive marginal effect reported in Table 4.[18] In Table 5 we also continue to find that

[18]In Table 5 we continue to report estimates from specifications that use export networks observed two years prior to acquisition, as in Table 4. However we find nearly identical results if we use earlier observations ($t-3$ or $t-4$) from each

Table 5: Results from FE Logistic estimation - With Firm FEs

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(\text{Export Network})_{it-2}$	1.105***			0.917***	0.936***	0.718***
	(5.667)			(4.733)	(4.017)	(2.688)
$\Delta \ln(\text{TFP})_{it-1}$		-0.569***	-2.434***	-2.296***	-2.132***	-3.421***
		(-2.941)	(-7.182)	(-6.751)	(-6.551)	(-5.034)
$\ln(\text{TFP})_{it-1}$			3.760***	3.590***	3.896***	5.499***
			(6.993)	(6.638)	(6.613)	(5.460)
$\text{Export Intensity}_{it-2}$	-52.121			-56.079**	-36.903	-38.232
	(-1.617)			(-2.140)	(-1.458)	(-0.976)
$\text{Share of Intangible}_{it-1}$					4.938***	5.971***
					(3.163)	(2.603)
$\text{Share of Skill}_{it-1}$					12.911***	10.333***
					(6.679)	(4.412)
Ile de France					-2.763***	-15.910***
					(-3.018)	(-21.967)
$\Delta \ln(\text{TFP})_{it-2}$						-2.230***
						(-4.473)
Firm FE	yes	yes	yes	yes	yes	yes
Trend	yes	yes	yes	yes	yes	yes
Observations	2,655	2,655	2,655	2,655	2,564	1,568
Pseudo R^2	0.029	0.005	0.091	0.109	0.216	0.196
Number of Switchers	502	502	502	502	492	349

Student ts are in parentheses. These are based on robust standard errors that are clustered at firm-level.
***, **, * significantly different from 0 at 1%, 5% and 10% level, respectively.

negative productivity shocks encourage takeover. Now that when we examine productivity changes within individual acquired firms, we find that that further lags in changes to TFP also contribute to the probability of acquisition by foreign firms. See column (6).[19] Each shock to target firm productivity levels increases the surplus generated by a merger. Consistent with the model above, underperforming lemons are relatively more attractive targets for cross-border M&A.

5.3 Country-Product Export Networks

So far we have presented evidence that the number of countries to which a target firm exports will positively affect its likelihood of acquisition by a foreign multinational. Bernard et al. (2011) argue that firms may make different export decisions for different products in their portfolio if there are product specific costs to establish export networks. The theory above also predicts that the product lines manufactured by target firms contribute to the surplus generated by a merger, and hence may alter the likelihood of foreign acquisition. In this section we examine the effect of established export networks on the probability that a firm is acquired,

acquired target. Recall that Figure 2 shows that the export networks among target firms grow following acquisition, and Guadalupe et al. (forthcoming) find that foreign multinationals make significant investments in export capacity following takeover of Spanish firms. Note that this formation of new nodes on the export network of acquired firms only works against us finding a positive effect of previous export behavior on the likelihood of foreign acquisition.

[19] In column (6) the number of observations drops due to the introduction of additional lagged variables.

Table 6: Results based on specifications with export networks defined as product-country pairs

