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Corporate Taxes and the Growth of the Firm

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It is desirable to reduce the number of "artificial" merger and acquisitions (MA) designed to escape from high tax jurisdictions, without discouraging domestic firms from growing into highly productive multinational corporations. This paper studies the effect of corporate taxes on the headquarter's decision to expand its extensive margins through the acquisition of pre-existing firms. A model for the investment behaviour of heterogeneous firms is built, and Corporate taxes are introduced. The model shows that higher home statutory corporate tax rates make exports relatively more expensive, making firms more likely to serve foreign demand through cross-border acquisitions. The model's predictions are tested on a dynamic random parameter probit model estimated on firm-level data. The model's predictions are confirmed by the results from the empirical investigation. The data also support the hypothesis that there are sunk costs associated with becoming a multinational corporation, and that domestic firm that overcome these costs and acquire their first foreign subsidiary are more likely to complete further acquisitions. In addition, the inability to shift profit to foreign locations makes domestic firms more sensitive to home corporate taxes, as their capacity to capture investment opportunity is negatively affected by a reduction in net tax profit. **JEL Classification: C25, G34, H25, H32**

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1 Introduction

Foreign Direct Investments (FDI) inflows are of strategic importance for countries that expect capital investment to bring positive spillovers and boost economic growth. The public economics debate on international tax competition has widely studied the policy instruments available to attract these investments, particularly with regard to resources employed by multinational companies (MNCs). The general suggestion being that volume and location of capital are negatively affected by the host country marginal and average corporate tax rates, respectively. The *expansion* of domestic companies and their diversification into foreign markets represents a second channel for growth. A channel that could prove particularly suitable in a situation of economic stagnation and financial uncertainty. With a specific interest into capital taxation, this paper investigates how home corporate taxes affect the initial decision of domestic firms to undertake investment projects such as cross-border Merger and Acquisitions (M&As), and through them eventually grow into a multinational organisation.

The latest World Investment Report (UNCTAD (2012)) stresses how the rise of FDI outflows from the EU that touched its peak in 2007 was driven by cross-border M&As, and how the financial crisis caused this trend to revert into a steep fall. In 2011, outflows from developed countries reached levels comparable to the pre-crisis average of 2005-2007 (see Figure 1), but this renewed growth was originated mainly from the United States and Japan. Europe remains behind the World trend, excluding the few countries that witnessed a rise in FDI, such as the UK, Sweden and Denmark. Netherlands and Italy had their outflows fall by half in 2011 as compared to the previous year. In the same period, Germany and Spain had theirs reduced by no less than thirty and forty per cent. The World Investment Report draws particular attention to how future policies should frame the liberalisation of investment into a quest for growth. In the recession climate generated by the European sovereign debt crisis it is important to understand whether corporate taxes constitute an instrument for supporting the growth of domestic firms. In keeping with the well-known result of the "new" new trade theory, firms that break into foreign markets are characterised by productivity levels higher than those of firms who confine to their domestic borders. Policymakers should have an interest in designing incentives for these domestic companies to start serving the international demand, while maintaining their headquarters within domestic borders.

This paper departs from the international trade literature, to introduce corporate taxes in a model that describes the discrete choice of heterogeneous firms who intend to expand their production through domestic and cross-border M&As. Three propositions are derived from

the model: (1) a raise in Home corporate taxes increases the probability that highly productive firms expand into foreign markets through cross-border acquisitions; (2) the application of a Tax Credit, as form of relief from international double taxation, negatively affects the probability that firms choose to serve the foreign market through a cross-border M&A; and (3) a raise in Home corporate taxes leaves the choice of making a domestic acquisition unaffected, for multinational firms. A firm-level dataset is constructed using detailed accounts unconsolidated to the subsidiary level, for the purpose of testing these three propositions. The dataset traces the pattern of corporate expansions followed by a sample of 29,000 European companies over a period of 6 years (2005-2010). It allows to estimate a model for the discrete choice of making a M&A, while paying particular attention to the way home corporate taxes affect such choices.

This paper extends on the existing literature in several ways. First, the proposed theoretical framework explicitly models the role of corporate taxes on the expansion of heterogeneous firms, following the literature initiated by Melitz (2003). Corporate taxes are introduced in a simplified version of the model by Helpman et al. (2003) to describe the mechanism driving both domestic and cross-border M&As. In the proposed model, acquisitions are associated with high fixed costs that are fully deductible. Under these conditions, a raise in home corporate taxes does not affect the probability that a firm expands its activity by acquiring domestic subsidiaries, but it affects the probability that the same firm expands its activity by serving the foreign market through the acquisition of foreign subsidiaries. An increase in home corporate taxes raises the marginal cost savings from acquiring foreign subsidiaries rather than doing exports (the implicit alternative entry mode), so firms are more likely to choose serving foreign demand by relocating production abroad.

Second, firms heterogeneity plays a central role in understanding the way corporate taxes affect firms' investment decision. There is a tendency in the empirical literature on international corporate taxation to concentrate exclusively on multinational companies[1], so one of the main goal of this paper is to show that the expansion pattern of domestic firms is very different from that of multinationals. The dataset used in the empirical analysis constitutes a special feature of this paper. It combines two commercial databases provided by the Bureau Van Dijk, named ORBIS and ZEPHYR, to follow the ownership structure changes occurred to a sample of *circa* 29,000 Global Ultimate Owners (GUO) located in Europe. When a GUO itself or any of its subsidiaries (up to the tenth level) acquire the majority share of a

[1] As Baldwin and Okubo (2009a) state, *"the public policy debate on international tax competition has long focused on large firms based on the premise that large firms are both the most likely to move in response to tax differentials and the sort of firms that a nation would be least happy about losing"*

pre-existing firm, the acquired target is added to the structure of the GUO and removed from that of the seller. This process guarantees perfect identification of the mode of expansion as an M&A and precise reconstruction of all changes occurred to a given company. It also allows to identify three different "types" of large firms: established multinational companies, large domestic companies (whose subsidiaries are all domestically located) and standalone companies (who are constituted only by their headquarter). The empirical evidence shows that multinational firms are more likely to expand their structure by acquiring a new subsidiary. Non-multinational firms do not expand as likely. However, the non-multinational firms that do expand have a higher probability to start expanding in sub-sequent years, and recursively acquire new subsidiaries. The empirical investigation then moves onto testing whether corporate taxes affect all three "types" of firms in the way predicted by the theoretical model.

Finally, this paper empirically investigates the possibility that the expansion choice is characterised by *true* state dependence. In particular, the empirical model allows to identify whether the M&As undertaken by the observed firms are single standing or rather are part of a complex restructuring that involves consecutive acquisitions of several different subsidiaries. The observation that non-multinationals are per se less likely to invest than multinationals, could motivate a lack of interest into supporting the expansion of domestic companies. However, showing that non-multinationals that begin expanding are to continue their expansion in several consecutive periods could motivate the promotion of policies that support their development into multinational corporations. As expected, the results show that the expansion choice is characterised by time dependence. In addition, the time dependence is stronger for standalone firms, that, before the first expansions are constituted only by their headquarter, rather than for firms with more sophisticated ownership structures.

The results from this paper seem to suggest that policies intended to enhance firms productivity should support the internationalization of simply structured firms. Home corporate taxes are a potential instrument for such policies. In particular, they could be used to support firms that undertake their first acquisition while choosing to maintain their headquarter within the domestic borders, and distinguish them from broad multinational firms that continue to expand, possibly in an attempt to exploit profit shifting opportunities.

Section 2 reviews the related literature. Section 3 presents the model for the firms discrete choice of making an expansion. Section 4 describes the Data and shows key descriptive statistics. Section 5 explains the empirical methodology, and section 6 presents the results. Section 7 concludes.

2 Literature Review

During the last twenty years a growing body of literature has focused on the role played by taxes in defining the volume and direction of Foreign Direct Investments (FDI) [2]. The general result that lower tax jurisdictions guarantee higher post-tax returns has inspired the literature on corporate tax competition, which predicted a *race-to-the-bottom* in setting corporate tax rates among different countries (among others, see Ferrett (2005) and Devereux et al. (2008)). Recently, the diffusion of firm-level data has allowed new studies to overcome the limits of conducting analysis exclusively on aggregate FDI.

Three main aspects related to the taxation of capital have attracted particular attention. First, there has been a revision of the analysis on the *direction of foreign direct investments* (FDI). A firm that is looking to make an investment follows some criteria to choose one out of a number of mutually exclusive alternative locations, which are compared also in terms of corporate tax legislation. Several empirical works estimate the role and importance of differences among the tax systems of a number of countries that qualify as potential investment destinations (see Devereux and Griffith (1998a), Buettner and Ruf (2007), Barrios et al. (2009) and Arulampalam et al. (2012)). The evidence brought by this literature confirms the initial result of Devereux and Griffith (1998a): corporate taxes affect the extensive margins of the investment project. Moreover, discrete decisions, such as the one of comparing potential investment locations, depend, among other things, on the effective average tax rate (EATR), which compares the various mutually exclusive alternatives by measuring what portion of profit would be paid as taxes under each scenario.

Secondly, the topic of *international double taxation*. Corporate organisations constituted by subsidiaries located in different countries pay corporate taxes in each country where profit is realised. The firm's parent also pays additional home taxes upon repatriation of the foreign profit. The parent's domestic government can alleviate the burden of double taxation in different ways. It can exempt the parent from domestic taxation of the repatriated profit. It can offer deduction of the taxes already paid in the foreign country. Or it can grant a credit for the taxes paid in the foreign country, so to bring taxation of all profits to the same level. The literature has focused on how to attain tax rules that are *nationally* and *globally* optimal [3]. Desai and Hines (2003, 2004) argue that the exemption system is optimal from a national

[2] Extensive surveys are Devereux (2007) and de Mooij and Ederveen (2008) and, more broadly on FDI determinants, Blonigen (2005)

[3] Becker and Fuest (2011) define National optimality as prevailing "if investment decisions cannot be changed without reducing national income" and Global optimality if "investment decisions cannot be changed without reducing global income"

point of view, because it reduces the ownership distortions that would be caused by double taxation. But the literature on FDI and, in particular, Greenfield Investments agrees on the fact that it is with the tax credit system that global optimality is achieved. Huizinga and Voget (2009b) propose an empirical investigation of the effect of different double taxation systems. With a particular attention devoted to M&A investments, Devereux and Hubbard (2003) and Becker and Fuest (2011) show how, in a theoretical model where capital is not limited to the domestic supply, the exemption system can be shown to be both nationally and globally optimal.

Finally, the possibility of observing data on the activity of multinationals at the unconsolidated level has allowed to study how corporate taxes influence the headquarters decision to shift profit among subsidiaries so to minimise the costs related to tax payments. The literature focuses on the channels used to exploit profit shifting opportunities: notably *strategic allocation of over-head costs, intra firm financial transactions,* and *transfer pricing*. Early works, like Clausing (2003), look at the channel of transfer pricing through intra firm trade. Dischinger (2007) use data similar to those of this paper to provide empirical evidence of a general pattern of profit shifting outside of European countries. Dischinger and Riedel (2007) give empirical support to the hypothesis that the transfer pricing channel is particularly exploited by multinationals with high volume of intangible assets. Dischinger and Riedel (2010) show how profit shifting opportunity due to differentials in home and foreign corporate tax rates are generally in favour of the headquarters location, to finally generate a flow toward the parents home countries and away from the high-tax subsidiary locations. Heckemeyer and Overesch (forthcoming) present a meticulous meta-review of all the most recent empirical evidence on the topic. One aspect arising from this framework, on which the entire literature seem to convey, is that established multinationals are the most responsive to profit shifting opportunities.

The literature of international trade initiated by Melitz (2003) and Helpman et al. (2003) provides a theoretical framework to study investment decisions of heterogenous firms. It shows why more productive firms earn larger profit and it uses entry fixed costs to explain the endogenous selection of the mass of expanding firms. Only sufficiently productive firms will be able to serve the foreign demand. Among these, the most productive will engage in merger and acquisitions (M&A) and the others will simply export. Nocke and Yeaple (2007) extend the model by Helpman et al. (2003) to include non-mobile productivities such as market and managerial capabilities, that are reflected in the quality of production. When these capabilities represent a second source of heterogeneity across firms, they can explain

the specific advantage of making M&A over Greenfield Investments (which is purchasing a pre-existing firm instead of setting a new plant from scratch) so to motivate the existence of domestic acquisitions. This literature has been recently adapted to study the effect of corporate taxation, with a particular focus on profit shifting and tax competition. Baldwin and Okubo (2009b,a) propose a model of tax competition with agglomeration economies and firm heterogeneity to show how the large and more productive firms are more sensitive to tax differences across countries and hence more likely to relocate in reaction to high taxes. Small countries attempt to attract these firms by inefficiently lowering their tax rate. They propose that a reform that increases the tax base can raise tax revenue while limiting relocation. Davies and Eckel (2007) also show how tax competition, realised through a race-to-the-bottom in corporate tax rates to attract foreign investors, leads to underprovision of public goods and overabundance of entering firms. In line with the empirical results of Desai et al. (2006), Krautheim and Schmidt-Eisenlohr (2011) introduce firm heterogeneity in a tax competition model to show how the larger more productive firms are more likely to shift profit to Tax Heavens. Finally, Lockwood (2012) applies the Melitz framework to a model for the optimal rule of foreign-source profits. He shows that the optimality of a double tax rule depends on the level of trade costs: high trade costs imply that all firms serving the foreign market choose to do so through FDI, and in this case the exemption rule is nationally optimal. With low trade costs, instead, only the more productive firms choose FDI, in which case the deduction rule is the nationally optimal one.

The "new" new international trade theory explains the endogenous sorting of firms into different market entry modes in a static framework. A firm's productivity is a random draw from a given distribution function, but once firms learn their productivity type they face no other source of uncertainty. The possibility that the fixed costs associated with specific entry modes, such as exports (like in Melitz (2003)) or also FDI (like in Helpman et al. (2003)), have the characteristics of sunk costs has drawn new attention upon this literature. Recent works like Ghironi and Melitz (2005), Alessandria and Choi (2007) and Ruhl (2008) extend Melitz' model into a dynamic framework where changes over time of productivity and prices also affect the sorting of firms into different foreign market entry modes. At the same time, the empirical literature initiated by Roberts and Tybout (1997) explores the hypothesis that sunk entry costs explains the persistence of export participation. Bernard and Jensen (2004) explores the difference in the exporting pattern of new and "established" exporter, Das et al. (2007) propose a structural model for both exit and entry into the export market that allows to estimate firms productivity growth over time and the size of export sunk costs. Non of these paper assess the issue of time dependence in the choice of entering domestic or foreign

markets with modes alternative to exports.

3 Theoretical Model

This section draws from the "new" new international trade literature started by Melitz (2003) to present a theoretical framework for the firms discrete choice of whether to expand production by acquiring pre-existing subsidiaries located in foreign countries. Departing from a simplified version of the model by Helpman, Melitz, and Yeaple (2003) (HMY), corporate taxes are introduced and comparative statics for their effect on the probability of expanding production to foreign markets are derived.

The HMY's model explains the international organisation of production when firms differ in terms of productivity and can choose whether and how to serve foreign demand of a differentiated good. The model shows that firms face the same *proximity-concentration tradeoff* suggested by Brainard (1997), but also that the response to such tradeoff depends on their productivity level. Any firm wanting to serve foreign demand needs to choose whether to cover the transport costs necessary to export part of the domestic production to the foreign market, or avoid paying transport costs and instead cover the fixed costs necessary to purchase a subsidiary that is already active in that foreign market. Ultimately countries where the distribution of firms productivity is highly dispersed will witness a higher number of firms choosing to serve foreign demand through cross-border M&As. Because the data used in this paper does not allow to observe firms exit from the domestic market or export to foreign market, the model assumes that expanding firms face fixed costs only when choosing to make cross-border acquisitions.[4] This simplifies Melitz result on the sorting of firms into different modes of production: under these assumptions all active firms can realise a positive profit from serving foreign demand through exports, but only the most productive realise a even higher profit from undertaking a M&A project. This section is closed by a discussion of an extension to the model that allows to explain domestic acquisitions.

3.1 The Economy

There are K countries, Home and $K-1$ Foreign countries. Variables indexed by k refer to the Foreign countries. Each country has a specific labour endowment (L for Home and L_k for each Foreign country), which constitutes the only input used for production. Two different types of goods are produced in each country. The first good is the *numeraire*, x_n:

[4] This assumption follows Yeaple (2009)

an homogenous good produced in an integrated market with no transport cost and unit price. The second good is the *differentiated good* , $x(\omega)$: it has varieties denoted by $\omega \in \Omega$ and can be exported only at a non-zero cost. Varieties are substitutable with constant elasticity $\eta > 1$. Each variety ω has a country-specific price, denoted as $p(\omega)$ ($p_k(\omega)$ for the Foreign countries). Marginal productivity of labour is also different across countries, so the Home country produces w units of the differentiated good with 1 unit of labour, and foreign countries produce w_k.

To focus the attention on corporate taxes, assumption is made that the labour income tax, t_L, and the ad-valorem tax on consumption of the differentiated goods, t_x, are both zero. Corporate taxes, instead, are levied on the volume of profit realised by all production sites located within the domestic borders at the statutory rate t. Fixed costs are fully deductible. However, when a firm decides to purchase a foreign subsidiary, the acquisition price is non-deductible. The profits realised by production sites located outside of the domestic borders are initially taxed at the foreign corporate tax rate t_k by the foreign government, and, upon repatriation to the home country, also taxed by the home government at the domestic rate T.

Individuals have two sources of income. They collect total (post-tax) profit, Π, and supply labour, L, at the country wage rate w. So their budget constraint can be written as $I = \Pi + wL = (1-\mu)x_n + \mu \int_\omega x(\omega)p(\omega)d\omega$. Utility from consuming the homogenous good, x_n, is constant and additively separable, whereas the utility from consuming the differentiated good has CES form, so that:

$$U(x_n, x(\omega)) = (1-\mu)\log x_n + \frac{\mu}{\alpha}\log\left(\int_{\omega\in\Omega} x(\omega)^\alpha d\omega\right), \tag{1}$$

where $\alpha = \frac{\eta-1}{\eta}$. Solving the maximisation problem yields Home country's demand for variety ω of the differentiated good

$$x(\omega) = \mu\frac{I}{P}\left(\frac{p(\omega)}{P}\right)^{-\eta}, \tag{2}$$

where P represents the Home country's price index, a weighted average of the price set for all demanded varieties of the differentiated good, which can be written as

$$P = \left(\int_{\omega} p(\omega)^{1-\eta} d\omega \right)^{\frac{1}{1-\eta}} \tag{3}$$

In the $K-1$ Foreign countries demand for the differentiated good and price index have the same functional form. Given $U_k(x_n, x(\omega))$, demand of the differentiated good will be $x_k(\omega) = \mu \frac{I_k}{P_k} \left(\frac{p_k(\omega)}{P_k} \right)^{-\eta}$ with price index $P_k = \left(\int_{\omega} (p_k(\omega)^{1-\eta} d\omega \right)^{\frac{1}{1-\eta}}$.[5]

3.2 Firm Heterogeneity and Production

On the supply side, in each country there is a mass N of potential entrant firms. Potential firms, like in Melitz (2003), need to pay a sunk cost, S, before being able to observe their randomly drawn productivity type and choose whether to start producing or exit the market. The productivity type is defined by the level of marginal costs, it is denoted by m and follows distribution $G(m)$[6]. Because each firm produces only one variety of the differentiate good, the variety indicator ω and the productivity type m are interchangeable. For the firms that pay the sunk cost, the profit from serving domestic demand of the differentiated good in the Home country is given by

$$\pi_D = (1-t) \left[x(m) \left(p(m) - c(m) \right) - f_D \right], \tag{4}$$

where $c(m) = \mathrm{w}m$ indicates variable cost and f_D indicates fixed costs. As mentioned earlier, the data used in this paper do not allow to observe firm-level exit and entry in the domestic market: all observed firms started production before the beginning of the panel and stayed active during its own length. This lead to the assumption that $f_D = 0$, which implies that all firms with strictly positive productivity actively serve the domestic demand.

Firms in the differentiated good sector are monopolistically competitive: they take demand for the variety they produce and price index for the country they serve as given, and

[5] In Helpman et al. (2003) the differentiated good is produced in H sectors, each having a different set of varieties Ω_h with $h = 1, ..., H$, so demand for the differentiated good and price index are both specific to each sector within each country. Here the setup is simplified by assuming there is only one sector producing the differentiated good $x(\omega)$. This does not affect the result on corporate taxes.

