universität wien

DISSERTATION

Titel der Dissertation

„Essays on Multinational Corporations, Investment and Economic Performance“

Verfasserin

Mag. Esther Kalkbrenner, MAS

angestrebter akademischer Grad

Doctor of Philosophy (PhD)

Wien, im August 2010

Studienkennzahl lt. Studienblatt:	094 140
Dissertationsgebiet lt. Studienblatt:	PhD-Studium Volkswirtschaftslehre (Economics)
Betreuer:	Prof. Dennis C. Müller

Essays on Multinational Corporations, Investment and Economic Performance

The Effects of Ownership and Institutional Quality on Internal Capital Markets: Cross-Country Evidence
Authors: K.Gugler, E.Kalkbrenner, E.Peev

Institutional Determinants of Domestic and Foreign Subsidiaries' Performance
Authors: K.Gugler, E.Kalkbrenner, D.C.Müller, E.Peev

Acquired versus Non-Acquired Subsidiaries - Which Entry Mode do Parent Firms Prefer?
Author: E.Kalkbrenner

Abstract (English)

Abstract (German)

Curriculum Vitae

The Effects of Ownership and Institutional Quality on Internal Capital Markets: Cross-Country Evidence *

Klaus Gugler†, Esther Kalkbrenner‡, Evgeni Peev§

Abstract

We derive empirical predictions from the standard investment-cash flow framework on the functioning of internal capital markets (ICM). We test these predictions using a unique data set of parent firms and their listed and unlisted subsidiaries in 82 countries over the period 1988-2005. The study reveals that company and country institutional structures matter. (1) Ownership participation of the parent firm in the subsidiary plays a crucial role for the efficient functioning of ICMs. The larger the ownership stake of the parent, the better the functioning of the ICM. (2) The best functioning cross-border ICMs can be found in the sub-sample of firms with parents from a country with *"strong"* institutions and subsidiaries from a country with *"weak"* institutions. (3) Subsidiaries in Eastern Europe are more dependent on ICMs than subsidiaries elsewhere. US subsidiaries do not use ICMs. (4) Unlisted subsidiaries utilize much more ICMs their parents provide than listed subsidiaries. Thus, ICMs are not per se *"bright"* or *"dark"*, their proper functioning depends on how they are set up.

*This research was partly supported by the FWF project P 19522-G14 on 'Corporate Governance in Central and Eastern Europe' and by the Austrian National Bank Project Nb. 12325. We would like to thank Dennis C. Mueller, Marc Roe, seminar participants at the EARIE 2008 in Toulouse, the University of Vienna, the Universitat Autonoma de Barcelona, and the Harvard Law School for helpful comments.

†Vienna University of Economics and Business, Department of Economics, Augasse 2-6, A-1090 Vienna, e-mail: klaus.gugler@univie.ac.at. (corresponding author)

‡University of Vienna, Department of Economics, Bruenner Strasse 72, A-1210 Vienna

§University of Vienna, Department of Economics, Bruenner Strasse 72, A-1210 Vienna

1 Introduction

The literature stresses two opposing effects of internal capital markets (ICMs) on the investment performance of group firms or group segments. On the one hand, ICMs may substitute for missing external capital markets (ECMs), especially in less developed countries (Khanna and Palepu, 1999). In the presence of capital market imperfections, subsidiaries/segments are able to access the funds that parents provide (Inderst and Mueller, 2003), and they benefit from the access to finance from other affiliates within the multinational network (Stein, 2003). Parents may also impose discipline on subsidiaries/segments by reallocating funds to those with investment proposals with a positive net present value but low internal cash flows (Stein, 2002).

On the other hand, the redistribution of capital between subsidiaries or segments may weaken managerial incentives and lead to wasteful business activities (Milgrom and Roberts (1988), Meyer et al. (1992)). Under the conditions of soft budget constraints, ICMs allocate too many resources to firms with bad investment opportunities and too few to firms with good investment opportunities (Lamont (1997), Shin and Stulz (1998), Rajan et al. (2000)). Some authors explain ICM inefficiency by poor corporate governance (Scharfstein and Stein (2000a,b), Glaser et al. (2008)). Others claim that the evidence of ICM misallocations is an artifact of measurement error in Tobin's Q used as a proxy for investment opportunities (Whited, 2001).