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(\text{Export Network})_{it-2}$	0.007***	0.004**	0.004*	0.566***	0.612***	0.357*
	(3.603)	(2.111)	(1.909)	(3.873)	(3.633)	(1.791)
$\Delta \ln(\text{TFP})_{it-1}$	-0.014***	-0.014***	-0.013*	-2.318***	-2.151***	-3.500***
	(-2.922)	(-3.036)	(-1.854)	(-6.867)	(-6.646)	(-5.208)
$\ln(\text{TFP})_{it-1}$	0.033***	0.034***	0.038***	3.646***	3.966***	5.605***
	(10.925)	(11.365)	(10.524)	(6.775)	(6.746)	(5.655)
$\text{Export Intensity}_{it-2}$	1.638**	1.773**	2.348	-51.759*	-33.909	-22.378
	(2.099)	(2.039)	(1.466)	(-1.824)	(-1.224)	(-0.621)
$\text{Share of Intangible}_{it-1}$		0.027**	0.034**		5.011***	5.984***
		(2.022)	(2.092)		(3.238)	(2.600)
$\text{Share of Skill}_{it-1}$		0.109***	0.119***		12.969***	10.356***
		(7.470)	(6.651)		(6.733)	(4.451)
Ile de France		-0.016**	-0.016**		-2.799***	-15.480***
		(-2.483)	(-2.105)		(-2.982)	(-21.527)
$\Delta \ln(\text{TFP})_{it-2}$			-0.002			-2.274***
			(-0.375)			(-4.651)
Sector FE	yes	yes	yes	no	no	no
Trend	yes	yes	yes	yes	yes	yes
Firm FE	no	no	no	yes	yes	yes
Observations	32,599	32,599	24,876	2,655	2,564	1,568
Pseudo R^2	0.162	0.174	0.173	0.103	0.212	0.192
Number of Switchers				502	492	349

Student ts in parentheses. These are based on robust standard errors clustered at firm-level.
***, **, * significantly different from 0 at 1%, 5% and 10% level, respectively.

where a target's export network is defined as the number of product-destination pairs.

Table 6 provides evidence that export networks, defined as product-destination pairs, promote foreign acquisition. Columns (1)-(3) report estimated marginal effects from specifications that include 4-digit sector fixed effects. Columns (4)-(6) report the coefficient estimates from specifications that include firm-level fixed effects. The estimates in Table 6 are consistent with the predictions of the model. However, comparing the estimates to those obtained with export networks defined by the number of countries to which a target exports suggests that the key feature of a target firm is the number of markets served.

The specification in column (3) of Table 6 is equivalent to the specification in column (6) of Table 4 for the corresponding definitions of export networks. The marginal effect of a larger export network defined as product-destination pair is nearly half the estimated effect of an increase in the number of foreign markets served; i.e., the elasticity with respect to the the number of product destination pairs is approximately 0.4 versus an elasticity of the probability of foreign acquisition with respect to the number of country export destinations estimated to be 0.8.[20] Substituting further lagged observations of export networks generates identical results. The regression models estimated in Tables 4 through 6 lead to similar goodness-of-fit

[20]In specifications that separately include the number of export destinations and the number of products exported, the estimated effect of the number of countries is positive and robust while the number of products has no discernible effect on the likelihood of acquisition.

regardless of how the export networks are specified; note that the pseudo-R^2 is nearly the same across definitions of export networks. From this point forward we continue to specify export networks as product-destination pairs.[21]

5.4 French versus Foreign Acquisitions

In previous sections we incorporated firm-level fixed effects to better distinguish export networks from other valuable assets held by target firms that may motivate cross-border M&A. In this section we take a more specific approach to highlight the impact of established export networks. The ability to serve foreign markets is, in part, tied to locational advantages and geographical characteristics. The export network established by a target firm in France has more value to foreign firms that face different trade costs, than it does to other domestic French firms that are likely to set up similar network on their own. In Table 7 we use a multinomial logit regression to estimate the role of trade networks in promoting foreign versus domestic acquisition.[22]

In each specification we continue to find that foreign multinationals acquire domestic targets that have large export networks, and that have recently suffered negative productivity shocks. Yet as expected, domestic firms do not seek targets with large export networks. Instead of export networks, domestic firms seek targets with large intangible assets, such as R&D expenditure or goodwill in the market place, or a skilled workforce, as is apparent from the estimates under specification (4). Table 7 does indicate that targets with relatively export intensity are more likely to be acquired by domestic firms. While domestic acquirers do not value redundant country-pair destinations within their own network, greater investments in export capabilities are attractive to other domestic firms. Note further that intangible assets have no impact on the likelihood of foreign acquisition; the point estimate is an order of magnitude smaller for foreign firms as well as being indistinguishable from zero. Multinationals seek export capacity in the targets they acquire, consistent with notion that their locations put them at a disadvantage relative to domestic firms in serving other foreign countries.[23]

In Table 7 we also find that productivity shocks have negative effects on the likelihood of takeover. Consistent with Proposition 1 negative productivity shocks promote acquisition by both domestic and foreign firms. The estimated effects of productivity changes in Table 7 provides further evidence that multinational look for target firms that appear to be cherries on sale.