[6] It is here implicitly assumed that the support of G(m) is the positive real line. Helpman et al. (2003) and Yeaple (2009) assume that G(m) is Pareto, implying its support corresponds to the interval $[b, \infty)$, with $b > 0$,

maximise profit by charging the optimal price $p(m) = c(m)\frac{\eta}{\eta-1} = \frac{m\mathrm{w}}{\alpha}$. This yield maximum profit from domestic production, which is

$$\pi_D = (1-t)\left[\frac{\mu I}{\eta P^{1-\eta}}\left(\frac{m\mathrm{w}}{\alpha}\right)^{1-\eta}\right]. \tag{5}$$

The differentiated good is demanded worldwide, so each domestic firm can expand its activity in order to serve foreign demand of the variety it specialises in. Foreign demand can be served by increasing the scale of domestic production to export the share in excess of domestic demand to the foreign market, or alternatively by purchasing the control of a foreign firm to adapt its technology and have it serve demand for local consumers.[7] The first option implies no fixed cost[8], but it requires that τ units of differentiated good are transported to the foreign market for a single unit to be delivered (so $\tau_k > 1$ denotes iceberg transport costs between the Home country and the destination country k). The second option involves no transport costs, but requires that the fixed cost f_A is paid, together with the acquisition price for the purchase of the foreign subsidiary.

The market for corporate control is perfectly competitive, so any potential target is acquired at the target's shareholders reservation price, which corresponds to the post-tax domestic profit realised by the target firm, denoted by $(1-t_k)\bar{\pi}_k$. The target firms technology can be adapted by the acquirer firm to produce the variety of differentiated good in which the acquirer specialises, so the determinants of $\bar{\pi}_k$ are not modelled. The fixed costs associated with making an acquisition can be thought of as including also the cost of adapting the technology of the target for production of the acquirer's differentiated good variety.

Defining the *mark-up adjusted demand* of the Home country as $A = \frac{\mu I}{\eta(P\alpha)^{1-\eta}}$ allows to rewrite Equation 5 as

[7]Helpman et al. (2003) do not explicitly talk about acquisitions in their original model. They only talk about the option of locating production abroad, which implicitly means that domestic firms can make Greenfield Investments by setting up new subsidiaries in the foreign market. Nocke and Yeaple (2007) extend the HMY model by allowing firms to make either Greenfield Investment or Acquisitions in order to serve foreign demand. Here interest lies on the determinants of the choice of making an acquisition, rather than on the determinants of the choice between Greenfield Investment and Acquisitions. Also, the data used in this paper do not include expansions of domestic firms through Geenfield Investments. For this reason the Greenfield Investment option is not modelled.

[8]In Helpman et al. (2003) there is a fixed cost also associated with export, which implies that there exist a productivity cutoff below which firms cannot afford serving foreign demand through export. Once more, the assumption of no fixed costs associated to export is due to the fact that the dataset used here does not allow to observe entry and exit in the export market.

$$\pi_D = (1-t)\left[A(m\mathrm{w})^{1-\eta}\right], \tag{6}$$

and also to derive the equations for the additional profit from export ($\pi_{ij,E}$) and from cross-border acquisition ($\pi_{ij,A}$) as

$$\pi_{k,E} = (1-t)\left[A_k(m\mathrm{w}\tau_k)^{1-\eta}\right] \tag{7}$$

$$\pi_{k,A} = (1-t_k-T)\left[A_k(m\mathrm{w}_k)^{1-\eta} - f_A^k\right] - (1-t_k)\bar{\pi}_k \tag{8}$$

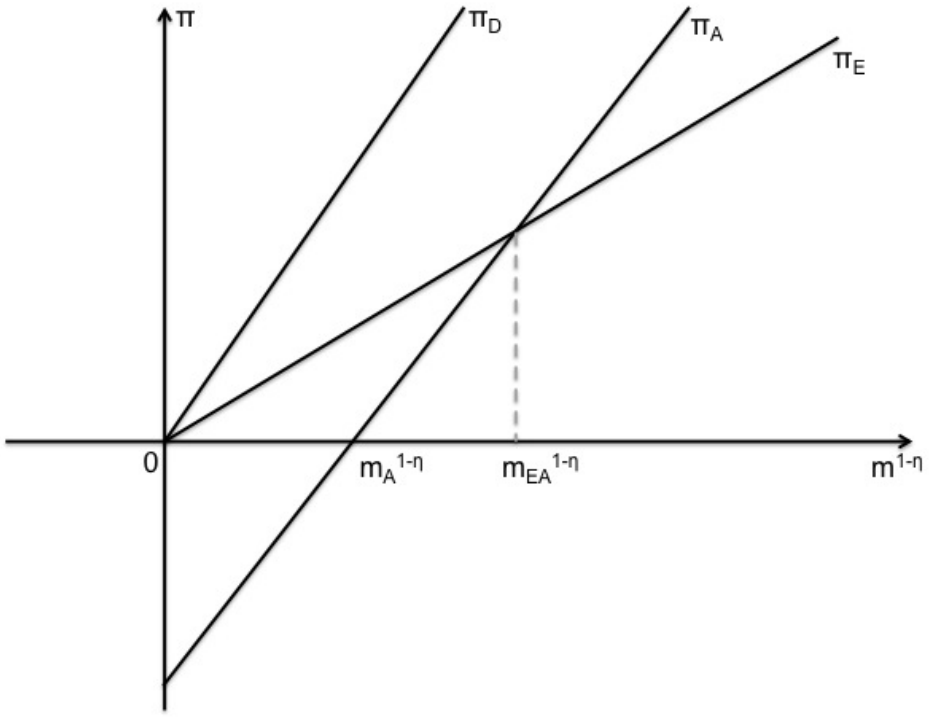
Condition necessary to guarantee a specific ordering in the sorting of firms into different foreign market entry mode is that the tax-adjusted transport cost between Home and the Foreign country k is relatively high with respect to the wage differential between the two countries, which is

$$\tau_k^{\eta-1}\frac{(1-t_k-T)}{(1-t)} > \frac{\mathrm{w}_k^{\eta-1}}{\mathrm{w}^{\eta-1}}. \tag{9}$$

This condition adapts the assumption of Helpman et al. (2003) to an environment where corporate taxes are levied by both the domestic and foreign government (Lockwood (2012)). It implies that the profit from making an acquisition is more responsive to m than the profit from doing export, which is $\frac{\partial \pi_A}{\partial m} > \frac{\partial \pi_E}{\partial m}$. Additionally, it rules out the possibility that firms engage in "export platform FDI", which is setting up production in a foreign country in order to export from that country to a third locations.

The Figure shows the different profit functions for the case where countries are symmetric in terms of demand, wage and corporate taxes. It shows the well known result of Melitz's model, adapted to the case where there are no fixed costs associated to domestic production or export. With a positive level of productivity ($1/m > 0$), all firms can afford to produce domestically and export to foreign countries, because a positive profit can be realised in both markets. The domestic profit function is more responsive to m than the export profit function because of the iceberg transport costs. At the same time, the acquisition profit function is shifted below the domestic profit function because of the fixed costs associated with purchasing a foreign subsidiary. In particular, from $f_A > 0$ it follows that firms choose how to serve the foreign demand according to their productivity. Firms with $m > m_A$ would realise

Profit from Domestic Production (π_D) and addition Profit from Export (π_E) and cross-border M&A (π_A) in the case of symmetric countries



positive profits from acquiring a foreign subsidiary, but they will not choose this strategy over exports unless $m > m_{EA}$, which is the productivity cutoff of indifference between doing exports and purchasing a foreign subsidiary.

At equilibrium, firms will expand their activity through the acquisition of a foreign subsidiary only if, conditional on their productivity level, they expect to realise a strictly positive profit. At equilibrium, the condition of indifference between making or not the cross-border acquisition is given by equating the profits from export and cross-border acquisitions:

$$(1 - t_k - T)\left[A_k \frac{m^{1-\eta}}{\mathrm{w}_k^{\eta-1}} - f_A^k\right] - (1 - t_k)\bar{\pi}_k = (1 - t)\left[A_k \frac{m^{1-\eta}}{(\mathrm{w}\tau_k)^{\eta-1}}\right] \tag{10}$$

3.3 Effect of Corporate Taxes on Cross-Border Acquisitions

The interest of this paper lies on understanding the effect of corporate taxes on a firm's decision to expand the scale of its activity by acquiring another pre-existing firm located in a foreign country. As discussed above, all firms have the ability to serve foreign demand through exports, but it is the cutoff level m_{EA}^k that, at equilibrium, defines the position

of indifference for making cross-border acquisitions. The number of firms headquartered in the Home country that will complete a M&A in the foreign country k is given by $N_A^k = N(1 - G(m_{EA}^k))$. So the probability of being among these firms is determined by the cutoff productivity level m_{EA}^k, which can be derived from Equation (10), as

$$(m_{E,A}^k)^{\eta-1} = \frac{1}{A_k}\left(\frac{\left[(1-t_k-T)f_A^k + (1-t_k)\bar{\pi}_k\right]}{\left[(1-t_k-T)\mathrm{w}_k^{1-\eta} - (1-t)(\mathrm{w}\tau_k)^{1-\eta}\right]}\right) \tag{11}$$

An analysis of the equilibrium condition for the cutoff m_{EA}^k allows to make some predictions on the effect of corporate taxes on the probability that a firm can afford the fixed costs associated with making the cross-border acquisition. The first term on the RHS is an inverse measure of the size of the mark-up adjusted demand in the foreign country, and the second term is a relative measure of the fixed costs associated with making the acquisition. In particular, the denominator of the second term gives the marginal cost savings from expanding through M&A (rather than through the implicit alternative represented by exports).

Proposition 1: *An increase in the Corporate Statutory Tax Rate of the Home country, t, raises the marginal cost savings from making acquisitions instead of exports. So it causes the productivity cutoff level $m_{E,A}$ to fall*

Proposition 1 implies that, following an increase in the home statutory tax rate, the mass of firms making cross-border $M\&A$ is larger and their average productivity is lower. This is in line with the literature on tax competition, according to which high home corporate taxes drive capital toward locations with "lighter" tax jurisdictions. Firms whose productivity is just below the level that would allow them to afford the high costs associated with acquiring a foreign subsidiary will be affected by a change in t. When facing an increase in home corporate taxes, these firms see in cross-border acquisitions an opportunity to save marginal costs by locating production destined to serve foreign demand directly abroad.

However, the effect of an increase in home corporate taxes is relevant for firms with productivity in the neighbourhood of $m_{E,A}$. Firms with a very low level of mobile capability might not be able to benefit from the shift in the productivity cutoff $m_{E,A}$. This particularly applies to firms that are just productive enough to serve foreign demand with exports. Conjecture could be made that an increase in Home corporate taxes has on these firms the opposite effect of what stated in Proposition 1. An increase of home corporate taxes could represent to these firms a reduction in domestic post-tax profit, with the result of delaying any ongoing internationalization process. The empirical investigation conducted in this paper

pays particular attention to controlling for different sources of heterogeneity across firms, and testing whether Proposition 1 equally holds for "all types" of firms observed in the sample.

Proposition 2: *An increase in the Foreign Profit Repatriation Tax, T, reduces the marginal cost savings from making acquisitions instead of exports. So it causes the productivity cutoff level $m_{E,A}$ to raise*

Proposition 2 implies that, following an increase in the Repatriation Tax (T), the mass of firms making cross-border M&As is smaller, and their average productivity is larger. Because a higher repatriation tax reduces the post-tax profit realised by the foreign subsidiary, it makes cross-border M&As less desirable and it pushes the cutoff productivity level toward the right. This argument is in line with the suggestions advanced from the literature on double taxations. In fact, in a situation where firms from different countries compete over the acquisition of a particular target, firms located in countries that apply exemption reliefs from double taxation of foreign repatriated profit will have an advantage w.r.t. firms that are located in countries that don't.

These two propositions can be empirically tested in a model for the probability that a firm expands its ownership structure through the acquisition of a pre-existing subsidiary. From Equation (10) follows the condition necessary for any firm to be able to afford a cross-border M&A, which is $\pi_A \geq \pi_E$. Impose that all acquisition fixed costs are firm i and time s specific, and that they have both a stochastic and a non-stochastic component, so that

$$(1 - t_k - T)f_A + (1 - t_k)\bar{\pi}_k = F_i \exp(\epsilon_{i,s}). \tag{12}$$

After defining $y_{i,s}$ as an indicator function for whether firm i chooses to make a cross-border acquisition in year s, Equation (10) and (12) can be combined into

$$y_{i,s} = 1\left[(1 - t_k - T)A_k \mathrm{w}_k^{1-\eta}\left(1 - \frac{(1-t)}{(1-t_k-T)}\frac{(\mathrm{w}\tau)^{1-\eta}}{\mathrm{w}_k^{1-\eta}}\right)m_i^{1-\eta} \geq F_i \exp(\epsilon_{i,s})\right],$$

whose logarithm motivates the following reduced form econometric specification

$$y_{i,s} = 1[\beta'_{ind}Ind_i + \beta'_y Year_s + \beta'_t TAX_{is} + \beta'_z Z_{i,s} + \beta'_h Home_i + c_i + \epsilon_{i,s} \geq 0]. \tag{13}$$

Dummies for the Industrial Sector and the Year of the acquisition (Ind_i and $Year_s$) con-

trol for the economic climate in which the expansion takes place[9]. Characteristics of the acquirer's Home country tax system ($TAX_{i,s}$) allow to test Proposition 1 and Proposition 2. Characteristics of the acquirer's Home country ($Z_{i,s}$ and $Home_i$) control for the marginal cost savings from serving foreign demand through acquisitions, and firms heterogeneity (c_i) control for the acquirer's specific unobserved heterogeneity, such as the productivity level and the specific fixed costs.

3.4 Domestic Acquisitions

The model presented in Section 3.3 explains how productivity determines the mode chosen by firms to serve foreign demand. Firms that are highly productive can afford the fixed costs associated with cross border acquisitions and become multinationals. This section extends the model in order to explain the motives behind a different kind of expansion: the acquisition of domestic subsidiaries made by multinational firms. Under the proposed extension, Proposition 1 and 2 hold for all firms in the economy. In addition, it can be shown that the Home Corporate Statutory Tax rate, t, has no effect on multinational firms' decision of acquiring a domestic subsidiary in order to expand domestic production.

The "OLI" framework, introduced by Dunning (1997), argues that multinational firms benefit from advantages derived from their Ownership, Location and Internalization features. In particular, Internalization advantages arise when multinational firms benefit from taking control of firms that would otherwise conduct production at higher costs, or lower quality. Following this argument, the model of Helpman et al. (2003) can be extended by assuming that marginal costs of production are higher for domestic firms that do not own the comparative advantages described by Dunning.[10] Under this assumption, the *total* post-tax profit for a domestic firm is

$$\pi_k^{Dom} = (1-t)\lambda \left[A(m\mathrm{w})^{1-\eta} + A_k(m\mathrm{w}\tau_k)^{1-\eta} \right], \tag{14}$$

[9] As discussed in section 4, any variable specific to the acquisition target or its location, meant to proxies for the target country Demand (A_k) or for the target country tax system (t_k), are endogenous to the firm's choice of expanding through M&As, and cannot be used in a probit model

[10] Nocke and Yeaple (2007) also extend HMY in this direction. Their model suggests that firms are characterised by two types of productivity, and that these productivities differ in terms of mobility. *Technological capabilities* (the $1/m$ in HMY's model) are fully mobile and can be freely transferred across production sites, whereas *Marketing capabilities* can be transferred only at a non-zero cost. In this setup domestic M&A are used by firms to match capabilities and acquire the "productivity profile" that maximises overall profit.

and the *total* post-tax profit of a multinational firm is

$$\pi_k^{MNE} = (1-t)\left[A(m\mathrm{w})^{1-\eta}\right] + (1-t_k-T)\left[A_k(m\mathrm{w}_k)^{1-\eta} - f_A\right] - (1-t_k)\bar{\pi}, \qquad (15)$$

where $\lambda \in (0,1)$ represents an efficiency parameter, common to all domestic firms.[11] The differences between the two profit functions indicate that drawing a low productivity type ($m < m_{EA}$) not only determines the decision on how to serve foreign demand (whether through exports or cross-border acquisitions), but also limits access to the OLI comparative advantages and negatively affects production efficiency.

At equilibrium, the cutoff productivity level of indifference between choosing cross-border acquisitions over exports is now given by

$$(m_{E,A}^k)^{\eta-1} = \frac{\left[(1-t_k-T)f_A^k + (1-t_k)\bar{\pi}_k\right]}{A\left[(1-\lambda)(1-t)\mathrm{w}^{1-\eta}\right] + A_k\left[(1-t_k-T)\mathrm{w}_k^{1-\eta} - \lambda(1-t)(\mathrm{w}\tau_k)^{1-\eta}\right]},$$

The first term of the denominator measures the efficiency gains from serving domestic demand as a multinational, and the second term of the denominator measures the marginal cost savings from serving foreign demand with cross-border acquisitions, rather than with exports. When all firms are equally efficient ($\lambda = 1$), the cutoff is equivalent to the one discussed in the previous section. However, the wider is the efficiency gap between domestic and multinationals (i.e. the closer λ is to 0) and the lower the productivity cutoff of indifference for undertaking cross-border acquisitions. This recalls HMY's result on the distribution of productivity: countries with higher firms heterogeneity are characterised by a larger mass of firms choosing to serve foreign demand with FDI.

The existence of an efficiency gap between domestic and multinationals also explains the motives for domestic acquisitions. Multinational firms now have the incentive to acquire domestic firms, transfer technology on to the target, and benefit from the synergies generated in terms of efficiency gains. This implies that all firms with high productivity ($m > m_{EA}$) now have the additional option of expanding domestic production with the acquisition of a (less-efficient) domestic firm, and realise the additional profit

$$\pi_{DA}^{MNE} = (1-t)\left[A(m\mathrm{w})^{1-\eta} - f_{DA}\right] - (1-t)\left[A(m\mathrm{w})^{1-\eta}\lambda\right],$$

where f_{DA} is fully deductible fixed cost from the acquisition and the second term is the

[11] *Total* post tax profit includes all profits from serving domestic and foreign demand

price paid to purchase the target firm. At equilibrium, multinational firms will choose this option if $\pi_{DA}^{MNE} > 0$, which implies the productivity cutoff level of indifference with respect to domestic acquisitions

$$(m_{DA})^{1-\eta} = \frac{f_{DA}}{A\mathrm{w}^{1-\eta}(1-\lambda)} \tag{16}$$

Equation (16) implies that larger differences in efficiency between multinational and domestic firms (i.e. a lower λ) increase the incentive for domestic acquisitions, because imply larger efficiency gains from domestic expansions. The derived condition also leads to a preposition on the effect of taxes on domestic acquisitions. In particular

Proposition 3: *An increase in the Home Corporate Tax Rate, t, does not affect the probability that a multinational firm expands domestic production with the acquisition of a (less efficient) non-multinational firm.*

4 The Data

Two facts stressed in the UNCTAD reports are of particular interest to this paper. First cross border M&A have covered, on average over the last ten years, about 60% of total FDI flows. Second, M&A deals worth over 1 Billions USD are increasing in number and are made mostly by large multinationals located in the World largest economies. These facts reconcile with the environment described in the literature initiated by Melitz (2003) and Helpman et al. (2003). This section describes the methodology followed to build a firm-level dataset that allows to test the three prepositions derived from the theoretical model of section 3. It also presents descriptive statistics that show evidence of two key features of the data: the heterogeneity across firms, in terms of firms size and performance, and the persistence of the expansion choice, defined as time dependence in the parent firms' decision of acquiring new subsidiaries.

4.1 Firm Expansion Data

The data on firms' expansions were drawn from three commercial databases compiled by Bureau Van Dijk (B.v.D.): Orbis 2004, Zephyr 2010 and Amadeus 2010. Orbis contains information on the identity and location of all known shareholders and subsidiaries of firms active worldwide. Zephyr contains information on all ownership transactions that involved

the companies listed in Orbis. The third source, Amadeus, contains historical financials of the European firms listed in Orbis.[12] These sources were combined in order to reconstruct the decision pattern followed by headquarters that expanded through the acquisition of one or more pre-existing subsidiaries.