In this paper, we construct a unique data set of parent firms and their listed and unlisted subsidiaries in 82 countries over the period 1988-2005, and present cross-country evidence on the effects of ownership concentration, country governance and legal systems on the working of internal capital markets. We seek to

contribute to the literature on ICMs in at least four ways.

First, using a unique and comprehensive cross-country data set we study ICMs in a broad multinational context. Subsidiary investment is analyzed as a function of financial and institutional characteristics of both parent firms and their subsidiaries. We utilize this variation and get consistent results for various determinants of the functioning of ICMs such as ownership concentration and parent-subsidiary country governance and legal systems.

Second, we extend the investment-cash flow framework to derive empirical predictions on the workings of ICMs. We show that proper functioning ICMs imply that parent cash flow (positively) and parent investment opportunities (given there is a group budget constraint, negatively) should be systematically related to subsidiary investment. The investment-cash flow literature was criticized on the grounds that cash flow merely proxies for future investment opportunities, and thus a positive investment-cash flow coefficient does not say anything about cash constraints (see e.g. the discussion between Fazzari et al. (1988, 2000) and Kaplan and Zingales (1997, 2000). This paper circumvents this critique by focusing on the parent cash flow influence on subsidiary investment, which should be less likely to proxy for subsidiary investment opportunities.

Third, most papers on ICMs use firm segment data that introduce measurement errors in the main variables (e.g. investment opportunities). Some authors try to resolve the problem of measurement errors constructing a measurement-error consistent estimator (Whited, 2001) or using plant-level data (Maksimovic and Phillips, 2002). Our paper uses both subsidiary data and parent firm data. Subsidiaries are separate legal entities and provide balance sheet and income statements, thus we do not need to rely on segment data and can directly control for the investment opportunities of the subsidiaries, e.g. via sales growth.

Finally, we analyze simultaneously listed and unlisted subsidiaries of (listed) parents. Carlin et al. (2008) focus on listed subsidiaries only and present evidence in favor of the existence of ICMs that reallocate finance to member firms with superior investment opportunities. However, unlisted subsidiaries far outweigh listed subsidiaries in economic importance and presumably, one of the main reasons why ICMs exist is to substitute for missing ECMs. Unlisted subsidiaries are more likely to face cash constraints, and should benefit most from the workings of ICMs. We find mixed evidence for the smooth functioning of ICMs. On the one hand, we find evidence that ICMs alleviate cash constraints in the presence of less than perfect ECMs. Parent firms do re-allocate cash flows, and the subsidiaries with better investment opportunities get a higher share of the pie (i.e. there is a *ranking* of subsidiaries competing for valuable funds). Investment of unlisted subsidiaries is more sensitive to parent firm cash flow than the investment of their listed counterparts. Subsidiaries from *"weak"* institutions countries, e.g. subsidiaries from Eastern Europe, are more dependent on ICMs than their counterparts in *"strong"* institutions countries. All this is consistent with the *bright side* of ICMs.

On the other hand, ICMs are *costly* in the sense that a large ownership stake of the parent is necessary to guarantee its smooth working. We find that an ownership stake of the parent of more than 20 percent is necessary to turn the parent cash flow coefficient positive, and one of more than 45 percent is necessary to get a *ranking* of competing subsidiaries. Moreover, the own (i.e. subsidiary) cash flows remain significant determinants of investment, even in the presence of ICMs. Thus, many ICMs do not completely solve the incentive and control problems between parent and subsidiary - there is also a *dark side* of ICMs.

The rest of the paper is structured as follows. Section 2 discusses our hy-

potheses and the econometric modeling. Section 3 describes the data and sample characteristics. Section 4 analyzes the econometric results and Section 5 provides conclusions.

2 Hypotheses

2.1 Cash Constraints and Managerial Discretion

The Modigliani & Miller (1958) approach to corporate finance when extended to FDI would imply that ownership and country institutional structures are irrelevant for investment decisions.[1] This traditional investment analysis is depicted in figure 1. With perfect capital markets the supply of funds, S, is a horizontal line at r, the risk-adjusted market rate of interest, internal and external funds are perfect substitutes. The demand for capital investment, D, is assumed downward sloping. In the neoclassical theory, a firm's investment depends only on this demand and its cost of capital, and is independent of the size of its cash flow. A neoclassical firm invests up to I^*, where the expected marginal profitability of investment equals its marginal cost.