[21] Our preference is to incorporate the additional source of firm-level heterogeneity into the regression model which may not be captured fully by clustering at the firm-level.

[22] Within each year and 4-digit sector there is a small number of acquisitions observed, and even fewer observations of either domestic or foreign acquisitions. Given the small number of observations we incorporate 2-digit sector fixed effects, rather that 4-digit, when estimating the multinomial logit regression in Table 7.

[23] Nocke and Yeaple (2008) argue that the market potential of a target firm is an asset particular to its domestic market. While here we find that the locational advantage of domestic targets is tied to the potential to serve other foreign markets.

Table 7: Multinomial Logit Estimation results

	(1)		(2)		(3)		(4)	
	DMA	FMA	DMA	FMA	DMA	FMA	DMA	FMA
ln(Export Network)$_{it-2}$	0.011***	0.009***			0.004**	0.003***	0.002	0.002***
	(7.406)	(15.119)			(2.483)	(4.999)	(1.440)	(3.450)
Δ ln(TFP)$_{it-1}$			-0.022***	-0.012***	-0.019**	-0.010**	-0.016*	-0.009**
			(-2.620)	(-2.765)	(-2.325)	(-2.281)	(-1.947)	(-2.157)
ln(TFP)$_{it-1}$			0.028***	0.016***	0.025***	0.013***	0.025***	0.012***
			(10.728)	(17.651)	(8.563)	(12.193)	(8.403)	(11.862)
Export Intensity$_{it-2}$	2.350*	1.172***			1.833	0.957***	2.390*	1.001***
	(1.941)	(3.102)			(1.639)	(3.151)	(1.836)	(2.803)
Share of Intangible$_{it-1}$							0.073***	0.008
							(5.023)	(1.324)
Share of Skill$_{it-1}$							0.063***	0.045***
							(4.348)	(8.395)
Ile de France							-0.024***	-0.006***
							(-3.966)	(-2.619)
Observations	38,038	38,038	38,038	38,038	38,038	38,038	36,962	36,962
Pseudo R^2	0.025		0.032		0.034		0.038	

Student ts are in parentheses. These are based on robust standard errors that are clustered at firm-level.
***, **, * significantly different from 0 at 1%, 5% and 10% level, respectively.

Table 8: European versus Non-European Acquiring firms

	(1)	(2)
	European	Non-European
ln(Export Network)$_{it-2}$	0.001	0.003**
	(0.749)	(2.320)
Δ ln(TFP)$_{it-1}$	-0.009**	-0.005*
	(-2.304)	(-1.826)
ln(TFP)$_{it-1}$	0.023***	0.011***
	(9.843)	(6.061)
Export Intensity$_{it-2}$	1.270**	0.352**
	(2.003)	(2.295)
Share of Intangible$_{it-1}$	0.018	0.011
	(1.593)	(1.541)
Share of Skill$_{it-1}$	0.078***	0.032***
	(6.386)	(4.090)
Ile de France	-0.019***	0.001
	(-3.486)	(0.213)
Sector FE	yes	yes
Trend	yes	yes
Observations	30,609	24,569
Pseudo R^2	0.164	0.200

Student ts in parentheses. These are based on robust standard errors clustered at firm-level.
***, **, * significantly different from 0 at 1%, 5% and 10% level, respectively.

5.5 Differences across Acquirer Origins

The model above makes predictions about cross-border M&A activity in a multi-country world. Given the differences in the costs of creating export networks across locations, the surplus generated from acquisition by a foreign multinational is much larger when it faces substantially different trade costs. Multinationals that originate in countries far from the domestic market should value locally established export networks relatively more. In this section, we investigate whether the impact of established export networks is smaller for multinationals that originate from (near) European countries than for those that originate from (far away) non-European countries.[24] Table 8 reports estimates obtained from sector fixed-effect logit regressions with the sample split by countries of origin.[25] In each specification we include the full set of firm-level controls.