The data sources were combined using a two-step procedure. In the first step, data from Orbis were used to identify all the ownership links that connect *large* and *very large*[13] firms to their shareholders, as at the end of financial year 2004.[14] The reconstructed ownership maps list each firm under the control of its direct majority shareholder, and report it as part of the corporate structure of a unique "Global Ultimate Owner" (GUO) (hereafter also referred to as "parent" or "headquarter"). This simplification reflects the assumption that, for a given level of dependency, the largest shareholder has the power to influence all changes in the ownership of its controlled subsidiaries, so that, for a given organisation, the "Global Ultimate Owner" can be held accountable for the expansion decisions that involve the subsidiaries linked to its ownership structure.[15] Through this first step, three different types of firms were identified: *standalone* firms (consisting of a single company with no subsidiaries), *domestic* firms (consisting of a parent linked to one or more subsidiaries, all located within the parent's domestic borders), and *multinational* firms (consisting of a parent linked to at least one subsidiary located in a foreign country). The classification of firms into types is based on 2004 data and it is time-invariant, so it is exogenous to all ownership changes that occurred between 2005 and 2010. This step resulted in the identification of a *base sample* of 28,940 European parent firms.

The second step involved the selection of mergers and acquisitions reported in Zephyr, that affected the composition of the base sample identified in the previous step. All M&A deals that involved the purchase of the *controlling* share of a pre-existing firm made by a *known* acquirer (matching a parent or a subsidiary of the base sample) were used to update

[12] Amadeus constitutes a subset of Orbis. Access to the sources used in this paper included only information on the ownership links reported in the 2004 CD update of Orbis, and on the historical data for the financial years 2002-2010 reported in the 2011 internet update of Amadeus.

[13] B.v.D. defines a firm as "very large" if its operating revenue is above 140 mil USD, if its total assets are above 280 mil USD or if its employees are more than 1000. It defines a firm as "large" if these figures are reduced to, respectively, over 14 mil USD, over 20 mil USD and over 150 employees. The internet version of any B.v.D. database provides no access to information on medium and small companies, which generally cover about the 85% of the overall sample.

[14] The Bureau Van Dijk lists all types of shareholders, among which private individuals, public authorities, institutions and foundations. For the purpose of reconstructing the corporate ownership structures, only shareholders corresponding to firms were considered.

[15] The ownership structure reconstructed at this stage can have up to ten different subsidiary dependency levels.

the ownership structures, as to the end of the financial year 2005. Such M&A deals unambiguously affect the composition of the base sample, because they imply the addition of a new subsidiary to the ownership structure of the acquiring parent. This updating process was recursively repeated for all years up to 2010, so to form a final panel spanning six financial periods. This step resulted in the creation of an indicator variable that defines a parent firm as making an "expansion" in year s if, by the end of financial year s, at least one new subsidiary was added to its ownership structure, following the acquisition of its controlling share.[16]

One of the advantages of the dataset is that it does not require sample restrictions based on firm characteristics. In fact, the only conditions imposed are: (1) an ownership link is defined on the basis of the largest share of the subsidiary, and (2) an M&A deal is considered only upon availability of full information about its ownership effects. This guarantees perfect identification of the expansion mode[17], and at the same time preserves the heterogeneity across parent firms.

4.2 Firm Heterogeneity and Expansion Persistency

The final sample of 28,940 parent firms is constituted by 3,268 multinational firms (the 11% of the sample), 10,855 domestic firms (the 38% of the sample) and 14,817 standalone firms (the 51.20% of the sample). Firms' size, measured in terms of number of subsidiaries controlled by the parent at the end of 2004 represents a source of (observable) heterogeneity. As shown in Table 2, the average multinational parent controls 11 subsidiaries, while the largest control more than 121. Domestic firms are considerably smaller than multinationals, but equally diverse, with the average parent controlling only 3 subsidiaries and the largest controlling above 20. Finally, as revealed by the top graph in Figure 2, the distribution of size for the subsample of firms that never made an acquisition between 2005 and 2010 is more (positively) skewed than that of firms that made at least one acquisition. The same level

[16] A parent firm makes a "direct" acquisition if it is reported in Zephyr as the acquirer of the completed deal, whereas it makes an "indirect" acquisition if one of its subsidiaries (irrespective of their dependency level) is reported in Zephyr as the acquirer of the completed deal.

[17] Other definitions of the expansion choice could generate ambiguity on the nature of the ownership change. For example, an alternative to the methodology proposed here would be to compare the ownership structure of the parent companies at two different points in time, and build an indicator variable for the expansion choice based on whether a new subsidiary is observed in the second period. This procedure would require an assumption on the very nature of the expansion, because it would be based on no information on whether the expansions followed an acquisition, a merger or rather a Greenfield Investment (i.e. the creation of a new firm)

of heterogeneity seems to be preserved by a second measure of size, defined as the number of countries where the controlled subsidiaries are located. Table 2 and the bottom graph of Figure 2 report statistics for this second variable. Note that size, measured by number or geographic spread of owned subsidiaries, does not directly capture the scale of production. It rather controls for the complexity of the ownership structure of a parent firm, relevant when the expansion is defined in terms of newly acquired subsidiaries. Table 3 and Table 4 report the geographic and industrial sector coverage of the sample. United Kingdom, Spain and France are the countries where the largest number of parent firms is legally registered; while Financial Services, Retail and Manufacturing are the industrial sectors in which the largest number of parent firms operate. As can be noted in these Tables, a second source of heterogeneity is represented by the distribution of firms' types within each country or industrial sector.

Part of the international trade literature has focused on testing the presence of a relation between productivity and firms self selection into the export market (see Wagner (2005) for a comprehensive survey). This has been done following different methodologies: linear model estimation for the direct effect of exports on firms productivity growth; quantile regressions for the effects of exporting on firms productivity; or comparison of productivity between matched firms. The dataset described above does not allow to directly test the hypothesis that productivity is higher among firms involved in M&A projects, simply because productivity remains unobserved. The dataset, however, allows to build an indirect test based on those firms observed characteristics that, as suggested by the model, are related to productivity. [18]

For each firm "type" (multinational, domestic and standalone), the characteristics of the parent firms who never expanded between 2005 and 2010 were compared to the characteristics of the parent firms that expanded at least once during the same period. Firms were compared in terms of size (measured by Volume of Sales), in terms of stock of intellectual capital (measured by Intangible Assets), performance (measured by Revenues and Profit) and labour cost. All size and performance characteristics were measured in terms of average over the pre-acquisition period (2002-2004). The results are reported in Table 5. The tests on the multinational firms were conducted on the full sub-sample, and then repeated after excluding the largest 5% of parent firms, those that controlled more than 8 subsidiaries by the end of 2004. For each size and performance variable, the Table reports the mean for the groups of non-expanding and expanding firms (column [1] and [2]), a test for the difference

[18] Amadeus allows to collect information on the consolidated financial accounts of the observed parent firms

in these mean (column [5]), and a two-sample Kolmogorov Smirnov tests for the equality of the distributions of each characteristic across the two groups (column [6]).

The table shows three different results. First, for all characteristics and for all parent firm types, the group of expanding firms stochastically dominates the group of non-expanding firms, suggesting that expanding firms are larger and better performing than non-expanding ones. Second, the mean characteristics for standalone firms are always lower than the mean characteristics for domestic firms, and the mean characteristics for domestic firms are lower than those of multinationals, suggesting that there is a sorting of firms into "types". Finally, the difference in mean characteristics between expanding and non-expanding firms is considerably larger for standalone firms than for domestic, and even more so for multinationals, suggesting that heterogeneity in size and performance is higher between standalone firms, and those standalone firms who do expand are considerably better performing than the average of their type.

The second feature of the dataset is persistence in the expansion decision. Table 6 shows statistics on firms transition across different ownership "types". Column [a] reports the number of acquisitions completed every year: it shows that domestic and multinational parent firms are more involved into M&A transactions than standalone firms, and that in general over the years the total number of completed acquisitions has more than halved for all firm "types". Column [b] reports the percentage of firms that transition into a different ownership "type", cases like those of Standalone and Domestic firms acquiring across borders, or those of Standalone firms acquiring domestically. The table shows that around 20% of the acquisitions completed in the observed period involved domestic firms acquiring their first international subsidiary and transitioning into a multinational organisation. Table 7 reports the probability that a parent firm expands through M&As, conditional on the previous period expansion decision. The first three columns report statistics for the total sample, while the remainder of the table separately looks at the different firm "types". The unconditional probability of making an expansion is between 0.015 and 0.036 for the overall sample, but raises as high as 0.16 for multinational parent firms and drops as low as 0.001 for standalone firms: this indicates that multinational firms are unconditionally more likely to expand than domestic and standalone firms. The ratio of raw probabilities from Table 7 computed on the whole sample indicates that firms that did expand in period $s-1$ are twenty times more likely to expand also in period s than firms that did not expand in $s-1$. The same ratio varies largely across firms types: multinationals that expanded in $s-1$ are only six times more likely to expand also in period s than multinationals that did not expand in $s-1$,

whereas standalone firms that have expanded in $s-1$ are up to one hundred times more likely to expand again in s than standalone that did not expand in $s-1$.

4.3 Corporate Tax Data

The empirical literature on corporate taxation argues that different measures of corporate taxes matter at each stage of an investment decision process (Devereux (2007)). This paper looks at the first stage of the process, when a firm decides whether to undertake an ownership transaction that will cause the expansion of its corporate structure. Alternative tax measures for the parent firm's Home country are included in the data. The corporate statutory tax rate (STR) simply reports the highest rate legally imposed on corporate profits by the Home country. It includes also local and regional taxes, and it does not include the tax alleviations recognised to small firms. The effective average tax rate (EATR) is a forward looking tax measure that reflects the portion of profit paid as tax in the home country, also accounting for capital tax allowances. Devereux and Griffith (1998b) and Auerbach et al. (2008) suggests that this second tax measure is particularly relevant for the stage of the investment decision process when a firm compares the capital tax treatment in the alternative locations where the investment could take place.

Choosing to purchase the controlling share of a foreign subsidiary has other tax effects for the acquiring parent. The profit of a domestic firm is simply taxed at the corporate tax rate levied by the Home country, but the taxation of a multinational firm depends on the international tax system applied by all countries where the firm operates. The profit realised at Home by the multinational parent will be taxed at the home corporate statutory rate, while the profit realised by the foreign subsidiaries is taxed at the corporate statutory rate applied by the countries where the subsidiaries are located. Following the notation of the model, denote these tax rates as t and t_k, respectively. If the post-tax profit realised by the foreign subsidiaries is not re-invested, a (non-resident) dividend withholding tax rate, d_k, can be applied by the foreign country before the profit is repatriated as dividends to the parent firm, so that total tax rate levied by the foreign country is $t_k+(1-t_k)d_k$. If the Home country applies a source-based system and taxes only profits realised within the domestic borders, the repatriated profit is practically exempted from further taxation. In principle, however, the repatriated profit can also be taxed by the parent firm's Home country. If the Home country applies a residence-based system, worldwide profits of the parent firms resident within the domestic borders are taxed at rate t. In order to reduce the burden of international double taxation, countries can coordinate and provide different tax reliefs. In particular, the Home

country can allow a tax-credit for the overall amount of taxes already paid in the foreign country (indirect credit system) or a tax-credit for the amount of withholding dividend taxes already pad in the foreign country (direct credit system). The tax credit is given when foreign tax rates are higher than domestic tax rates (which is $t_k + (1 - t_k)d_k > t$ in the case of indirect credit and $d_k > t$ in the case of direct credit), and guarantees equal tax treatment of all profits realised by the multinational firm. The data used in this paper include information on the double tax system applied by the Home country of the observed firms, which allows to tests the second proposition derived from the model. Table 8 reports descriptive statistics for the tax variables applied in all countries where the parent firms observed in the sample reside. The table also indicates whether the parent Home country applies the Credit or the Exemption system to foreign repatriated profit.

Characteristics of the tax system applied by the country where the acquired subsidiary is located, are, instead, endogenous to the binary choice of whether or not to make the ownership expansion. One way to overcome this limitation would be to include information on the characteristics of the "most generous foreign tax system", which is common to all firms, and exogenous to the expansion choice. In fact, other things being equal, any expanding firm should prefer directing its investment toward this tax-favourable location. However, variables that capture the main features of the most advantageous fiscal system available among a given pool of countries (or even the entire World) do not have enough variation over the observed six years period, so their effect on the expansion choice cannot be estimated.

5 Empirical Strategy

The dataset built for this paper tracks all M&A deals completed by the base sample of 28,940 European companies over a period of six years (2005-2010). It allows to follow the time-pattern of corporate structure changes and to extend the static discrete choice model of Equation (13) into a setup that accounts for the presence of time-dependence in the choice-outcome.

Time-dependence in the decision of making a M&A can be explained by different arguments. First, a single M&A could represent only one stage of a complex ownership restructuring process. The headquarter might be going through a phase of diversification into new markets. It could be starting a large expansion that implies extending production to different locations, or it could be transitioning from a standalone, into a domestic and finally a

multinational corporation. All these changes are radical enough to potentially require several periods to be completed. This effect would be particularly captured by data with a short time coverage, like those used in this paper. Second, time-dependence could be due to an "acquisition *learning* process" that affects the cost structure faced by firms that repeat the same choice over time. In the model presented, the fixed cost of making an acquisition is time invariant, so it is similar to a sunk cost, that firms need to pay in order to break into the acquisition market. Once the fixed cost is paid, the acquiring firm needs to cover only the marginal cost of additional acquisitions. An extension of the theoretical model into a second period would show that firms who already acquired in the first period have an advantage in undertaking acquisitions also in the second period with respect to firms who did not acquire in the first period. Alternatively, similarly to what suggested by Roberts and Tybout (1997), Bernard and Jensen (2004) and Das et al. (2007), the level of fixed cost could depend on the amount of experience that the firm has in the matter of M&As. Having successfully completed M&As in the past means that a firm has already adapted its organisation to the existence of dependent subsidiaries, so that making additional acquisitions comes at a lower cost. Finally, conjectures could be made in support of a negative effect of past acquisitions on the probability of making new acquisitions. For example a firm that persistently enters the same market could find it increasingly costly to complete a new investment, because of the gradual market saturation resulting from previous M&As. Or a firm with an already sophisticated structure might find it particularly difficult to stretch its managerial capacity and its coordination network to an additional subsidiary.

To allow for the dynamics in the estimated model, Equation (13) is rewritten as

$$y_{i,s} = 1[\gamma y_{i,s-1} + \beta' \mathbf{X}_{i,s} + c_i + \epsilon_{i,s} > 0] \tag{17}$$

where $y_{i,s}$ is a dichotomous variable, equal to 1 if the headquarter of company i completes the acquisition of at least one new subsidiary by the end of accounting period s.[19] $\mathbf{X}_{i,s} = (TAX_{i,s}, Z_{i,s-1}, H_i, Y_s, Ind_i)$, where $TAX_{i,s}$ is a vector of variables capturing different aspects of the parent home country fiscal system, $Z_{i,s-1}$ is a vector of macroeconomic indicators for the parent home country, H_i, Y_s and Ind_i are parent home country, year and industry-specific dummies. c_i denotes the unobserved firm-specific heterogeneity. Testing for

[19] A firm is defined as undertaking an "ownership expansion" if at least one subsidiary is acquired for the majority share during the course of a particular financial year. This definition allows to control also for expansions that correspond to the contemporaneous acquisition of several subsidiaries. The data section gives an accurate description of how the definition of expansion was applied to construct the dataset. In the empirical investigation, distinction is made between expansions that involve only cross-border acquisitions and expansion that involve both domestic and cross-border acquisitions.

the presence of time-dependence in the acquisition choice, corresponds to investigate on the significance of γ.

Assuming a normal distribution for the disturbances, $\epsilon_{i,s}$, a dynamic Random Effect (RE) Probit for the probability that a parent firm undertakes an "ownership expansion" is specified

$$Pr(y_{i,s} = 1|y_{i,s-1}, \mathbf{X}_i, c_i) = \Phi(\gamma y_{i,s-1} + \beta' \mathbf{X}_{i,s} + c_i) \tag{18}$$

Conditional on the dynamics of Equation (17) being well specified and on $\mathbf{X}_{i,s}$ being strictly exogenous, the likelihood contribution of firm i can be written as

$$L_i = \prod_{s=1}^{S} f(y_{i,s}|y_{i,0}, \mathbf{X}_{i,s}, c_i) = \prod_{s=1}^{S} \Phi[(\gamma y_{i,s-1} + \beta' \mathbf{X}_{is} + c_i)(2y_{i,s} - 1)]$$

The advantage of this specification is that it can capture the presence of state-dependence (which is observed if $\gamma \neq 0$), while distinguishing its effects from that of unobserved heterogeneity. It allows to quantify how much the likelihood of a firm's expansion is affected by the fact that the same firm has already expanded in the previous period. At the same time it guarantees that the observed dynamic effect is due to true state dependence, rather than due to unobserved time-invariant characteristics specific to the firm under observation.

Dynamic probit models, defined as in (18), suffer from the well-known *initial condition problem*. The unobserved heterogeneity captured by the random coefficient c_i is correlated with the initial value of the dependent variable, $y_{i,0}$. The co-presence of these two elements in the equation for the conditional probability of $y_{i,s} = 1$ would make the parameter estimates inconsistent and would cause a positive bias in the estimation of γ. The "naive" approach of treating y_{i0} as non stochastic (which corresponds to assuming its exogeneity with respect to c_i) represents a solution to the problem only if the first period observed in the sample corresponds to the beginning of the true data generating process.[20] In that case the density of c_i would be integrated out of the Likelihood function and the conditional probability of observing an expansion would be estimated using maximum likelihood. In this paper, the dataset starting period does not correspond to the incorporation date of the firms observed in the sample[21], hence this first approach cannot be applied.

[20] Wooldridge (2010) argues that the exogeneity between $y_{i,0}$ and the c_i is questionable, regardless of whether y_{i0} corresponds to the beginning of the data generating process, in all cases where the unobserved heterogeneity is supposed to affect the dependent variable in $s > 0$.

[21] Also consider that a panel including all firms from their incorporation date would be very difficult to handle due to severe unbalanceness

The econometric literature presents other solutions to the initial condition problem. All proposed alternatives mainly consist of integrating the unobserved heterogeneity out of the likelihood function, to approximate the density of $\mathbf{y}_i$ conditional on the exogenous variables $\mathbf{X}_i$. Heckman (1981a,b) suggests to approximate the distribution of the initial value of the dependent variable, y_{i0}, conditional on the unobserved heterogeneity and the exogenous variables, while also making an assumption on the unobserved heterogeneity. Orme (1997, 2001) suggests to follow a two step procedure and find an approximation of the unobserved heterogeneity that is uncorrelated to the lagged dependent variable. Wooldridge (2005) shifts the attention on the unobserved heterogeneity, and claims another solution to the problem consists in finding an approximation of the distribution of $\mathbf{y}_i$ conditional on the initial condition and the exogenous variables, while again making an assumption on the distribution of the unobserved heterogeneity.[22]

Two recent papers have compared the performance of these different methodologies. Arulampalam and Stewart (2009) propose a shortcut to implement the Heckman estimator using standard softwares. In addition, they examine the difference between the methodologies proposed by Heckman, Orme and Wooldrige in a real application on UK unemployment data, and in a series of Monte Carlo experiments. The results from the simulations suggest that none of the three estimators performs better than the others in all cases. Akay (2011) compares the performance of the Heckman and the Wooldridge estimators, in an empirical application once more based on labour force participation, and in a series of Monte Carlo experiments. Akay's empirical application focuses on studying the performance of the different estimators in unbalanced panels. The results from his simulation show that the Heckman estimator performs better, in term of bias, in very short panels (where $T < 5$), while the Wooldridge estimator performs better for medium length panels ($5 \leq T \leq 8$).

In this paper the methodology used by Wooldridge is preferred for three specific reasons. First, the dataset used covers a period of six years, and, according to Akay (2011) Wooldridge's is the better performing estimator on this time length. Second, implementing this methodology over the available alternatives has the advantage of computational efficiency and feasibility of estimation of the average partial effects (APE). Finally, the methodology proposed by Wooldridge can be used in an extension of the random effect model where some of the parameters are allowed to vary across firms, which represents an alternative way to

[22] A different route is that of using Bayesian techniques of estimation. For Bayesian modelling and computation of discrete responses model see Lancaster (2004), Chib (1992), Albert and Chib (1993) and Chib and Greenberg (1996)

explore the heterogeneity in the data (see Greene (2004)).