In contradiction to the neoclassical theory, imperfect external capital markets and corporate governance problems are major determinants of investment behavior.[2] The cash constraints hypothesis (CCH) posits a rising cost of capital schedule once a firm enters the external capital market e.g. due to transaction costs or asymmetric information causing adverse selection.[3] With rising costs of

[1] See also Miller (1988).

[2] See e.g. Gugler et al. (2004), Gugler and Peev (2010).

[3] Myers and Majluf (1984) posit that firms may be cash-constrained because outside investors have less information than the owner-managers about the true value of assets or investment opportunities. Cash-constrained managers maximize incumbent shareholder wealth by foregoing some positive NPV projects rather than issue equity which is currently undervalued due to

external capital the supply of capital, S, is dependent on the level of cash flows. At cash flow CF_a the firm is constrained to invest I_a. It under invests. If cash flow increases from CF_a to CF_b the cost of funds schedule shifts from $S(CF_a)$ to $S(CF_b)$ and the firm invests I_b . Thus, the CCH implies a positive sensitivity of investment to cash flow.

Positive investment cash flow sensitivity is also expected according to the managerial discretion hypothesis (MDH).[4] Following Marris (1963, 1998), managers' utility $U = U(g(I), p(I))$ is an increasing function of company growth, g , which rises with investment, and a decreasing function of the probability of corporate governance intervention, p. This probability is assumed to be zero at the optimal investment I^*, where the value of the firm is at its maximum. As I increases beyond I^* the value of the firm falls and p rises. In Anglo-Saxon "market-based"-systems, corporate governance external controls like hostile takeovers may be triggered by such over-investment. In "insider"-systems as in Continental Europe, dominant shareholders, such as parent firms, may step in. Managerial investment, I_m, and dividends, $CF_m(I_m)$, are chosen to maximize managerial utility by equating the marginal utility derived from increasing company growth by one extra unit of investment to the marginal disutility from the increase in the probability of corporate governance intervention caused by the corresponding reduction in dividends by one extra unit of investment. (In figure 1, I_m is determined by the intersection of the manager's indirect marginal utility of investment schedule, $MU_I = (\partial U/\partial g)(\partial g/\partial I)$, and the indirect marginal (dis-)

asymmetric information. Adverse selection can also lead to credit rationing (Stiglitz and Weiss, 1981). Un-collateralized credit could be denied to firms if adverse selection of loan applicants leads banks to choose an interest rate at which the market does not clear. See Fazzari et al. (1988) for the first empirical tests.

[4]Managerialist theories of the firm e.g. Baumol (1959), Williamson (1963), Marris (1963, 1964), Grabowski and Mueller (1972) and the principal-agent literature (Jensen and Meckling (1976), Jensen (1986)) question the profit maximization assumption.

utility schedule, $MD_I = (\partial U/\partial p)(\partial p/\partial I))$. A cash flow increase from CF_m to $CF_{m'}$ shifts MD_I to $MD_{I'}$: The decline in utility from incremental investment is now lower at every investment level, because the threat of governance intervention is lower when cash flow and dividends are higher. The optimal investment for managers increases from CF_m to $CF_{m'}$ and dividends increase from $CF_m(I_m)$ to $CF_{m'}(I_{m'})$. A control failure leads to *cheap* internal finance and managers over invest. Thus MDH thus implies that the investment-cash flow coefficient is positive.[5]

So far we have assumed that the firm is "stand alone" in the sense that if its own cash flows are insufficient to cover all profitable investment opportunities, it has to go to the external capital market. Next we add the possibility that the firm has a parent firm which it can approach for additional funds.

2.2 Internal Capital Markets

Figure 2 depicts the workings of an ICM between a subsidiary (on the left part of the figure), which has good investment opportunities but a steeply upward sloping external cost of funds schedule, and a parent (to the right), which is much larger and is also depicted as having an upward sloping external cost of funds schedule.[6] If ICMs work perfectly, the parent firm uses own cash flow and available external funds and redistributes them to the subsidiary until risk adjusted returns across both firms are equalized, i.e. until $r_S = r_P$. It follows that the

[5]CCH and MDH are also in line with a "life-cycle" model of the firm (Mueller (1972), Grabowski and Mueller (1972)) according to which young, fast growing firms use internal finance to mitigate transaction costs of external finance, and large, mature firms use internal finance to maximize growth at the expense of shareholder wealth. See also Kathuria and Mueller (1995) and Carpenter (2002).