The pattern of cross-border M&A activity originating from European nations appears much different than activity originating in non-European nations. Consistent with nearby countries facing similar costs to set up preferred export networks as French firms, we find no strong evidence that export networks motivate cross-border M&A activity among European acquirers. On the other hand, we find significant evidence

[24]There are 16 European members in the sample to which we add Liechtenstein, Monaco and the Netherlands and United Kingdom Possessions. (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom). The group of non-European members is composed by Australia Canada, India, Israel, Japan, Lebanon, Singapore, South Korea, Switzerland, Taiwan, Tunisia, USA, and Venezuela.

[25]Note that it is not possible to make comparisons across sample using firm-level fixed effects because comparable marginal effects cannot be calculated.

that export networks motivate cross-border M&A activity from non-European countries. See column (2). In fact, the estimated marginal effect of export network on the likelihood of acquisition by non-European multinationals, 0.003, is similar in magnitude to the marginal effect of 0.004 in Table 6 estimated using the same specification with the entire sample of country origins. All together, the evidence in Table 8 suggests there are significant differences in role of exporting behavior by target firms in motivating cross-border M&A based on the location of the acquiring multinational firm.

There appears to be significant heterogeneity in the effects of export intensity on the likelihood of acquisition. Note that the average marginal effect of export intensity for European acquisition is four times as large as the the effect on non-European acquisition. Consistent with the results obtained by comparing acquisition by domestic and foreign firms, multinationals from nearby locations are attracted to targets that have made relatively large investments in export capabilities, but do not value the specific networks they have established which are likely to be redundant. Regardless of the country of origin, negative productivity shocks promote takeover.

6 Conclusion

Cross-border mergers and acquisition constitute the primary mode of foreign direct investment. Understanding the motives to acquire affiliates in foreign countries, and understanding the effects of this substantial global economic activity, requires knowing what types of domestic targets multinationals seek to acquire. Here we have argued for two seemingly opposing incentives simultaneously motivate global M&A activity.

In a multi-country world with differences in trade costs across locations, the formation of export networks endogenously creates (trade) cost synergies between firms in different locations. Since firms with high initial levels of productivity are better able to establish costly export networks, there are larger surpluses available by acquiring a target that was initially more productive. In other words, there are strong incentives for multinational firms to seek out targets that appear to be cherries in the domestic market. The incentives are even stronger for potential acquirers originating from locations far from the domestic market.

Firm productivities are constantly changing over time. When the performance of a domestic firm suffers, there is a greater surplus to be had by transferring control its stock of assets over to new management. Productivity losses among target firms provide an opportunity for multinational acquirers to obtain desired assets at relatively lower costs. Searching for such bargains lead multinational firms to seek out targets that appear to be cherries on sale.

We first constructed a model with endogenous export behavior, dynamic productivity, and endogenous M&A activity that provided several predictions about the patterns of cross-border acquisitions. We found strong evidence in from M&A activity in France that foreign multinationals seek firms with strong prior

export behavior and recent productivity losses. We also provided further evidence on the importance of export networks by contrasting acquisition patterns by domestic firms versus foreign multinationals, comparing foreign acquisitions across different countries of origin.

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Table 9: Description of the Sample

Year	Number of Foreign Affiliates	Number of French Firms
2001	261	5364
2002	378	5162
2003	449	4956
2004	512	4860
2005	636	4768
2006	749	4504
Total	2985	29614

7 Appendix: Sample Construction

The full sample is composed by 31,611 firms and 168,548 observations over the period 1999-2006. Due to the construction of the M&A information, we lose information on 1999. The sample reduces to 20,476 firms and 90,967 observations because there are also missing information on TFP, export network and other covariates. The introduction of the lag change in TFP and the second lag of the export network and export intensity variables, reduces the sample further to 18,114 firms and 71,830 observations over 2001 to 2006.

In order to build the control group in the estimation of section 5.1, we eliminate all observations for i) firms acquired by French firms after having been foreign owned, ii) firms that have always been foreign owned from 1999-2006, iii) independent firms acquired by French groups; and iv) French groups acquired by French groups. The corresponding sample reduces to 8,713 firms and 32,559 observations. Table 9 reports the number of foreign affiliates and French firms in the control group over the estimation period.