Wooldridge's suggestion involves proposing an assumption for the distribution of c_i, conditional on the initial condition $y_{i,0}$ and on a set of strictly exogenous explanatory variables, z_i. Following this method,

$$c_i|y_{i,0}, z_i \sim N(\phi_0 + \phi_1 y_{i,0} + \phi' z_i; \sigma_a^2) \tag{19}$$

so that

$$c_i = \phi_0 + \phi_1 y_{i,0} + \phi' z_i + a_i \tag{20}$$

where $a_i \sim N(0, \sigma_a^2)$. This allows to substitute out the unobserved heterogeneity, c_i, with Equation (20) so that the indicator function becomes

$$y_{i,s} = 1[\gamma y_{i,s-1} + \beta' \mathbf{X}_{i,s} + (\phi_0 + \phi_1 y_{i0} + \phi' z_i + a_i) + \epsilon_{i,s} > 0] \tag{21}$$

and the unconditional likelihood contribution of firm i is

$$L_i = \int \left(\prod_{t=1}^{T} \Phi \left[(\gamma y_{i,s-1} + \beta' \mathbf{x}_{i,s} + \phi_0 + \phi_1 y_{i,0} + \phi' z_i + a_i)(2y_{i,s} - 1) \right] \right) \frac{1}{\sigma_a} f\left(\frac{a_i}{\sigma_a} \right) da \tag{22}$$

with $f(a_i)$ indicating the density of the random effects, a_i, uncorrelated with the initial condition and with the other exogenous regressors.

Wooldridge suggests that Equation (20) should contain the full history (over $s = 1, ..., S$) of the explanatory variables z. Arulampalam and Stewart (2009) specify that one could follow Mundlak and substitute $z_i = (z_{i1}, ..., z_{i,S})$ with $\bar{z}_{i\cdot} = \sum_{s=1}^{S} z_{i,s}$. They stress how Equation (13) should contain *any* exogenous time-invariant individual characteristic that explains the correlation between c_i, the initial condition $y_{i,0}$ and the other variables of the model. This constitutes a useful flexibility for the application presented in this paper, where the vector z_i can be defined in terms of observable parent-specific characteristics. Firm-specific variables are naturally affected by the contemporaneous acquisition choice, and they cannot enter the vector z_i. The same holds for firms characteristics averaged over the full length of the panel (years 2005 to 2010), but not for characteristics measured over the years preceding the first observed expansion choice (made in 2005). So for the specification of z_i, the within average over the years from 2002 to 2004 is used for each continuous variable, and the value observed at 2004 is used for each qualitative variable. The resulting set of instruments is exogenous

to the expansion choices taken during the period 2006-2010. The data allows to define three kinds of firm-specific characteristics: characteristics on financial performance of the parent firm; on the size of the firm (both in terms of volume of sales and in terms of number of owned subsidiaries); and on the level of "internationality" of a firm.

Computational convenience for this model is guaranteed by the fact that the likelihood contribution, conditional on the c_i, as above specified, corresponds to that of a standard random effects probit model. So that consistent maximum likelihood (ML) estimation of the parameters β, γ, ϕ and σ_a^2 can be obtained using standard softwares that approximate the log likelihood function using adaptive Gauss-Hermite quadrature (such as STATA12 and NLOGIT5). Note that a robust estimate of $\rho = \sigma_a^2/(\sigma_a^2 + 1)$ gives a measure of what portion of the total variance is explained by the unobserved heterogeneity. Additionally, this model allows to quantify the size of the effect of any variable of interest by deriving its Average Partial Effects (see Appendix **??**).

Finally, the model is extended to allow for the effect of the tax variable and of the lagged dependent variable to be random. This implies that the effect of a given variable on the probability of making an expansion is specific to each firm i, and follows a distribution with heterogenous mean. This extension of the classic random effect model represents an alternative way of exploring the unobserved heterogeneity in the data. The possibility of allowing the parameters to vary across firms is crucial, as it represents a way of considering that unobserved differences across firms goes as far as defining the way in which various factors, and especially corporate tax measures, affect the probability of a future corporate expansion.

The model in Equation (17) is extended as follows:

$$y_{i,s} = 1\left[\theta_{1i} y_{i,s-1} + \theta_{2i} TAX_{i,s} + \beta' \mathbf{X}_{i,s} + (\phi_0 + \phi_1 y_{i,0} + \phi' z_i + a_i) + u_{i,s} > 0\right] \qquad (23)$$

with

$$\boldsymbol{\theta}_i = \boldsymbol{\theta}' \mathrm{k}_i + \boldsymbol{\zeta} v_i$$

where $\boldsymbol{\theta}_i = (\theta_{1i}, \theta_{2i})$ are the random parameters for the $i = 1, ..., N$ parent firms, whose mean is shifted by the firm characteristics k_i. Normality of the stochastic component of the parameters, v_i, can be assumed so that $\theta_i \sim N(\theta' \mathrm{k}_i, \zeta^2)$. Exogeneity of the mean shifting firm characteristics k_i is required for consistency with the Wooldridge's initial condition model. In the empirical analysis, k_i are characteristics of the parent firm's ownership structure, as

measured before any expansion took place. By substituting the equation for the random parameter in the indicator function, the model becomes

$$y_{i,s} = 1[(\theta_1' \mathrm{k}_i) y_{i,s-1} + (\theta_2' \mathrm{k}_i) TAX_{i,s} + \beta' \mathbf{X}_{i,s} + \\ (\phi_0 + \phi_1 y_{i,0} + \phi' z_i + a_i) + (\zeta_1 v_i y_{i,s-1} + \zeta_2 v_i TAX_{i,s} + \epsilon_{i,s}) > 0] \tag{24}$$

Simulated Maximum Likelihood (SML) can be use to consistently estimate the structural parameters of Equation (24), with simulation conducted by building $\boldsymbol{\theta}_{i,d}$ over D draws of $\zeta_{i,d}$ the likelihood contribution of firm i can be approximated by

$$L_i = log \frac{1}{D} \sum_{d=1}^{D} \Bigg[\int \prod_{s=1}^{S} \Phi \Bigg((\theta_{1i,d} y_{i,s-1} + \theta_{2i,d} TAX_{i,s} + \beta' \mathbf{X}_{i,s} + \phi_0 + \phi_1 y_{i,0} + \phi' z_i + a_i) \\ (2y_{it} - 1) \Bigg) \frac{1}{\sigma_a} f \left(\frac{a_i}{\sigma_a} \right) da \Bigg] \tag{25}$$

6 Results

This section presents the results from the econometric analysis. Table 9 and 10 give a list of all the variables, their definition and descriptive statistics. Table 11 presents estimates of different dynamic probit specifications where the parent firm is recorded as making an expansion if it acquires the controlling share of at least one pre-existing subsidiary. Table 12 extends Table 11 by including additional tax variables. Table 13 and 14 restrict the definition of the choice variable and present results for models where the expansion decision is limited to only *cross-border* acquisitions and only *domestic* acquisitions, respectively. Table 13 and 14 constitute a test for the propositions derived from the theoretical model. Finally, Table 15 extends the preferred model for each choice variable using a random parameter dynamic probit.

Table 11 presents estimates of the baseline model for the parent firm's choice of making at least one acquisition, without conditioning the definition of the dependent variable on the location of the acquired subsidiary. All acquisitions are recorded as expansions at this stage, irrespective of whether they are only domestic, only cross-border or a combination of the two. Column [1] presents the results from a simple Pooled Dynamic probit model for the effect of the lagged expansion choice and of the statutory corporate tax rate levied by the parent firm's Home country (STR) on the probability of making an expansion at time s. The model also controls for observable firm heterogeneity, by including a set of dummies for the parent firm's

initial type (multinational, domestic or standalone), and allowing these dummies to shift the effect on the expansion choice of both the STR and the lagged dependent variable. Column [2] estimates a random effect dynamic probit, equivalent the model in column [1], using the Wooldridge's method. The c_i are assumed to be a linear function of the first observed choice $y_{i,0}$, and of key characteristics of the parent firm, the z_i. Motivated by the discussion of Section 4, the time-invariant firm characteristics that enter Equation (20) are the number of subsidiaries and the number of foreign countries where the subsidiaries are located, both measures of parent firms' size. Column [3] uses a richer specification for Wooldridge's assumption on the unobserved heterogeneity, by including also squared measures of the size variables. Column [4] further extends the model by controlling for macroeconomic variables reporting characteristics of the economic environment in which the parent firm operates. Finally, Column [5] presents a robustness check where the c_i are assumed to be a function of financial variables that are meant to capture the pre-acquisition performance of the parent firm. The parent firm's "type" is defined on the basis of the ownership structure as at the end of 2004, and the base category is the group of standalone firms. Parent firm's size measures are also based on the number of subsidiaries owned in 2004, and have the group standalone firms as the base case. Finally, the variables capturing the parent firm performance are measured on the average between 2002 and 2004. Dummies for the expansion year, for the Home country and for the parent firm's industrial sector are always included.

The Pooled Dynamic probit estimated in Column [1] ignores the presence of unobserved heterogeneity across firms, and estimates a large time dependence: $\hat{\gamma} = 1.948$, with $SE(\hat{\gamma}) = 0.100$ for the reference group of standalone firms. Dividing the lagged choice variable coefficient estimated in Column [2] by $\sqrt{1-\rho}$ gives a scaled coefficient of 0.776 (for standalone firms), which can be directly compared with the much higher coefficient of 1.948 estimated in Column [1].[23] In terms of Average Partial Effects (APE, reported at the bottom of Table 11), the results from the model of Column [2] imply that the probability of making an expansion in period s is 0.02 points higher for standalone firms that expanded in $s-1$ than for standalone firms that did not expand in $s-1$. According to the results from Column [1], the effect of having made an expansion in $s-1$ on the probability of making an expansion also in s is ten times higher than what estimated in Column [2]. Similar results hold for domestic and multinational firms. The model in Column [2] also allows to test whether the effect of corporate taxes is homogenous across firms' types. When interacted with the parent firm's initial type, the tax effect on the probability of making an expansion is significant at the 1% level, but it has different sign for the different types of parent firms. In particular, according

[23]RE probit coefficient estimates need to be scaled before being compared to the pooled probit coefficient estimates, see Arulampalam (1998). ρ is the constant cross-period error correlation

to the APE from Column [2], a raise of 10 percentage points in the Home Statutory Tax rate increases the probability of an expansion for a Multinational and a Domestic firm by, respectively, 1.5 and 0.3 percentage points, but reduces the probability of an expansion for a Standalone company by 0.1 percentage points.

The model in Column [3] provides further investigation on the role of firms' size. Theories on the growth of the firm suggest that firms expand only until the marginal benefit from a further expansion is zero. Accordingly, a multinational firm with a very complex structure and subsidiaries spread worldwide might represent a case where opportunities have been already exploited, and the map of potential international locations has been saturated, so that the acquisition of one more subsidiary would only increase fixed costs. This implies that there is an optimal "size" for each company, beyond which any further expansion represents a loss of efficiency. Consistently with the hypothesis of a bell shape relationship between size and probability of expansion, the results reported in Column [3] show that the estimated coefficient of parent firms' initial size (measured both in terms of number of subsidiaries and number of countries where the subsidiaries are located) is positive and significant, whereas the estimated coefficient of the squared of these measures has negative sign.

Column [4] introduces control variables for the characteristics of the Home country's economy. First, firms headquartered in larger and more industrialised countries are generally characterised by high productivity, as suggested by Melitz (2003). Also, during economic expansions firms might have stronger incentives to increase their scale of production through the acquisition of domestic subsidiaries. For this reason, the logarithm of real GDP and the industry value added (as a share of GDP) are both included in the model. The GDP variable is non-significant, whereas the Industry Value Added is positive and significant. Second, flexible and easy access to financial assets might affect the feasibility of an M&A project (see di Giovanni (2005)). This argument justifies the inclusion of three variables measuring the parent firm's home country financial "depth": the volume of domestic credit to private sector, the domestic credit provided by the banking sector and the market value of listed domestic companies, all expressed as a share of GDP. The results of Column [4] interestingly show that a greater involvement of the banking sector into the domestic credit market deteriorates the probability that parent firms undertake M&As, but larger availability of credit services to the private sector improves this probability. The size of the stock market, measured by the market capitalisation of listed company (as a share of GDP), is instead insignificant. Finally, countries whose firms are greatly involved in serving foreign markets through exports might see a low participation in the cross-border M&As, which justifies the inclusion of three variable capturing characteristics of the domestic export market. Trade, as a share

of GDP, measures the size of net exports. Consistently with the theoretical model, the effect of exports on the probability of an expansion is negative, because it indicates that domestic firms prefer serving foreign markets with exports rather than with cross-border M&As. The remaining two variables measure concentration and diversification of the export market.[24] Including both indices allows to identify different aspects of the involvement of domestic firms in international trade. A high concentration index indicates that firms undertaking exports are all concentrated in the production of few specific goods, which implies that exports is the dominant foreign market entry mode only in a minority of industrial sectors. Once the concentration index is controlled for, a high diversification index indicates that domestic exports are diversified over many goods, which translates into the fact that firms choose exports over M&A in the majority of industrial sectors. As expected, the effect of the concentration index is positive and significant, while that of the diversification index is negative and significant. With the inclusion of these macroeconomic indicators the estimated coefficients of the lagged dependent variable remain unchanged, but the size of the estimated effect of the statutory corporate tax rate for Multinational and Domestic firms falls of few points. The APEs from Column [4] indicate that a raise of 10 percentage points in the Home Statutory Tax rate increases the probability of an expansion for a Multinational firm by 0.7 percentage points (instead of 0.9 of [3]), increases the probability of an expansion for a Domestic firm by 0.1 percentage points (instead of 0.3 of [3]), but still reduces the probability of an expansion for a Standalone firm by 0.1 percentage points (as estimated in [3]). The maximised log likelihood in Column [4] is also the highest of all models estimated in Table 11, so this represents the preferred specification, base for further extension in the remainder of the econometric analysis.

Column [5] presents a robustness check for Column [4], where variables extracted from the consolidated financial accounts of the parent firm enter the vector z_i. Firm size is now captured by the natural logarithm of total sales, while performance is captured by the solvency ratio and by the profit margin. Including these variables causes a significant reduction in the sample size, due to the fact that financial accounts are available only for a subset of the observed firms (11,221 of the 28,940 parent firms). [25] The profit margin variable is not

[24] In particular, the concentration index is an Herfindahl-Hirschmann for the export market: it is increasing in the share of total export given by exports of a single product and decreasing in the number of exported products. Instead, the diversification index measures whether the composition of net exports of a given country differs from the World composition of net exports. It is close to 1 when exports are more concentrated or when they are more diversified than in the World aggregate composition

[25] The sample changes also in composition, because the consolidated financial accounts are provided to the BvD to the *discretion* of each company's headquarter. In general, simply structured firms, such as standalone and domestic firms, submit only the unconsolidated accounts,so they are the group with more missing values for these variables.

significant, but the coefficient of the sales volume and of the solvency ratio is always positive and significant. The other results are consistent with those reported in the rest of the table.

Table 12 extends the preferred model by adding variables that control for additional aspects of the home corporate fiscal regime. Column [1] reproduces Column [4] of Table 11. Column [2] adds a dummy variable controlling whether the home country applies a credit system or an exemption system on repatriated foreign profit. Column [3] includes a control variable accounting for the size of domestic capital allowances, and Column [4] substitutes the corporate tax measure, by using the Effective Average Tax rate (EATR) instead of the Statutory Tax rate (STR). The coefficient for the dummy variable on the double tax system is not significant, and neither is the coefficient for the variable on capital allowances. The EATR variable is a non-linear combination of the STR and of the variable measuring the generosity of capital allowances recognised by the Home country. The argument that firms compare EATR, when evaluating the corporate tax treatment applied in possible investment locations (Devereux and Griffith (1998b)), would imply that a raise in home corporate taxes reduces the likelihood of domestic acquisitions and increases the likelihood of cross-border acquisition, because it makes domestic taxes more unfavourable relatively to foreign taxes. The coefficient for the EATR is significant and negative, but the results indicates that changes in this variable equally affect all types of firms. In this Table, the dependent variable includes both domestic and foreign acquisitions, so at this stage it is not possible to distinguish between the effect of tax on one or the other kind of expansions.

6.1 Effects of Corporate Taxes on Cross-Border Acquisitions

The main hypothesis advanced by the theoretical model presented in Section 3 is that multinational firms are more productive than domestic firms, and consequently more likely to favour *cross-border* acquisitions over the implicit alternative represented by exports. Proposition 1 suggests that, under these conditions, a raise of Home STR lowers the productivity cutoff level of indifference between making or not a cross-border acquisition, and increases the likelihood that a high productivity firm chooses to complete the cross-border acquisition. Proposition 2, instead, suggests that parent firms located in countries that apply a Tax Credit on foreign repatriated profit are less likely to serve the foreign market with a cross-border acquisition, than parent firms located in countries that exempt foreign repatriated profits from double taxation. Additionally, the literature on profit shifting suggests that the complex ownership structure of established multinationals constitutes *per se* a comparative advantage with respect to that of domestic firms, in terms of ability to capture opportunities

and shift profit to locations that are more "tax-advantageous" than the Home country.

Table 13 allows to test Proposition 1 and Proposition 2, by estimating a model for the parent firms' choice of expanding their ownership structure through the acquisition of at least one *foreign* pre-existing subsidiary. Column [1] re-estimates the baseline model from Table 11 on the newly defined dependent variable. Column [2] presents a model specification that only controls for whether the parent firm already had the structure of a multinational organisation by the end of 2004, without distinguishing domestic parent firms from standalone parent firms, while Column [3] omits the irrelevant macroeconomic variables from Column [1]. The remainder of the table extends Column [3] with additional tax variables: Column [4] includes the dummy indicating whether the Home country applies the Credit System on foreign repatriated profits, Column [5] includes a measure of capital allowances, and Column [6] substitute the STR with the EATR.

Column [1] of Table 13 presents two interesting results. First, when it comes to cross-border acquisitions only, standalone parent firms do not seem to be significantly different from domestic parent firms. The model's estimates indicate that a change in Home STR would not affect the choice of foreign acquisition of a domestic parent firm differently than how the same change in Home STR would affect a standalone firm; and also having completed an acquisition in $s-1$ affects the probability of making a new acquisition in period s in a similar way for domestic and standalone parent firms (the Average Partial Effect (APE) estimated with respect to the lagged dependent choice variable is 0.0066 for Domestic Firms and 0.0070 for Standalone Firms). This first result motivates the specification of Column [2]. Second, the results reported in Column [1] suggest that the macroeconomic variables accounting for Home market size and financial sector "depth" do not play a role in the parent firms' decision of whether to acquire a foreign subsidiary. In fact, only the coefficients estimated for the export concentration and diversification indices are significantly different from zero. This result motivates the specification of Column [3]

Column [3] allows to conclude that the tax effects from the base line model estimated for the choice of making any acquisition (domestic and/or cross-border) also hold for the model estimated for the choice of making cross-border acquisition only. In terms of APE, the model predicts that a 10 percentage points increase in the Home STR increase the probability that a multinational parent firm acquires a foreign subsidiary by 0.6 percentage points, but reduces the probability that a standalone or a domestic firm makes the same acquisition by 0.1 percentage points. This suggests that Proposition 1 holds only for multinational firms, and that parents that do not already have a multinational structure would not find the acquisition

option more profitable than exports, following an increase of Home corporate taxes. In line with the theory, this would seem to indicate that non-multinational firms are considerably less productive than multinational firms and do not benefit from marginal shifts in the cutoff productivity level.

The results from Column [4] indicate that the probability of making a cross-border acquisition is not affected by whether the Home country applies a Tax Credit on foreign repatriated profit. This result contradicts the hypothesis advanced by Proposition 2, but could be driven by the low variation in the Tax Credit System dummy due to the fact that most countries in Europe do apply the Exemption System. Column [5] suggest that an increase of capital allowances reduces the probability that any firm chooses to make cross-border acquisitions. More generous capital allowances constitute an improvement in the domestic tax treatment of capital expenditure, that might represent an incentive to concentrate production at home, instead of locating it to a foreign location through cross-border acquisitions. Column [6] substitutes the STR measure with the EATRA, and finds results similar to those of Table 12, column [4].