[6]For the basic argument of redistribution of funds to the subsidiary with better projects it does not matter whether the parent has also a rising cost of capital schedule or not.

subsidiary can profitably invest more, I^S_{aICM}, than as a stand alone firm, I^S_a, and the parent invests less.[7]

Figure 3 depicts an increase in parent cash flows, shifting its cost of funds schedule to the right. Not surprisingly by alleviating the group's cash constraints, this shift increases both subsidiary and parent investment, if the ICM works smoothly. ICMs also imply that the parent firm allocates its funds across subsidiaries depending on the relative value of each subsidiary's investment opportunities. Thus, we expect that increasing investment opportunities of the parent firm (or more concretely, the entire group except the particular subsidiary) will decrease the subsidiary's investment, holding the subsidiary's investment opportunities constant. In Figure 4, we analyze this situation as a shift of the parent demand for capital schedule to the right. The parent invests more and the subsidiary less after this shift (given the budget constraint of the group). In sum, we predict that ICMs lead to investment of subsidiaries positively affected by the cash flows of the parent firm and negatively affected by the investment opportunities of the parent firm.

2.3 Determinants of the functioning of ICMs

The functioning of ICMs may differ according to (1) the tightness of the internal incentive and control structure between parent and subsidiary, and (2) the external constraints faced by the parent and the subsidiary.

Regarding (1), the ownership stake of the parent in the subsidiary determines the financial interest/incentive the parent has in funding profitable investment opportunities of the subsidiary as well as its ability to control the operations of

[7] If the parent has a flat cost of capital schedule, its investment would not be affected by the ICM and it would remain at I^{P^*}.

the subsidiary (e.g. via management selection, supervisory board representation and the like). In fact figures 2-4 were drawn under the assumption that the parent has a 100% ownership stake in the subsidiary. Only in this case should we expect full equalization of risk-adjusted marginal returns on investment across group firms. If the parent had, e.g., only a 50% stake in the subsidiary, it might prefer a lower marginal return project conducted internally where it gets all of the benefits to a higher marginal return project conducted by the subsidiary where it only gets 50% of the returns. There are also a number of legal and tax reasons to expect that ICMs work better the larger the ownership stake of the parent, and in particular when it is 100%. E.g. wholly owned subsidiaries are tax advantaged in their dividend payments in the US as opposed to partially owned subsidiaries, in partially owned subsidiaries minority shareholder rights might complicate ICMs.[8] Thus, the functioning of ICMs depends on the parent firm's ownership stake in the subsidiary: the larger this stake, the better the ICM should function.

Hypothesis 1. The larger the parent stake, the larger the parent's cash flow effect, and the more negative the parent's investment opportunities effect.

Regarding (2), external constraints, country level factors, such as the legal system, law enforcement, corruption, country governance, and the development of external capital markets, determine how easy it is for the subsidiary to raise capital externally (either external debt or equity; i.e. the slopes of S in figures 2-4) and therefore the value of ICMs. LaPorta et al. (1997, 1998) sparked a huge literature in law and finance analyzing country effects worldwide, however, there is no study analyzing the influence of country factors on the workings of ICMs in a cross-country setting. We expect that when parent firms come from coun-

[8]We want to thank all the participants of the Corporate Lunch Seminar at the Harvard Law School in March 2009, who made these extremely valuable comments. See also Samphantharak (2007).

tries with high institutional quality and more developed ECMs, they can provide better monitoring and finance profitable investment opportunities. On the other hand, subsidiaries in countries with low institutional quality need ICMs as substitutes for the lack of developed ECMs.

Hypothesis 2. The positive effect of the parent's cash flow and the negative effect of the parent's investment opportunities on subsidiary investment are stronger for subsidiaries in countries with *"weak"* country governance and financial systems and parent firms from *"strong"* systems than for subsidiaries from countries with other parent-subsidiary pairs.