A final important result from Table 13 regards the time dependence of the cross-border acquisition choice. The estimated coefficients for the lagged dependent variable are significant in all model specifications. According to the APE, multinational firms that did acquire foreign subsidiaries in $s-1$ are more likely to acquire also in period s with respect to multinationals that did not acquire in $s-1$ by only 0.002 percentage points, whereas the same difference in probabilities amounts to 0.005 for non-multinationals. This indicates that there is time dependence in the cross-border acquisition choice. However, the interesting fact is that the time dependence measured in terms of Average Partial Effects is for this choice up to five times lower than how it was for the general acquisition choice (cross-border and/or domestic acquisition).

6.2 Effects of Corporate Taxes on Domestic Acquisitions

The extension to the theoretical model presented in section 3.4 was closed by a proposition on the effect of Home corporate taxes on the choice made by multinational parent firms to acquire domestic firms, in order to increase their domestic production. In particular, proposition 3 suggested that such investment choice is affected by the size of the (mark-up adjusted) demand in the Home market and by the inefficiency of domestic firms, but it is not affected by changes in Home corporate taxes. Table 14 presents results from model specifications estimated on the parent firms choice of acquiring the controlling share of at least one domes-

tic subsidiary. Column [1] replicates the specification of the base line model from Table 11, Column [4], after omitting the macroeconomic variables controlling for the export market (that were found to have no significant effect on the domestic expansion choice). Column [2] adds the dummy controlling for whether the Home country applies the Tax Credit System, Column [3] adds the capital allowance variable and Column [4] substitute the STR with the EATR measure.

The main result from table 14 is that, in line with Proposition 3, the estimates for the coefficient of the Statutory Tax rate applied by the Home country lose significance with respect to the estimates from the models on the choice of making a general (cross border and/or domestic) or a cross-border acquisition. Column [3] accounts from the tax allowances. The estimated coefficient of the STR for domestic parent firms is significant only at the 10% level, and the estimated coefficient of the capital allowances indicates that a more generous treatment of capital expenditure represents an incentive for any type of firm to expand domestic production through the acquisition of a pre-existing domestic subsidiary, which is consistent with the results from Table 13. Finally, the estimated coefficients of the lagged dependent variable , and the respective Average Partial Effects (APE), suggest that the time dependence of the domestic acquisition choice was the driver of the results on time dependence from Table 11. In fact, whereas the time dependence in the cross-border acquisition choice is very low, Table 14 indicates that multinational firms that did acquire domestic subsidiaries in $s-1$ are more likely to acquire also in period s, with respect to multinationals that did not acquire in $s-1$, by 0.007 percentage points, and the same difference in probabilities amounts to 0.015 for domestic firms and to 0.017 for standalone firms.

6.3 Results from the Random Parameter Dynamic Probit

Table 15 present the results from model specifications that attempt a different approach to investigate the role of firm heterogeneity. The random effect dynamic probit is extended to a random *parameter* dynamic probit, that allows the estimate a firm-specific effect of corporate taxes on the probability of making an expansion. This is combined with the assumption that the observable firm heterogeneity (the parent firms' type) shifts the mean effect of the tax variable on the probability of making an acquisition.

Column [1], Column [3] and Column [5] replicate the best preferred models from Table 11, Table 13 and Table 14, respectively; while Column [2], Column [4] and Column [6] re-estimate these models allowing for a random parameter in the effect of the Home STR and of the lagged dependent variable, as shown in Equation (20). The mean of the distribution of the

random parameters is allowed to vary according to the "original firm type" (the k_i of Equation (20)), and the stochastic component of the random parameters are assumed to follow a normal distribution.

For the mean effect of the Home Statutory Tax Rate and of the lagged expansion choice, the results from the random parameter probit are quite similar to those from the random effect probit, for all dependent variables. However, Column [2], [4] and [6] of Table 15 predict a large significant variance in the distribution of the random parameters, suggesting that there is a large unobservable variation across firms in the impact of corporate taxes on the probability of an expansion, and that the same is true for the size and direction of the state dependence.

Figure (3), (4) and (5) show the Kernel Density Estimate for the Distribution of the Tax Effect, as estimated in Column [2], [4] and [6], respectively. Figure (3) shows that for standalone firms (which are the largest mass) the decision of making any kind of acquisition is negatively affected by an increase in the Home Statutory Tax Rate. The same result holds when the expansion decision is restricted to cross-border acquisitions only, Figure (4). In Figure (3) there is a second mass of firms whose expansion decision is affected negatively by an increase in home corporate taxes, the mass of domestic firms. The effect for these firms is smaller, as the predicted tax coefficient is closer to zero, but still negative. Finally, both Figure (3) and Figure (4) show how there is a small mass of firms whose expansion decision is positively affected by an increase of corporate taxes, as predicted by the proposition derived from the theoretical model. This smaller mass represents the multinational firms, and supports the argument that productivity advantages such as those owned by these firms allows to afford the high costs associated to an acquisition and locate production abroad when facing an increase of home corporate taxes.

7 Conclusions

This papers analyses the effect of home corporate taxes on the decision of a firm to expand its ownership structure through the completion of an M&A deal. The results from the existing literature suggest that home corporate taxes could affect this decision in different ways. The argument proposed here is that the dominating effect depends on the composition of the observed sample, given that different types of firms are affected in different ways. In particular, the main result of the paper is that standalone firms are likely to be negatively affected by a rise of the home statutory corporate tax rate. This is in contrast with what the literature on corporate tax competition suggests, namely that firms tend to relocate their

capital investment when facing a rise in home corporate taxes. On the other hand, a rise in the home corporate statutory tax rate could incentivise more sophisticated firms to enlarge their structure even further, possibly in search of profit shifting opportunities.

The paper also accounts for the expansion pattern followed by the observed companies over a period of six years. The results show evidence that the firms that are more likely to expand are those that have completed other acquisitions in the recent past and that had a simple structure at the beginning of the sample. This confirms the hypothesis that a domestic firm that is in the process of evolving into a multinational is likely to continue and complete the transformation with a series of consecutive acquisitions, but that this firm will find it inconvenient to keep expanding once a large enough number of subsidiaries have come under its control.

This paper suggests that firms' heterogeneity should not be ignored by policy makers. Corporate tax systems should be flexible enough to differentiate between firms types. A reduction of the Statutory Corporate Tax Rate would attract more inward FDI, as shown by the literature on investment location, but it would also incentivise domestic companies to undertake their first acquisitions and grow into multinational corporations.

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Appendices

A Equilibrium Conditions

The Equilibrium of the model presented in the paper is closed by the productivity cutoff $(m_{EA}^k)^{1-\eta}$, the Free Entry Condition, the balance of the Government Budget Constraint and the Price Index.

Free Entry Condition: before drawing their productivity type, firms will have to make a decision on paying the sunk cost (f_s) to discover how productive they will actually be in the domestic and foreign market. To close the model a free entry condition guarantees that firms will enter the market until their expected profit, net of the sunk cost, is zero. This implies

$$\int_0^{\infty} \pi_D \quad dG(m) + \sum_k \left(\int_{m_{EA}^k}^{\infty} \pi_{k,E} \quad dG(m) + \int_0^{m_{EA}^k} \pi_{k,A} \quad dG(m) \right) = f_s \tag{26}$$

which, denoting $\int_0^{m_0} m^{1-\eta} dG(m) = V(m_0)$, can be rewritten as

$$(1-t)\frac{A}{\mathrm{w}^{\eta-1}} V(m) + \sum_k \left((1-t)\frac{A_k}{(\mathrm{w}\tau_k)^{\eta-1}} \left(V(m) - V(m_{EA}^j) \right) + (1-t_k-T)\frac{A_k}{\mathrm{w}_k^{\eta-1}} \right.$$
$$\left. V(m_{EA}^k) - \left((1-t_k-T) f_A^k + (1-t_k)\bar{\pi}_k \right) F_m(m_{EA}^k) \right) = f_s \tag{27}$$

Government Budget Constrain: the government of the Home country collects taxes t on profit realised by domestic production of all firms located within its border, and in addition it will collect taxes T from repatriation of the profits realised by the foreign subsidiaries acquired by those domestic firms with productivity above the cutoff level m_{EA}. The total tax revenue is then redistributed to individuals as a public good g, so the Government Budget constrain is

$$g = t\frac{A}{\mathrm{w}} V(m) + \sum_k \left(t\frac{A_k}{\mathrm{w}\tau_k} \left(V(m) - V(m_{EA}^k) \right) + T\left(\frac{A_k}{\mathrm{w}_k} V(m_{EA}^k) - f_A^k F_m(m_{EA}^k) \right) \right) \tag{28}$$

under the assumption that individuals have a linear utility from consumption of the public good, $U(g) = g$, the Home country welfare will be given by $W = W(P, w, I) + g$

Prices: the Price Index in the Home country, P, is a weighted average of the price set by all firms that sell the differentiated good, each firm in its own variety. This includes all prices set by firms that serve the domestic demand, and by firms that serve the foreign demand through exports, along with the prices set by the domestic firms that acquire foreign subsidiaries to serve the foreign demand, which is

$$P^{1-\eta} = \int_0^{\infty} p(\omega)^{1-\eta} \quad dG(m) + \sum_k \left(\int_{m_{EA}^k}^{\infty} p(\omega)^{1-\eta} \quad dG(m) + \int_0^{m_{EA}^k} p(\omega)^{1-\eta} \quad dG(m) \right) \tag{29}$$

$$P^{1-\eta} = \frac{1}{\mathrm{w}\alpha^{1-\eta}} V(m) + \sum_k \left(\frac{1}{\mathrm{w}\tau_k \alpha^{1-\eta}} \big(V(m) - V(m_{EA}^k)\big) + \frac{1}{\mathrm{w}_k \alpha^{1-\eta}} V(m_{EA}^k) \right)$$

Helpman et al. (2003) show the analytical solution to the equilibrium for the special case where all countries are symmetric, and the labour endowment is not too different across countries. In that case the system of conditions presented here is simplified by the fact that wages are equalised to 1, the transport cost and the acquisition fixed cost are constant across countries, so $\tau_{ij} = \tau$ and $f_A^j = f_A$ and as a consequence the markup adjusted demand, A, and the productivity cutoff level, m_{EA}, are also constant across countries.

B Average Partial Effects (APE) of Dynamic Probit Model

?? Given

$$y_{i,s} = 1[\gamma y_{i,s-1} + \beta' \mathbf{x}_{i,s} + c_i + \epsilon_{i,s} > 0]$$
$$c_i | y_{i0}, z_i \sim N(\phi_0 + \phi_1 y_{i0} + \phi' z_i; \sigma_a^2)$$
$$\epsilon_{i,s} | x_{i,s}, z_i \sim N(0, \mathbf{I})$$

Wooldridge (2005) propose a simple procedure to estimate the Average Partial Effect (APE) of a given explanatory variable. He suggests to obtain this estimate by starting from the Average Structural Function (ASF), which is the expectation of a mean function w.r.t. the c_i . So defining

$$ASF(y_{i,s-1}, \mathbf{x}_{i,s}) = E_c[\Phi(\gamma y_{i,s-1} + \beta' \mathbf{x}_{i,s} + c_i)] \tag{30}$$

and using the distributional assumption made on c_i, can write

$$E_{y_{i0}, z_i}[\Phi(\gamma y_{i,s-1} + \beta' \mathbf{x}_{i,s} + \phi_0 + \phi_1 y_{i0} + \phi' z_i + a_i)] =$$
$$E_{y_{i0}, z_i}\left[\Phi\left(\frac{\gamma y_{i,s-1} + \beta' \mathbf{x}_{i,s} + \phi_0 + \phi_1 y_{i0} + \phi' z_i}{(1 + \sigma_a^2)^{1/2}} \right) \right] \tag{31}$$

A consistent estimator for (31) is

$$\widehat{ASF}(y_{i,s-1}, \mathbf{x}_{i,s}) = N^{-1} \sum_{i=1}^{N} \Phi\left(\hat{\gamma}_a y_{i,s-1} + \hat{\beta}_a' \mathbf{x}_{i,s} + \hat{\phi}_0 a + \hat{\phi}_{1a} y_{i0} + \hat{\phi}_a' z_i \right) \tag{32}$$

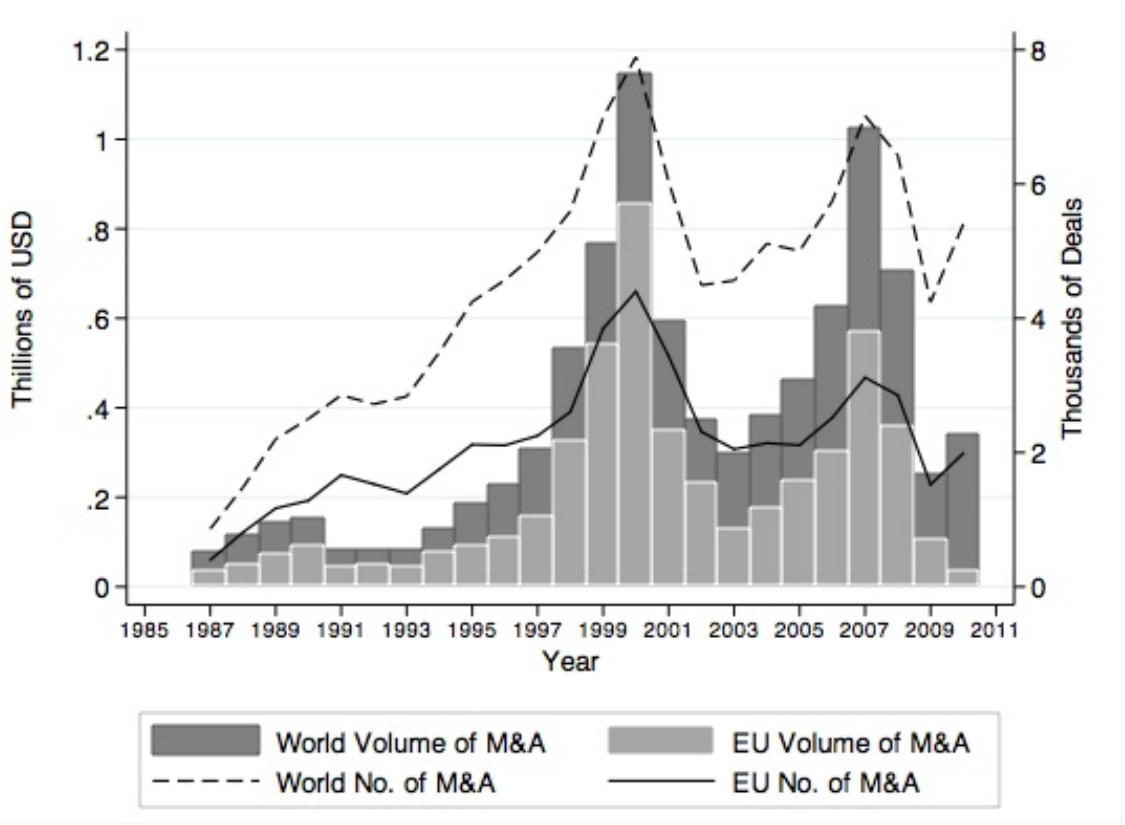
(where the subscript a indicates that an estimated parameter has been scaled by $(1 + \hat{\sigma}_a^2)^{-1/2}$). To obtain the APE w.r.t. a continuous variable it is only necessary to take the derivative of (32) with respect to the continuous variable of interest. Whereas for the APE w.r.t. a discrete variable, such as $y_{i,s-1}$ it is necessary to look at the discrete change in Equation (32).

In the analysis presented in this paper particular attention is given to modelling the effect of firms heterogeneity on the probability of an expansion. In fact, in the main model specification the continuous corporate tax variable and the lagged dependent variable are interacted with the dummies identifying the original firms "type" (multinational or domestic, with standalone as reference group). This allows the estimated effect of the main variables to have heterogeneous mean. The presence of these interactions has to be taken into account when estimating the APEs. The issue with this particular specification is that to evaluate the function at the sample mean, like in the illustrated general case, corresponds to average also the binary indicators for the firm's type. Which would make interpretation and inference of the derived APEs ambiguous. Instead, the interest lies on deriving the APEs for each specific firm's type. This is not done by forcing the firm's type indicators to 1 and estimating the APE on the full sample of firms, but rather by estimating the APE for the subgroup of firms with common type only.

The APE standard error can be obtained with panel data bootstrap when, like in this case, N is large and T is not. Alternatively, they can be derived using the delta method. Using both procedures, it was found that the results were extremely similar whenever the bootstrap was set on 100 or more draws. The standard error shown in the table are those obtained through the delta method (as estimated by NLOGIT5).

8 Tables and Figures

Figure 1: Trend in worldwide FDI and cross-border M&A



Note: information on volume and number of cross-border merger and acquisition deals are collected from UNCTAD Stastistics. Cross-border M&A purchases are calculated on a net basis as follows: Purchases of companies abroad by home-based companies (-) Sales of foreign affiliates of home-based companies. The data cover only the deals that involved an acquisition of an equity stake of more than 10%. Data refer to the net purchases by the region/economy of the ultimate acquiring company

Table 1: M&A deals worth over 1 Billion USD completed in 2010

Parent Country	Number of "MegaDeal"	Total Value (Bil USD)
European Countries		
France	9	24.8
United Kingdom	8	14.1
Spain	7	21
Switzerland	6	11.7
Germany	5	18.9
Netherlands	5	18.3
Sweden	4	5.5
Luxembourg	2	5.6
Russia	2	6.6
Austria	1	1.4
Belgium	1	1.1
Denmark	1	1.3
Greece	1	1.1
Ireland	1	1.6
Rest of the World		
United States	36	96.9
China	10	26.2
Canada	9	23.4
Japan	8	18.5
Brazil	6	11.5
Bermuda	5	6.5
India	5	21
Singapore	3	5.5
Australia	2	11
Colombia	2	4.1
Guernsey	2	7.5
Korea	2	4.8
Hong Kong	1	9.1
Israel	1	4.9
Malaysia	1	2.4
Mexico	1	1.2
New Zeal.	1	4.5
Qatar	1	2.2
Thailand	1	1.6

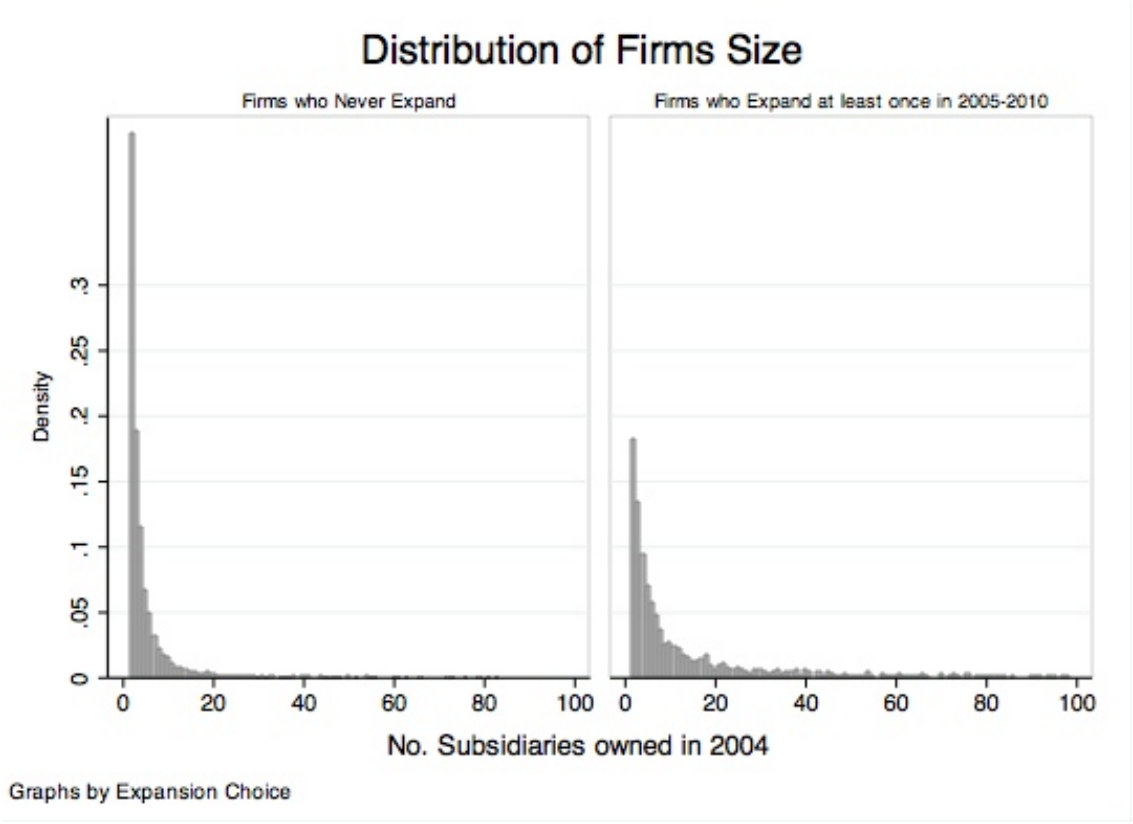
Note: information on "mega-deals" is extracted from the UNCTAD World Investment Report 2011 and they cover the largest M&A deals completed in 2010. The Total value of the observed deals is reported in terms of Billions of USD

Table 2: Sample composition and Firms Size

Initial Type	Number of Firms	Average Firm Size				
		Size as Number of Controlled Subidiaries				
		Average Size	St. Dev.	Median	75th Perc	99th Perc
Multinational	3,268	11.42	29.64	4	10	121
Domestic	10,855	2.64	4.20	1	3	20
Standalone	14,817	0.00	0.00	0	0	0
		Size as Number of Countries of Controlled Subsidiaries				
		Average Size	St. Dev.	Median	75th Perc	99th Perc
Multinational	3,268	3.11	3.18	2	3	17
Domestic	10,855	1.00	0.00	1	1	1
Standalone	14,817	0.00	0.00	0	0	0

Note: two firms' size measured are used. Total number of controlled subsidiaries or total number of foreign countries where the controlled subsidiaries are located. Both measures are based on all subsidiaries directly or indirectly controlled by the Global Ultimate Owner up to the tenth level of dependency as at the end of 2004. Any link in the reconstruction of the corporate ownership tree is conditional on the parent being the largest shareholder for a given subsidiary. This condition guarantees the pattern of control from the Global Ultimate Owner to all listed subsidiaries

Figure 2: Distribution of Parents size, conditional on Expansion Choice



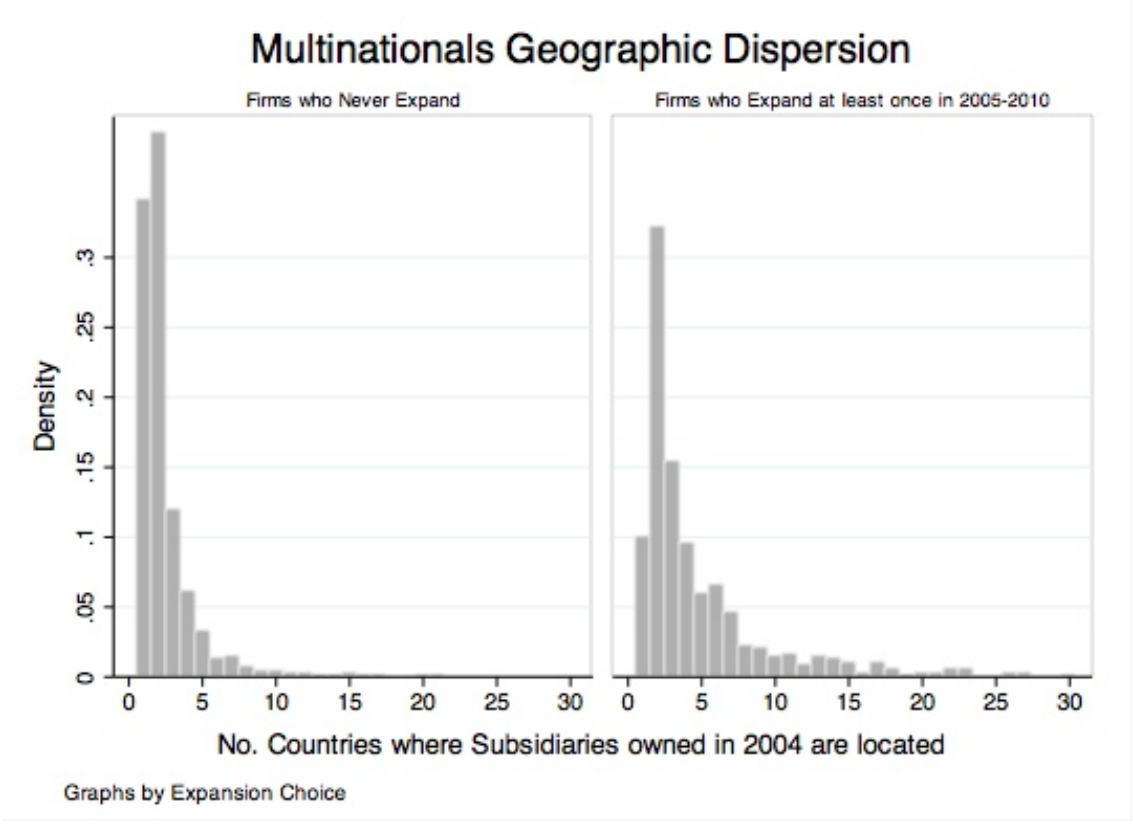


Table 3: Geographic Distribution of Parent Companies

Country	All Firms	Distribution of Firms Types:		
		Multinational	Domestic	Standalone
United Kingdom	8518	5.93%	54.80%	39.27%
Spain	3445	4.76%	24.06%	71.18%
France	3107	10.72%	30.54%	58.74%
Italy	3096	7.24%	20.22%	72.55%
Sweden	2142	15.83%	68.95%	15.22%
Germany	1894	28.09%	29.14%	42.77%
Denmark	1009	17.84%	57.19%	24.98%
Belgium	943	20.47%	22.16%	57.37%
Netherlands	853	50.29%	21.69%	28.02%
Greece	761	3.81%	23.92%	72.27%
Poland	746	1.21%	10.46%	88.34%
Ireland	677	12.70%	28.80%	58.49%
Portugal	470	6.38%	23.83%	69.79%
Romania	297	0.00%	13.47%	86.53%
Finaland	259	30.50%	27.80%	41.70%
Austria	152	48.68%	19.74%	31.58%
Bulgaria	115	0.00%	31.30%	68.70%
Lithuania	98	0.00%	12.24%	87.76%
Czech Republic	93	1.08%	2.15%	96.77%
Estonia	71	5.63%	19.72%	74.65%
Latvia	71	1.41%	5.63%	92.96%
Luxembourg	64	68.75%	3.13%	28.13%
Hungary	31	19.35%	6.45%	74.19%
Slovenia	18	27.78%	0.00%	72.22%
Slovakia	10	10.00%	20.00%	70.00%
All Countries	28,940	11.29%	37.51%	51.20%

Note: each row reports the total number of parent firms located in the country indicated by the first column, together with the percentage of these firms represented by multinational, domestic and standalone firms. A parent is defined as a firm whose shares are not (directly or indirectly) owned by other firms. A parent firm's location country is defined on the bases of the country where the firm was legally incorporated. A parent firm's "type" is identified according to the ownership structure as at the end of 2004. A firm is multinational if it owns at least one subsidiary located in a foreign country. It is a domestic if it owns one or more subsidiaries, all located within the home country. It is a standalone if it owns no subsidiaries

Table 4: Distribution of Parent Companies across Industrial Sectors

Sector	All Firms	Distribution of Firms Types:		
		Multinational	Domestic	Standalone
Finance, Ins. & Real Est.	9,075	16.44%	50.07%	33.49%
Wholesale & Retail Trade	6,345	6.05%	26.34%	67.61%
Manufacturing	6,037	14.83%	27.81%	57.36%
Construction	2,814	2.31%	36.25%	61.44%
Trasp., Storage and Comm.	2,072	13.18%	36.82%	50.00%
Other Services	871	2.64%	41.91%	55.45%
Electricity Gas & Water	596	4.53%	32.05%	63.42%
Agriculture, For., Fish.	244	3.69%	39.34%	56.97%
Mining & Quarrying	196	13.78%	43.37%	42.86%
Unknown	690	10.58%	63.91%	25.51%
All Sectors	28,940	11.29%	37.51%	51.20%

Note: each row reports the total number of parent firms operating in the industrial sector indicated by the first column, together with the percentage of these firms represented by multinational, domestic and standalone firms. A parent firm's industrial sector is defined according to the main activity reported by the BvD. There is a total of 690 firms whose Industrial Sector is unknown. Industrial Sectors reported in this table follow the main categories given by the ISIC rev.4 classification

Table 5: Mean Difference between expanding and non-expanding firms

	[1] non-Acquirers	[2] Acquirers	[3] Difference [1]−[2]	[4] Max Difference	[5] Test Difference Means	[6] KS Test
Firm Characteristics Differentials between Multinational parents who expand at least once and Multinationals who never expand						
ln(Total Sales)	16.257	16.618	-.361	0.143	0.0014	0.0010
	(.049)	(.110)	(.120)			
ln(Intangible Fixed Assets)	12.515	13.861	-1.346	0.296	0.0000	0.0000
	(.084)	(.117)	(.144)			
ln(Financial Revenue)	11.017	11.286	-.269	0.111	0.0208	0.0060
	(.065)	(.115)	(.132)			
ln(Operating Revenue)	16.192	16.490	-.299	0.128	0.0024	0.0010
	(.045)	(.095)	(.105)			
ln(Profit or Loss Before Tax)	13.117	13.739	-.621	0.193	0.0000	0.0000
	(.063)	(.0108)	(.125)			
Av. Cost of Employees	8.271	8.398	-.127	0.195	0.0000	0.0001
	(.018)	(.027)	(.032)			
Firm Characteristics Differentials between Domestic parents who expand at least once and Domestic who never expand						
ln(Total Sales)	15.802	15.177	-.625	0.234	0.0000	0.0000
	(.024)	(.080)	(.084)			
ln(Intangible Fixed Assets)	11.360	12.894	-1.534	0.273	0.0000	0.0000
	(.040)	(.082)	(.092)			
ln(Financial Revenue)	10.199	10.975	-.776	0.160	0.0000	0.0000
	(.031)	(.078)	(.084)			
ln(Operating Revenue)	15.130	15.607	-.478	0.192	0.0000	0.0000
	(.018)	(.058)	(.061)			
ln(Profit (Loss) Before Tax)	12.007	12.990	-.983	0.254	0.0000	0.0000
	(.024)	(.069)	(.074)			
Average Cost of Employees	8.250	8.305	-0.055	0.109	0.0033	0.0000
	(.008)	(.019)	(.020)			
Firm Characteristics Differentials between Standalones who expand at least once and Standalones who never expand						
ln(Total Sales)	14.026	14.823	-.797	0.266	0.0000	0.0000
	(.013)	(.211)	(.212)			
ln(Intangible Fixed Assets)	8.716	10.775	-2.058	0.308	0.0000	0.0000
	(.027)	(.286)	(.287)			
ln(Financial Revenue)	8.414	9.786	-1.372	0.275	0.0000	0.0000
	(.021)	(.221)	(.222)			
ln(Operating Revenue)	14.067	14.715	-.648	0.229	0.0000	0.0000
	(.012)	(.150)	(.151)			
ln(Profit (Loss) Before Tax)	10.797	12.107	-1.310	0.308	0.0000	0.0000
	(.016)	(.190)	(.191)			
Average Cost of Employees	7.989	8.213	-0.223	0.239	0.0030	0.0000
	(.008)	(.079)	(.079)			

Continued on next page

Table 5 – continued from previous page

	[1]	[2]	[3]	[4]	[5]	[6]

Note: characteristics distribution comparison tests were conducted on the three groups of firms observed in our sample. All characteristics are measured on the basis of the firms consolidated financial accounts, averaged over the period 2002-2004. Column [1] and [2] report mean values of each characteristic. Column [3] reports the mean difference of the two distributions. Column [5] reports the p-value for a test of the null hypothesis of equal means in column [1] and [2] against the alternative of of a smaller mean in column [2]. Column [6] reports the result of a test of the null hypothesis of identical distribution in column [1] and [2], against the alternative that the distribution in column [1] stochastically dominates that in column [2]. Multinationals with more than 8 different subsidiaries (representing the top 5% of the size distribution of all firms) are excluded from the sample. The final sample includes a total of 28,023 firms: 14,817 standalone, 10,855 domestic firms and 2,351 multinationals

Table 6: Firms transition into Multinational Companies

	Total Sample			Domestic			Standalone		Multinationals	
Year	[a]	[b]	[c]	[a]	[b]	[c]	[a]	[c]	[a]	[c]
2006	**1,045**	13.68%	19.43%	**483**	39.54%	14.08%	**40**	12.50%	**522**	24.90%
2007	**937**	18.89%	19.10%	**431**	27.61%	15.55%	**56**	12.50%	**450**	23.33%
2008	**743**	21.40%	22.61%	**310**	33.55%	18.71%	**53**	22.64%	**380**	25.79%
2009	**521**	24.18%	29.58%	**233**	32.62%	20.60%	**49**	26.53%	**239**	39.33%
2010	**423**	15.13%	23.88%	**194**	21.65%	21.65%	**21**	33.33%	**208**	25.00%

Note: the table reports, in percentage, the share of expansions that lead the acquiring firm to switch to a new "type". Column [a] reports the total number of expansions completed every year, simply defined as the acquisition of the control share of a pre-existing subsidiary. Column [b] reports the share of expansions from column [a] that corresponds, for the acquirer, to a corporate "re-structuring". This happens when - given the acquisition - the company switches from a Domestic to a Multinational or from a Standalone to either a Domestic or a Multinational. Finally, column [c] reports the number of expansions consisting in a parent firm acquiring the controlling share of a subsidiary that was already owned before the M&A, but only for a minority share. Column [b] is not reported for Standalone and Multinational companies because trivial: by definition, all Standalone firms change their type when completing an acquisition, and none of the Multinationals do.

Table 7: Number of Expanding Parents and Probability of Expansion, conditional on Expansion History and Firms Type

		Total Sample			Multinational			Domestic			Standalone		
		$Choice_{t-1}$=0	$Choice_{t-1}$=1	Total	$Choice_{t-1}$=0	$Choice_{t-1}$=1	Total	$Choice_{t-1}$=0	$Choice_{t-1}$=1	Total	$Choice_{t-1}$=0	$Choice_{t-1}$=1	Total
2006	N	709	336	1,045	309	213	522	365	118	483	35	5	40
	Prob.	0.025	0.400	0.036	0.108	0.513	0.160	0.035	0.295	0.044	0.002	0.208	0.003
	SD	(.16)	(.49)	(.19)	(.31)	(.5)	(.37)	(.18)	(.46)	(.21)	(.05)	(.41)	(.05)
2007	N	524	413	937	195	255	450	286	145	431	43	13	56
	Prob.	0.019	0.395	0.032	0.071	0.489	0.138	0.028	0.300	0.040	0.003	0.325	0.004
	SD	(.14)	(.49)	(.18)	(.26)	(.5)	(.34)	(.16)	(.46)	(.2)	(.05)	(.47)	(.06)
2008	N	426	317	743	183	197	380	202	108	310	41	12	53
	Prob.	0.015	0.338	0.026	0.065	0.438	0.116	0.019	0.251	0.029	0.003	0.214	0.004
	SD	(.12)	(.47)	(.16)	(.25)	(.5)	(.32)	(.14)	(.43)	(.17)	(.05)	(.41)	(.06)
2009	N	330	191	521	115	124	239	176	57	233	39	10	49
	Prob.	0.012	0.257	0.018	0.040	0.326	0.073	0.017	0.184	0.021	0.003	0.189	0.003
	SD	(.11)	(.44)	(.13)	(.2)	(.47)	(.26)	(.13)	(.39)	(.14)	(.05)	(.39)	(.06)
2010	N	304	119	423	136	72	208	151	43	194	17	4	21
	Prob.	0.011	0.228	0.015	0.045	0.301	0.064	0.014	0.185	0.018	0.001	0.082	0.001
	SD	(.1)	(.42)	(.12)	(.21)	(.46)	(.24)	(.12)	(.39)	(.13)	(.03)	(.28)	(.04)

The general definition of expansion has been used. Accordingly, a company is observed to have expanded if, by the end of the accounting year, it has completed the acquisition of the controlling share of a pre-existing subsidiary. Data are shown for the number of companies that do make at least one expansion per year. Probability of completing an expansion, and its standard deviation (in parenthesis), are also shown. This is reported for the whole sample, as well as for the specific groups identified by the different firm "types". All statistics are also reported conditioning on whether the observed firm had just completed another expansion in the following accounting year.

Table 8: Corporate Taxes in the Parent Home Countries

	Statutory Tax Rate		Effective Average Tax Rate		Allowances		Double Tax Relief
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	
Austria	0.2500	(0.00)	0.2310	(0.00)	0.1180	(0.00)	Exemp.
Belgium	0.3399	(0.00)	0.2844	(.003)	0.1961	(.003)	Exemp.
Bulgaria	0.1167	(.024)	0.1010	(.02)	0.0738	(.015)	Credit
Czech Republic	0.2233	(.025)	0.2341	(.02)	0.0983	(.009)	Exemp.
Denmark	0.2650	(.015)	0.2342	(.009)	0.1471	(.012)	Exemp.
Estonia	0.2200	(.012)	0.3142	(.018)	0.0000	(0.00)	Exemp.
Finland	0.2600	(0.00)	0.2233	(0.00)	0.1449	(0.00)	Exemp.
France	0.3333	(0.00)	0.2892	(.002)	0.1998	(.001)	Exemp.
Germany	0.2000	(.05)	0.3437	(.028)	0.1693	(.028)	Exemp.
Greece	0.2667	(.029)	0.2053	(.023)	0.1956	(.022)	Credit
Hungary	0.1917	(.015)	0.1598	(.016)	0.1065	(.011)	Exemp.
Ireland	0.1250	(0.00)	0.1150	(0.00)	0.0612	(0.00)	Exemp.
Italy	0.3025	(.028)	0.3073	(.025)	0.1921	(.014)	Exemp.
Latvia	0.1500	(0.00)	0.1146	(0.00)	0.0992	(0.00)	Exemp.
Lithuania	0.1583	(.019)	0.1094	(.011)	0.1276	(.013)	Exemp.
Luxembourg	0.2167	(.005)	0.2694	(.014)	0.1512	(.016)	Exemp.
Netherlands	0.2718	(.024)	0.2473	(.024)	0.1448	(.014)	Exemp.
Poland	0.1900	(0.00)	0.1438	(0.00)	0.1313	(0.00)	Exemp.
Portugal	0.2500	(0.00)	0.2228	(.004)	0.1608	(.003)	Exemp.
Romania	0.1600	(0.00)	0.1097	(.002)	0.1218	(.003)	Credit*
Slovakia	0.1900	(0.00)	0.1800	(0.00)	0.0878	(0.00)	Exemp.
Slovenia	0.2267	(.019)	0.1985	(.004)	0.1332	(.019)	Exemp.
Spain	0.3208	(.022)	0.3131	(.021)	0.1473	(.01)	Exemp.
Sweden	0.2743	(.008)	0.2317	(0.00)	0.1604	(0.00)	Exemp.
United Kingdom	0.2900	(.01)	0.2640	(.001)	0.1476	(.014)	Credit*

Note: country-specific averages and standard deviations (in parenthesis) of the various measures of corporate tax rates are reported in the table. Statutory Corporate Tax Rate is equivalent to the top rate imposed by each country's jurisdiction. Effective Average Tax Rate is calculated using Devereux and Klemm method. The Double Tax Relief can be either exemption or tax credit. (*) indicates a country has switched to the exemption system