Hypothesis 3. The positive effect of the parent's cash flow and the negative effect of the parent's investment opportunities on subsidiary investment are stronger for subsidiaries in countries with *"weak"* legal systems and parent firms from *"strong"* legal systems than for subsidiaries from countries with other parent-subsidiary pairs.

As a corollary, one may test whether subsidiaries in Eastern Europe are more dependent on ICMs than subsidiaries in Western Europe and the US. In Eastern Europe, the institutional environment has several key characteristics conducive to ICMs (Mueller and Peev, 2007). While the written law is similar to or even better than in EU-15 countries, law enforcement is rather inefficient.[9] Despite major differences in privatization policies, the striking outcome of transition is high ownership concentration (Bergloef and Bolton, 2002), and the major corporate governance conflict is between the controlling shareholder and minority shareholders (Bergloef and Pajuste, 2003). Most stock exchanges are very illiquid and only a small number of firms are actively traded. Bank-based financial systems have emerged with foreign-owned commercial banks prevailing. Thus,

[9]See e.g. Pistor (2000).

ICMs can be expected to play a large role in transition countries.

Hypothesis 4. The positive effect of the parent's cash flow and the negative effect of the parent's investment opportunities on subsidiary investment are stronger for subsidiaries from countries in Eastern Europe than for subsidiaries in Western Europe and the US.

Whether the subsidiary is listed or not is somewhat between (1) and (2). Listing of course entails a dispersion of ownership, so that we move away from the wholly owned subsidiary. Listing on a stock exchange also means minority shareholder rights and much stricter transparency. The legal form of a listed subsidiary usually is a joint stock corporation, which gives it much more autonomy in decision making vis a vis the parent (e.g. it is not bound by directives). Thus, we expect a much looser relation between parents and listed subsidiaries than between parents and unlisted subsidiaries. Moreover, listing may also affect the external constraints faced by the subsidiary: Listed subsidiaries do not need ICMs as much as unlisted subsidiaries do, since ECMs substitute for them. It is very likely that the asymmetry of information for listed subsidiaries is much lower than for unlisted subsidiaries: their shares are traded daily on the stock exchange, they are covered by a number of analysts, they provide quarterly company reports, and they are likely to be much larger than their unlisted counterparts. Moreover, unlisted firms have not gone to the stock exchange in the first place, because, presumably, asymmetry of information is particularly severe for them so that under-pricing of assets would occur. Thus, we expect that ICMs play a larger role for unlisted subsidiaries than for listed subsidiaries.

Hypothesis 5. The positive effect of the parent's cash flow and the negative effect of the parent's investment opportunities on subsidiary investment are stronger for *unlisted* subsidiaries than for *listed* subsidiaries.

2.4 Econometric Modeling

We test these predictions by estimating simple investment accelerator-cash flow models similar to those used by Shin and Stulz (1998), Chevallier (2004) and Carlin et al. (2008):

$$I_{St} = \alpha + \beta_S SG_{S,t} + \beta_P SG_{P,t} + \gamma_P Q_{P,t} + \delta_S CF_{S,t-1} + \delta_P CF_{P,t-1} + \epsilon_{S,t} \quad (1)$$

Whereby, $I_{S,t}$ is defined as the investment of the subsidiary at time t divided by total assets; $SG_{S,t}$ is defined as the sales growth rate of the subsidiary at time t; $SG_{P,t}$ is the sales growth rate of the parent at time t; $CF_{S,t-1}$ is the cash flow of the subsidiary at time t-1 and $CF_{P,t-1}$ is the cash flow of the parent at time t-1; $Q_{P,t}$ reflects the Tobin's Q of the parent at time t. We measure investment as the change in fixed assets, cash flow as the profit/loss of a firm plus depreciation, Tobin's Q as market capitalization plus long term debt over total assets, and sales growth as the log difference between sales from one period to the other.

The coefficients of main interest are γ_P and δ_P. A negative γ_P implies a ranking of subsidiaries, such that if the investment opportunities of the whole group go up relative to the investment opportunities of the subsidiary under study, the investment of the subsidiary should go down, since funds are redistributed within the group. A positive δ_P implies that parent funds are used to finance subsidiary investment.