Table 9: Explanatory Variables - definition

Variable	Definition
Characteristic of the Parent Firm's Country	
Domestic Credit to Private Sector (%GDP)	Financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. (WDI, The World Bank)
ln(real GDP)	GDP measured in constant 2005 U.S. dollars. (WDI, The World Bank)
Industry Value Added (annual % growth)	Value added in manufacturing sectors (ISIC divisions 15-37). It measures the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. (WDI, The World Bank)
Mkt Capitalization of Listed Companies (%GDP)	Market Value (measured as the share price times the number of shares outstanding) of listed domestic companies. These are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies does not include investment companies, mutual funds, or other collective investment vehicles. (WDI, The World Bank)
Trade (%GDP).	Sum of exports and imports of goods and services measured as a share of gross domestic product. (WDI, The World Bank)
Concentration Index	Herfindahl-Hirschmann index, is a measure of the degree of market concentration. An index value that is close to 1 indicates a very concentrated market (maximum concentration). On the contrary, values closer to 0 reflect a more equal distribution of market shares among exporters or importers. (UNCTAD)
Diversification Index	Differences between the structure of trade of the country and the World average. The index value closer to 1 indicates a bigger difference from the World average. Diversification index is computed by measuring absolute deviation of the country share from world structure. (UNCTAD)
Characteristic of the Parent Firm	
ln(Operating Revenue)	Four years average of Revenue realized in the course of yearly normal operations. Only ordinary revenue rather than unexpected, one-time income, is included. (Amadeus, Bureau Van Dijk)
ln(Sales)	Volume of Total Yearly Sales, averaged over four years. (Amadeus, Bureau Van Dijk)
Profit Margin (%)	(Profit before tax / Operating revenue) $\times$ 100. (Amadeus, Bureau Van Dijk)
Solvency Ratio (%)	(Shareholders funds / Total assets) $\times$ 100. (Amadeus, Bureau Van Dijk)
Number Owned Subsidiaries	Total Number of Subsidiaries owned with majority share at the end of the accounting year 2004. (Own Calculation)
Number Foreign Countries	Number of Different Foreign countries where the Subsidiaries Owned by the end of 2004 were located. (Own Calculation)

Table 10: Descriptive Statics of Explanatory Variables

Variable		Mean	St. Dev.	Obs.
Statutory Corporate Tax Rate	overall	0.2778	0.0521	N = 144700
	between		0.0487	n = 28940
	within		0.0185	T = 5
Effective Average Tax Rate	overall	0.2649	0.0527	N = 144700
	between		0.0505	n = 28940
	within		0.0148	T = 5
Allowances	overall	0.1577	0.0317	N = 144700
	between		0.0288	n = 28940
	within		0.0132	T = 5
Domestic Credit to Private Sector (%GDP)	overall	1.4515	0.5120	N = 144700
	between		0.4797	n = 28940
	within		0.1791	T = 5
ln(real GDP)	overall	27.3542	1.0446	N = 144700
	between		1.0439	n = 28940
	within		0.0378	T = 5
Industry Value Added (annual % growth)	overall	0.0067	0.0329	N = 144700
	between		0.0193	n = 28940
	within		0.0267	T = 5
Mkt Capitalization of Listed Companies (%GDP)	overall	0.8384	0.3966	N = 144700
	between		0.3093	n = 28940
	within		0.2481	T = 5
Trade (%GDP)	overall	0.7608	0.3196	N = 144700
	between		0.3171	n = 28940
	within		0.0402	T = 5
Index of hourly compensation costs (US=100)	overall	113.0210	28.2502	N = 141030
	between		27.3170	n = 28206
	within		7.2026	T = 5

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Variable		Mean	St. Dev.	Obs.
ln(Operating Revenue) average	overall	14.7075	1.6897	N = 99150
2002-2005	between		1.6898	n = 19830
	within		0.0000	T = 5
ln(Financial Turnover) average	overall	14.6016	1.6525	N = 68735
2002-2005	between		1.6525	n = 13747
	within		0.0000	T = 5
Profit Margin (%) average	overall	4.5044	13.8669	N = 97540
2002-2005	between		13.8672	n = 19508
	within		0.0000	T = 5
Solvency Ratio (%) average	overall	32.8041	25.3809	N = 107725
2002-2005	between		25.3814	n = 21545
	within		0.0000	T = 5
Total No. Subsidiaries owned in	overall	2.2788	10.8602	N = 144700
2005	between		10.8603	n = 28940
	within		0.0000	T = 5
No. Foreign Countries in 2005	overall	0.7262	1.4434	N = 144700
	between		1.4434	n = 28940
	within		0.0000	T = 5

Note: all the macro variables are taken from the WDI (World Bank). The TAX variables are from the CBT (Oxford Said Business School). Finally, the accounting variables are from Bureau Van Dijk, and refer to the consolidated financial accounts averaged over the years 2002-2005

Table 11: Dynamic Probit Model Estimates - All Acquisitions

	Dynamic Pooled Probit	Dynamic RE Probit	[2] + Sq. Size	[3] + Macro Controls	[4] + Financial Accounts
	[1]	[2]	[3]	[4]	[5]
Expansion $s-1$	1.948***	0.982***	1.012***	0.996***	0.900***
	(.100)	(.115)	(.114)	(.116)	(.189)
Expansion $s-1$ * Multinational	-.738***	-0.840***	-0.893***	-0.879***	-0.796***
	(.105)	(.12)	(.12)	(.122)	(.197)
Expansion $s-1$ * Domestic	-.686***	-0.688***	-0.711***	-0.701***	-0.635***
	(.106)	(.12)	(.119)	(.121)	(.205)
Statutory Tax Rate	-1.131***	-1.604***	-1.618***	-1.644**	-2.204**
	(.390)	(.598)	(.591)	(.721)	(.969)
Statutory Tax Rate*Multinational	2.534***	2.901***	2.511***	2.274***	2.553**
	(.471)	(.722)	(.717)	(.767)	(1.087)
Statutory Tax Rate*Domestic	1.706***	2.315***	2.187***	1.752**	1.069
	(.481)	(.716)	(.71)	(.731)	(1.072)
Characteristics of Parent Country measured in the year before the expansion					
Domestic credit by banking sector				-0.615*	-1.237**
				(.314)	(.523)
Domestic credit to private sector				0.478*	1.439***
				(.28)	(.506)
Ln (real GDP)				-0.011	0.056
				(.039)	(.041)
Industry Value Added				2.024***	2.902***
				(.678)	(1.039)
MKT Capitalization of Listed				-0.022	-0.071
Companies				(.065)	(.094)
Trade (% GDP)				-0.120*	0.290**
				(.07)	(.131)
Concentration Index				3.046***	4.466**
				(1.045)	(2.191)
Diversification Index				-2.089***	-3.638***
				(.594)	(1.364)
Characteristics of Parent Firm measured in 2004					
Type = Multinational	0.683***	0.618***	0.459**	0.540**	0.639**
	(.129)	(.199)	(.199)	(.214)	(.292)
Type = Domestic	0.326**	0.279	0.202	0.299	0.627**
	(.134)	(.197)	(.196)	(.203)	(.282)
Subidiaries Locations		0.069***	0.151***	0.156***	
		(.007)	(.017)	(.017)	
(Subidiaries Locations)^2			-0.006***	-0.007***	
			(.001)	(.001)	
Number of Subsidiaries		0.007***	0.018***	0.017***	
		(.000)	(.001)	(.001)	
(Number of Subsidiaries)^2			-0.2D-04***	-0.2D-04***	
			(.000)	(.000)	

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Table 11 – continued from previous page

	[1]	[2]	[3]	[4]	[5]
Ln (Total Sales) (av. 2002-2004)					0.228***
					(.016)
Solvency Ratio (av. 2002-2004)					0.006***
					(.001)
Profit Margin (av. 2002-2004)					-0.001
					(.002)
Expansion Choice in 2005	1.236***	1.220***	1.143***	1.121***	1.114***
	(.052)	(.051)	(.05)	(.05)	(.084)
Constant	-2.723***	-3.490***	-3.464***	-2.360***	-1.708***
	(.107)	(.168)	(.166)	(1.207)	(2.525)
Rho		0.376***	0.367***	0.365***	0.314***
		(.016)	(.016)	(.016)	(.028)
Log-L	-12431.83	-11608.9	-11530.5	-11488.1	-3671.02
Sample	28,940	28,940	28,940	28,940	11,221
Average Partial Effects (APE)					
APE for Expansion $s-1$:					
Multinational Firms	0.3009	0.0158	0.0136	0.0135	0.0138
	(.011)	(.006)	(.006)	(.006)	(0.011)
Domestic Firms	0.1980	0.0167	0.0172	0.0167	0.0140
	(.009)	(.033)	(.003)	(.003)	(0.006)
Standalone Firms	0.1733	0.0171	0.0184	0.0177	0.0110
	(.024)	(.004)	(.005)	(.004)	(0.004)
APE for Statutory Tax Rate:					
Multinational Firms	0.2155	0.1458	0.0987	0.0696	0.0479
	(.011)	(.049)	(.048)	(.061)	(.109)
Domestic Firms	0.0351	0.0335	0.0268	0.0051	-0.0532
	(.018)	(.020)	(.019)	(.025)	(.004)
Standalone Firms	-0.0091	-0.0096	-0.0098	-0.0099	-0.0090
	(.003)	(.004)	(.004)	(.004)	(.004)

Notes: (1) the dependent variable is the parents choice of acquiring at least one new subsidiary at period s, acquisitions can be only cross-border or cross-border and domestic at the same time (int he case of multiple acquisitions); (2) all models include dummy variables specific to the country of the parent firm, dummies specific to the industrial sector of the parent firm and dummies specific to the year when the acquisition took place (unreported); (3) standard errors are given in parenthesis; (4) asterisks indicate significance at *** (1%), ** (5%), * (10%); (5) rho indicates the proportion of the total variance contributed by the panel-variance component; (6) dummies of firms "type" identify whether the firm is Multinational or Domestic, and use the type Standalone as reference group; (7) for Standalone companies, number of subsidiaries and number of countries where the subsidiaries are located is 0; (8) sample size is 28,940 parent firms observed for the five years between 2006 and 2010 (2005 is the base year), sample size for column [6] is reduced due to incompleteness of data on firms financial accounts; (9) the Average Partial Effects (APE), reported at the bottom, have standard errors computed using the delta method, bootstrap standard errors were also computed by they are not reported here; (10) Average Partial Effects conditional on firms types were computed by restricting the sample to all parent firms who were of a specific type in 2004; (11) the *raw* unconditional probability of making an acquisition at any point in time between 2006 and 2010 is 0.1559.

Table 12: Dynamic Probit Model Estimates - Extension of Tab 11 Column 4

	Tab 11, Col. [4] (TAX=STR)	Double Tax System (TAX=STR)	Capital Allowances (TAX=STR)	TAX=EATR
	[1]	[2]	[3]	[4]
Expansion $s-1$	0.996***	1.015***	1.014***	1.031***
	(.116)	(.120)	(.12)	(.119)
Expansion $s-1$ * Multinational	-0.879***	-0.921***	-0.920***	-0.941***
	(.122)	(.126)	(.126)	(.125)
Expansion $s-1$ * Domestic	-0.701***	-0.694***	-0.696***	-0.711***
	(.121)	(.125)	(.125)	(.124)
TAX	-1.644**	-1.685**	-2.201**	-2.415**
	(.721)	(.790)	(.894)	(1.017)
TAX*Multinational	2.274***	2.738***	2.813***	-0.343
	(.767)	(.843)	(.848)	(.861)
TAX*Domestic	1.752**	1.464*	1.502*	-0.048
	(.731)	(.803)	(.801)	(.759)
Dummy for Credit System		-0.032		
		(.049)		
Capital Allowances			1.557	
			(1.16)	
Characteristics of Parent Country measured in the year before the expansion				
Domestic credit by banking sector	-0.615*	-1.089***	-1.137***	-0.556
	(.314)	(.394)	(.381)	(.407)
Domestic credit to private sector	0.478*	0.886**	0.974***	0.456
	(.28)	(.348)	(.351)	(.36)
Ln (real GDP)	-0.011	0.032	0.013	0.118**
	(.039)	(.050)	(.051)	(.059)
Industry Value Added	2.024***	1.935**	2.202***	2.090***
	(.678)	(.740)	(.759)	(.724)
MKT Capitalization of Listed	-0.022	-0.020	-0.013	-0.175**
Companies	(.065)	(.081)	(.076)	(.079)
Trade (% GDP)	-0.120*	-0.035	-0.037	0.139
	(.07)	(.079)	(.079)	(.104)
Concentration Index	3.046***	2.670***	2.684**	3.220**
	(1.045)	(1.301)	(1.304)	(1.305)
Diversification Index	-2.089***	-2.094***	-2.280***	-2.176***
	(.594)	(.795)	(.822)	(.716)
Characteristics of Parent Firms measured in 2004				
Type = Multinational	0.540**	0.348	0.327	1.197***
	(.214)	(.233)	(.234)	(.239)
Type = Domestic	0.299	0.325	0.315	0.742***
	(.203)	(.221)	(.22)	(.201)
Subsidiaries Locations	0.156***	0.164***	0.164***	0.165***
	(.017)	(.017)	(.017)	(.017)
(Subsidiaries Locations)^2	-0.007***	-0.007***	-0.007***	-0.007***
	(.001)	(.001)	(.001)	(.001)
Number of Subsidiaries	0.017***	0.016***	0.016***	0.016***

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Table 12 – continued from previous page

	[1]	[2]	[3]	[4]
	(.001)	(.001)	(.001)	(.001)
(Number of Subsidiaries)^2	-.2D-04***	-.2D-04***	-.2D-04***	-.2D-04***
	(.000)	(.000)	(.000)	(.000)
Expansion Choice in 2005	1.121***	1.128***	1.131***	1.118***
	(.05)	(.052)	(.052)	(.052)
Constant	-2.360*	-3.391**	-2.959*	-5.875***
	(1.207)	(1.614)	(1.649)	(1.719)
Rho	0.365***	0.364***	0.364***	0.364***
	(.016)	(.017)	(.017)	(.017)
Log-L	-11488.1	-10348.8	-10348.2	-10350.5
No. Firms	28,940	24,729	24,729	24,729
Average Partial Effects (APE)				
APE for Expansion $s-1$:				
Multinational Firms	0.0135	0.0105	0.0105	0.0101
	(.006)	(.006)	(.006)	(.006)
Domestic Firms	0.0167	0.0184	0.0182	0.0184
	(.003)	(.004)	(.004)	(.003)
Standalone Firms	0.0177	0.0197	0.0197	0.0204
	(.004)	(.005)	(.005)	(.005)
APE for Tax Variable:				
Multinational Firms	0.0696	0.1147	0.0666	-0.3010
	(.061)	(.066)	(.076)	(.115)
Domestic Firms	0.0051	-0.0104	-0.0328	-0.1156
	(.025)	(.03)	(.035)	(.048)
Standalone Firms	-0.0099	-0.0112	-0.0146	-0.0160
	(.004)	(.005)	(.006)	(.007)

Notes: (1) the dependent variable is the parents choice of acquiring at least one new subsidiary at period s, acquisitions can be only cross-border or cross-border and domestic at the same time (int he case of multiple acquisitions); (2) all models include dummy variables specific to the country of the parent firm, dummies specific to the industrial sector of the parent firm and dummies specific to the year when the acquisition took place (unreported); (3) standard errors are given in parenthesis; (4) asterisks indicate significance at *** (1%), ** (5%), * (10%); (5) rho indicates the proportion of the total variance contributed by the panel-variance component; (6) dummies of firms "type" identify whether the firm is Multinational or Domestic, and use the type Standalone as reference group; (7) for Standalone companies, number of subsidiaries and number of countries where the subsidiaries are located is 0; (8) sample size is 28,940 parent firms observed for the five years between 2006 and 2010 (2005 is the base year), sample size for column [2] to [4] is reduced due to incompleteness of data on tax variables; (9) the Average Partial Effects (APE), reported at the bottom, have standard errors computed using the delta method, bootstrap standard errors were also computed by they are not reported here; (10) Average Partial Effects conditional on firms types were computed by restricting the sample to all parent firms who were of a specific type in 2004; (11) the *raw* unconditional probability of making an acquisition at any point in time between 2006 and 2010 is 0.1559.

Table 13: Dynamic Probit Model Estimates - Cross-Border Acquisitions Only

	Baseline Model (TAX=STR)	Col. [1] + Only MNE and non-MNE	Col. [2] no WDI	Col. [2] + Double Tax System (TAX=STR)	Col. [2] + Capital Allowances (TAX=STR)	Col. [2] + TAX=EATR
	[1]	[2]	[3]	[4]	[5]	[6]
Expansion $s-1$	1.052***	0.515***	0.513***	0.513***	0.513***	0.535***
	(.214)	(.108)	(.107)	(0.107)	(0.107)	(0.106)
Expansion $s-1$ * MNE	-1.005***	-0.492***	-0.490***	-0.490***	-0.492***	-0.511***
	(.22)	(.115)	(.114)	(0.114)	(0.114)	(0.113)
Expansion $s-1$ * DOM	-0.665***					
	(.242)					
TAX	-2.195*	-2.16***	-2.08***	-2.075***	-1.860***	-1.060*
	(1.202)	(.714)	(.579)	(0.579)	(0.608)	(0.620)
TAX*MNE	2.840**	2.578***	2.748***	2.757***	2.752***	-0.083
	(1.224)	(.731)	(.724)	(0.723)	(0.726)	(0.737)
TAX*DOM	0.032					
	(1.266)					
Dummy for Credit System				-0.035		
				(0.055)		
Capital Allowances					-1.924*	
					(0.993)	
Characteristics of Parent Country measured in the year before the expansion						
Domestic credit by banking sector	-0.410	-0.364				
	(.475)	(.474)				
Domestic credit to private sector	0.409	0.396				
	(.419)	(.418)				
Ln (real GDP)	-0.033	-0.033				
	(.058)	(.058)				
Industry Value Added	1.124	1.030				
	(1.118)	(1.114)				
MKT Capitalization of Listed	-0.071	-0.023				
Companies	(.087)	(.087)				
Trade (% GDP)	-0.044	-0.024				
	(.093)	(.094)				
Concentration Index	3.539**	3.760***	3.610***	3.835***	2.856***	3.303***
	(1.438)	(1.416)	(.984)	(1.040)	(1.073)	(0.983)
Diversification Index	-2.109**	-2.389***	-1.825***	-1.949***	-1.915***	-1.848***
	(.87)	(.859)	(.342)	(0.392)	(0.342)	(0.366)
Characteristics of Parent Firms measured in 2004						
Type = MNE	0.647**	0.235	0.174	0.167	0.185	0.963***
	(.329)	(.202)	(.199)	(0.199)	(0.200)	(0.205)
Type = DOM	0.571*					
	(.342)					
No. Subs Locations	0.199***	0.250***	0.250***	0.250***	0.251***	0.249***
	(.02)	(.019)	(.019)	(0.019)	(0.019)	(0.019)
Sq. No. Subs Locations	-0.007***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***
	(.001)	(.001)	(.001)	(0.001)	(0.001)	(0.001)

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Table 13 – continued from previous page

	[1]	[2]	[3]	[4]	[5]	[6]
No. Subsidiaries	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***
	(.002)	(.002)	(.002)	(0.002)	(0.002)	(0.002)
Sq. No. Subsidiaries	-0.1D-04***	-0.1D-04***	-0.1D-04***	-0.1D-04***	-0.1D-04***	-0.1D-04***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Expansion Choice in 2005	1.092***	1.083***	1.092***	1.092***	1.086***	1.071***
	(.08)	(.08)	(.08)	(0.079)	(0.079)	(0.079)
Constant	-2.633	-2.340***	-3.452***	-3.429***	-3.144***	-3.707***
	(1.793)	(1.793)	(.228)	(0.232)	(0.264)	(0.250)
Rho	0.406***	0.412***	0.413***	0.413***	0.413***	0.410***
	(.024)	(.024)	(.023)	(0.024)	(0.023)	(0.023)
Log-L	-5410.6	-5452.69	-5455.26	-5445.36	-5453.3	-5461.11
Number of Firms	28,940	28,940	28,940	24,729	24,729	24,729
Average Partial Effects						
APE for Expansion $s-1$:						
Multinational Firms	0.0040	0.0020	0.0019	0.0019	0.0017	0.002
	(.006)	(.005)	(.005)	(0.005)	(0.005)	(0.006)
Domestic Firms	0.0066					
	(.003)					
Standalone Firms	0.0070					
	(.003)					
Non-Multinational Firms		0.0053	0.0052	0.0052	0.0052	0.0056
		(0.002)	(.002)	(0.002)	(0.002)	(0.002)
APE for Statutory Tax Rate:						
Multinational Firms	0.0545	0.0351	0.0559	0.0569	0.0744	-0.0956
	(.06)	(.059)	(.048)	(0.048)	(0.049)	(0.052)
Domestic Firms	-0.0256					
	(.009)					
Standalone Firms	-0.0039					
	(.002)					
Non-Multinational Firms		-0.0129	-0.0128	-0.0125	-0.0112	-0.00639
		(0.004)	(.004)	(0.003)	(0.004)	(0.004)

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Table 13 – continued from previous page

	[1]	[2]	[3]	[4]	[5]	[6]

Notes: (1) the dependent variable is the parents choice of acquiring at least one new subsidiary at period s, acquisitions can be only cross-border; (2) all models include dummy variables specific to the country of the parent firm, dummies specific to the industrial sector of the parent firm and dummies specific to the year when the acquisition took place (unreported); (3) standard errors are given in parenthesis; (4) asterisks indicate significance at *** (1%), ** (5%), * (10%); (5) rho indicates the proportion of the total variance contributed by the panel-variance component; (6) dummies of firms "type" identify whether the firm is Multinational or Domestic, and use the type Standalone as reference group, in columns [6] and [7] the reference group is constituted by all non-multinational parent firms; (7) for Standalone companies, number of subsidiaries and number of countries where the subsidiaries are located is 0; (8) sample size is 28,940 parent firms observed for the five years between 2006 and 2010 (2005 is the base year); (9) the Average Partial Effects (APE), reported at the bottom, have standard errors computed using the delta method, bootstrap standard errors were also computed by they are not reported here; (10) Average Partial Effects conditional on firms types were computed by restricting the sample to all parent firms who were of a specific type in 2004; (11) the *raw* unconditional probability of making a cross-border only acquisition at any point in time between 2006 and 2010 is 0.0685.

Table 14: Dynamic Probit Model Estimates - Domestic Expansions Only

	Baseline Model (TAX=STR)	Col. [1] + Double Tax System (TAX=STR)	Col. [1] + Allowances (TAX=STR)	TAX=EATR
	[1]	[2]	[3]	[4]
Expansion $s-1$	1.007***	1.020***	1.017***	1.027***
	(.148)	(.155)	(.155)	(.155)
Expansion $s-1$ * Multinational	-0.899***	-0.904***	-0.901***	-0.911***
	(.161)	(.168)	(.168)	(.168)
Expansion $s-1$ * Domestic	-0.717***	-0.719***	-0.718***	-0.726***
	(.152)	(.158)	(.159)	(.158)
TAX	-0.354	-0.052	-0.888	-1.945
	(.827)	(.955)	(1.066)	(1.185)
TAX*Multinational	1.134	0.591	0.798	-0.192
	(.885)	(.975)	(.982)	(1.019)
TAX*Domestic	1.963**	1.382	1.478*	-0.533
	(.807)	(.882)	(.877)	(.807)
Dummy for Credit System		0.020		
		(.054)		
Capital Allowances			2.841*	
			(1.456)	
Characteristics of Parent Country measured in the year before the expansion				
Domesticestic credit by banking sector	-1.079***	-1.544***	-1.974***	-0.961*
	(.336)	(.443)	(.452)	(.493)
Domesticestic credit to private sector	0.777**	1.224***	1.673***	0.769*
	(.303)	(.393)	(.425)	(.435)
Ln (real GDP)	.107***	.151***	0.148***	0.235***
	(.024)	(.030)	(.029)	(.052)
Industry Value Added	1.737**	2.032**	2.273***	1.963**
	(.712)	(.819)	(.837)	(.806)
MKT Capitalization of Listed	0.018	-0.045	-0.006	-0.074
Companies	(.082)	(.092)	(.093)	(.093)
Characteristics of Parent Firms measured in 2004				
Type = Multinational	0.687***	0.818***	0.758***	1.031***
	(.252)	(.276)	(.279)	(.291)
Type = Domestic	0.331	0.464*	0.435*	0.986***
	(.225)	(.244)	(.243)	(.217)
No. Subs Locations	-0.035	-0.036	-0.036	-0.037
	(.024)	(.025)	(.025)	(.025)
Sq. No. Subs Locations	-0.001	-0.001	-0.001	-0.001
	(.001)	(.001)	(.001)	(.001)
No. Subsidiaries	0.039***	0.038***	0.039***	0.039***
	(.002)	(.003)	(.003)	(.003)
Sq. No. Subsidiaries	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(.000)	(.000)	(.000)	(.000)
Expansion Choice in 2005	1.018***	1.036***	1.041***	1.028***
	(.062)	(.065)	(.065)	(.065)
Constant	-5.876***	-7.185***	-7.335***	-9.422***

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	[1]	[2]	[3]	[4]
	(.703)	(.840)	(.835)	(1.346)
Rho	0.314***	0.321***	0.322***	0.319***
	(.02)	(.022)	(.022)	(.022)
Log-L	-8222.83	-7383.76	-7381.65	-7383.87
Number of Firms	28940	24729	24729	24729
Average Partial Effects, SD computed with Delta Method				
APE for Expansion $s-1$:				
Multinational Firms	0.0062	0.0065	0.0065	0.0066
	(0.005)	(0.005)	(0.005)	(0.005)
Domestic Firms	0.0145	0.0149	0.0148	0.0150
	(0.004)	(0.004)	(0.004)	(0.004)
Standalone Firms	0.0161	0.0173	0.0172	0.0177
	(0.005)	(0.006)	(0.006)	(0.006)

Notes: (1) the dependent variable is the parents choice of acquiring at least one new domestic subsidiary at period s; (2) all models include dummy variables specific to the country of the parent firm, dummies specific to the industrial sector of the parent firm and dummies specific to the year when the acquisition took place (unreported); (3) standard errors are given in parenthesis; (4) asterisks indicate significance at *** (1%), ** (5%), * (10%); (5) rho indicates the proportion of the total variance contributed by the panel-variance component; (6) dummies of firms "type" identify whether the firm is Multinational or Domestic, and use the type Standalone as reference group; (7) for Standalone companies, number of subsidiaries and number of countries where the subsidiaries are located is 0; (8) sample size is 28,940 parent firms observed for the five years between 2006 and 2010 (2005 is the base year), sample size for column [2] to [4] is reduced due to incompleteness of data on tax variables; (9) the Average Partial Effects (APE), reported at the bottom, have standard errors computed using the delta method, bootstrap standard errors were also computed by they are not reported here; (10) Average Partial Effects conditional on firms types were computed by restricting the sample to all parent firms who were of a specific type in 2004; (11) the *raw* unconditional probability of making a cross-border only acquisition at any point in time between 2006 and 2010 is 0.07062

Table 15: Dynamic Random Parameter Probit Model - Extension of Preferred Models from Tab 11 and Tab 13

Dependent Variable:	All Expansions		Only Cross-Border Expansions		Only Domestic Expansions	
	Tab 11, Col [4]	RPM	Tab 13, Col [3]	RPM	Tab 14, Col [1]	RPM
	[1]	[2]	[3]	[4]	[5]	[6]
Random Parameter						
Expansion $s-1$						
Intercept	0.996***	1.033***	0.513***	0.620***	1.007***	1.149***
	(.116)	(.104)	(.107)	(.084)	(.148)	(.149)
Multinational Type Effect	-0.879***	-0.912***	-0.490***	-0.577***	-.899***	-1.069***
	(.122)	(.111)	(.114)	(.097)	(.161)	(.155)
Domestic Type Effect	-0.701***	-0.722***			-.717***	-0.874***
	(.121)	(.110)			(.152)	(.145)
Standard Deviation		0.320***		0.206***		0.461***
		(.025)		(.037)		(.035)
Statutory Tax Rate						
Intercept	-1.644**	-2.724**	-2.08***	-2.355***	-0.354	0.016
	(.721)	(.642)	(.579)	(.461)	(.827)	(.821)
Multinational Type Effect	2.274***	2.901***	2.748***	2.858***	1.134	0.987
	(.767)	(.644)	(.724)	(.568)	(.885)	(.792)
Domestic Type Effect	1.752**	2.109***			1.963**	1.762**
	(.731)	(.621)			(.807)	(.712)
Standard Deviation		1.338***		0.570***		1.522***
		(.038)		(.053)		(.047)
Constant						
Intercept	-2.360***	-2.135**	-3.452***	-3.280***	-5.876***	-5.681***
	(1.207)	(1.023)	(.228)	(.174)	(.703)	(.619)
Multinational Type Effect	0.540**	0.338*	0.174	0.114	0.687***	0.684***
	(.214)	(.177)	(.199)	(.157)	(.252)	(.224)
Domestic Type Effect	0.299	0.188			0.331	0.356*
	(.203)	(.170)			(.225)	(.199)
Standard Deviation		0.620***		0.786***		0.833***
		(0.012)		(0.019)		(.079)
Characteristics of Parent Country						
Domestic credit by banking sector	-0.615*	-0.608**			-1.079***	-1.098***
	(.314)	(.281)			(.336)	(.304)
Domestic credit to private sector	0.478*	0.478*			.777**	.793***
	(.280)	(.247)			(.303)	(.272)
Ln (real GDP)	-0.011	-0.007			.107***	.100***
	(.039)	(.033)			(.024)	(.021)
Industry Value Added	2.024***	1.935***			1.737**	1.700**
	(.678)	(.634)			(.712)	(.676)
MKT Capitalization of Listed Companies	-0.022	-0.019			0.018	0.012
	(.065)	(.058)			(.082)	(.075)
Trade (% GDP)	-0.120*	-0.108*			-0.139	-0.153**
	(.07)	(.499)			(.088)	(.074)
Concentration Index	3.046***	2.787***	3.610***	3.450***		
	(1.045)	(.870)	(.984)	(.797)		
Diversification Index	-2.089***	-2.011***	-1.825***	-1.817***		

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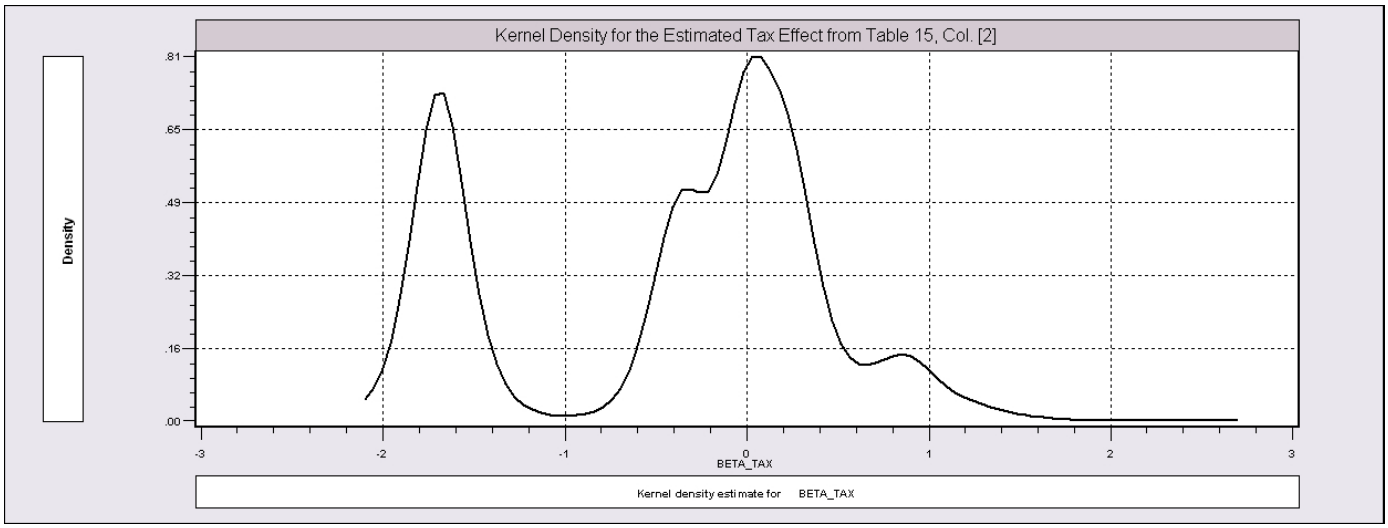
	[1]	[2]	[3]	[4]	[5]	[6]
	(.594)	(.499)	(.342)	(.270)		
Characteristics of Parent in 2004 (t=0)						
No. Subs Locations	0.156***	0.157***	0.250***	0.246***	-0.035	-0.029
	(.017)	(.012)	(.019)	(.013)	(.024)	(.019)
Sq. No. Subs Locations	-0.007***	-0.007***	-0.009***	-0.009***	-0.001	-0.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
No. Subsidiaries	0.017***	0.017***	0.011***	0.010***	.039***	0.038***
	(.001)	(.001)	(.002)	(.001)	(.002)	(.002)
Sq. No. Subsidiaries	-0.2D-04***	-0.1D-04***	-0.1D-04***	-0.1D-04***	-.0001***	-.0002***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Expansion Choice in 2005	1.121***	1.079***	1.092***	1.045***	1.018***	0.947***
	(.05)	(.031)	(.08)	(.049)	(.062)	(.042)
Log-Likelihood	-11488.1	-11497.93	-5455.26	-5466.51	-8222.83	-8226.55
Number of Firms	28,940	28,940	28,940	28,940	28,940	28,940

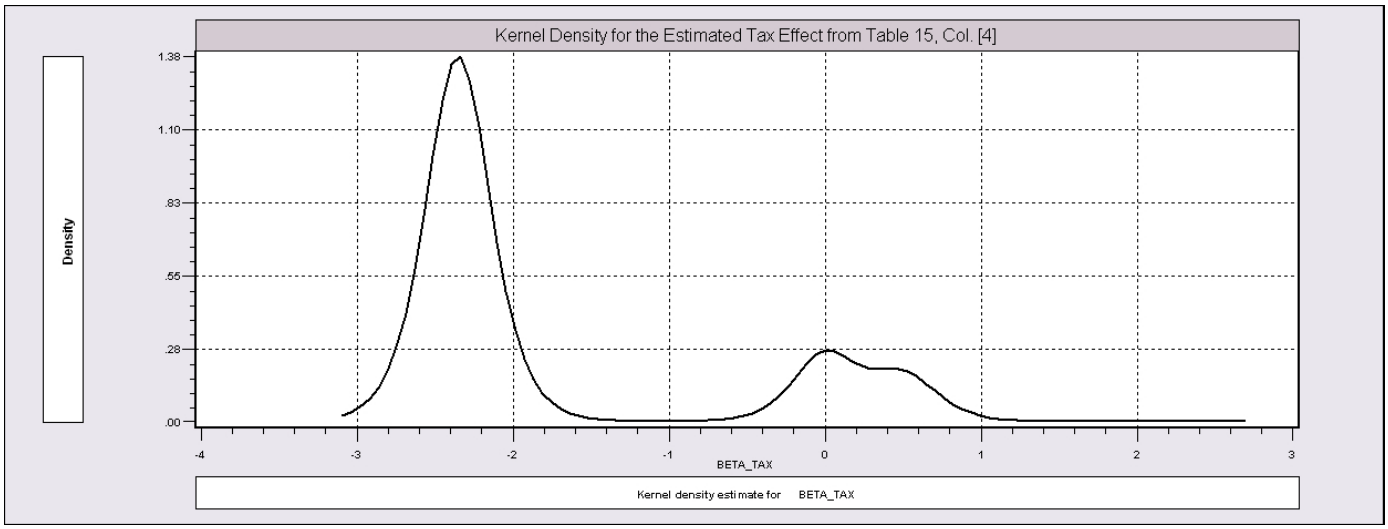
Notes: (1) dependent variable is the parents choice of acquiring at least one new subsidiary at period s, acquisitions can be only cross-border in columns [3] and [4]; (2) models in column [2] and [4] are estimated by simulated maximum likelihood; (3) for each random parameter, the table gives the "intercept", which is the constant term in the means of the random parameters, the effect of the firm-specific characteristics that are supposed to shift the intercept and the conditional standard deviation of the estimated parameter; (4) all models include dummy variables specific to the country of the parent firm, dummies specific to the industrial sector of the parent firm and dummies specific to the year when the acquisition took place (unreported); (5) standard errors are given in parenthesis; (6) asterisks indicate significance at *** (1%), ** (5%), * (10%); (7) dummies of firms "type" identify whether the firm is Multinational or Domestic, and use the type Standalone as reference group, in columns [6] and [7] the reference group is constituted by all non-multinational parent firms; (8) for Standalone companies, number of subsidiaries and number of countries where the subsidiaries are located is 0; (9) sample size is 28,940 parent firms observed for the five years between 2006 and 2010 (2005 is the base year)

Figure 3: Distribution of the effect of Home Corporate Statutory Tax Rate on Acquisition Choice across Parent Firms



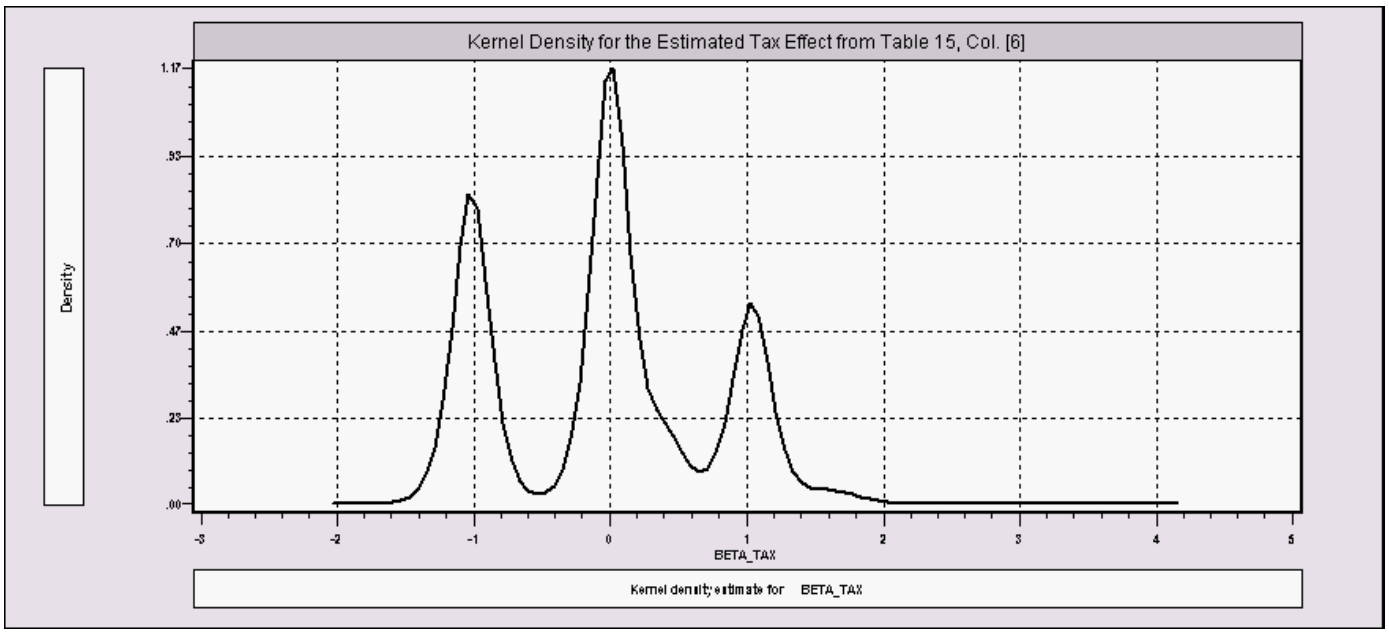
Kernel Density for Tax Parameter estimated in Column [2] of Table 15. Mean effect shifted by Multinational and Domestic Type Dummies, Standalones being the reference group. Effect estimated on the full sample of 28,940 firms. Mean Value = -0.449, Std Deviation = 0.871, Skewness = -0.374, Excess Kurtosis -3 = -1.093, Minimum = -1.998, Maximum= 2.640

Figure 4: Distribution of the effect of Home Corporate Statutory Tax Rate on cross-border Acquisition Choice across Parent Firms



Kernel Density for Tax Parameter estimated in Column [4] of Table 15. Mean effect shifted by Multinational Dummy, non-Multinationals being the reference group. Effect estimated on the full sample of 28,940 firms. Mean Value = -1.743, Std Deviation = 1.097, Skewness = 1.284, Excess Kurtosis -3 = -0.267, Minimum = -2.959, Maximum= 2.611

Figure 5: Distribution of the effect of Home Corporate Statutory Tax Rate on domestic Acquisition Choice across Parent Firms



Kernel Density for Tax Parameter estimated in Column [6] of Table 15. Mean effect shifted by Multinational Dummy, and Domestic Type Dummies, Standalones being the reference group. Effect estimated on the full sample of 28,940 firms. Mean Value = -0.042, Std Deviation = 0.764, Skewness = 0.155, Excess Kurtosis -3 = -0.877, Minimum = -1.949, Maximum= 4.121