3 Data

We construct a unique data set containing data from two databases, Amadeus and Osiris, provided by Bureau van Dijk electronic publishing. Bureau von Dijk

combines several information sources, like company registers, annual reports, stock exchanges etc., to establish the two databases, and Amadeus and Osiris assign unique identification numbers to each company. Using this identification key, it was possible to interlink the two databases. Amadeus contains ownership and financial firm-level data for mainly unlisted companies from 38 European countries, while Osiris contains ownership and financial firm-level data for listed companies for around 120 countries. We use the ownership structure provided by Osiris and add financial data for unlisted subsidiaries from Amadeus, and so construct a panel using both databases for the years 1988-2005. Thus, we are able to identify 8,677 parent firms, 9,699 listed and 39,346 unlisted subsidiaries.[10]

We evaluate the quality of a country's institutions using the Worldwide Governance Indicators (WGI) of the World Bank. We average the six indexes: (1) voice and accountability, (2) political stability, (3) government effectiveness, (4) regulatory quality, (5) rule of law, and (6) control of corruption. The indicators are constructed using the unobserved components methodology described in Kaufmann et al. (2005). The indicators are measured in units ranging from -2.5 to 2.5, with higher values corresponding to better governance. We also classify countries by their legal origin using LaPorta et al. (1997, 1998) typology, namely: Anglo-Saxon, German, French, and Scandinavian. Transition countries form a separate fifth group.

Table 1 provides descriptive statistics by countries classified by the five legal origin systems. For any country we present the number of listed and unlisted subsidiaries, number of parent firms and the country average institutional quality index. On average, countries in the Scandinavian legal family group have

[10]Due to the requirement that parents hold 50% or more of the subsidiary and missing balance sheet data the number of firms and observations are much lower in the regression analysis that follows.

the highest institutional quality score (1.75), while transition countries show the lowest (0.23).

Table 2 presents descriptive statistics of the main variables by parent firms, listed and unlisted subsidiaries. On average, the investment ratio is higher for listed than unlisted subsidiaries, and it is largest for parent firms. Internally generated cash flow is 8.3% of assets in listed, 8% in unlisted subsidiaries, and 7.3% in parent firms. While average sales growth is smaller for parent firms than for either type of subsidiary, parents' average Tobin's Q is larger than for listed subsidiaries. Not surprisingly, on average, listed subsidiaries are much larger than unlisted subsidiaries in terms of number of employees, and parent firms are by far the largest. Parents on average hold around 2/3 of the equity in listed, and 94% in unlisted subsidiaries.

The sample contains data from two databases, Amadeus and Osiris, provided by Bureau van Dijk electronic publishing. Bureau von Dijk combines several information sources, like company registers, annual reports, stock exchanges etc., to establish the two databases, whereby a unique identification number is assigned to each company. Using this identification key, it was possible to interlink the two databases. Amadeus contains ownership and financial firm-level data for mainly unlisted companies from 38 European countries, while Osiris contains ownership and financial firm-level data for listed companies for around 120 countries. We use the ownership structure provided by Osiris and add financial data for unlisted subsidiaries from Amadeus. A panel is constructed using both databases for the years 1988-2005. Thus, we are able to identify 8,677 parent firms, 9,699 listed and 39,346 unlisted subsidiaries.

We evaluate the quality of a country's institutions as the average of six indexes: (1) voice and accountability, (2) political stability, (3) government effec-

tiveness, (4) regulatory quality, (5) rule of law, and (6) control of corruption. The indicators are constructed using the unobserved components methodology described in Kaufmann et al. (2005). The indicators are measured in units ranging from -2.5 to 2.5, with higher values corresponding to better governance. We also classify countries by their legal origin using LaPorta et al. (1997, 1998) typology, namely: Anglo-Saxon, German, French, and Scandinavian. Transition countries form a separate fifth group.

Table 1 provides descriptive statistics by countries classified by the five legal systems. For any country we present the number of listed and unlisted subsidiaries, number of parent firms and the country average institutional quality index. On average, countries in the Scandinavian legal family group have the highest institutional quality score (1.75), while transition countries show the lowest score (0.23).

Table 2 presents descriptive statistics of the main variables by parent firms, listed and unlisted subsidiaries. On average, the investment ratio is higher for listed than unlisted subsidiaries but it is largest for parent firms. Internally generated cash flow is 8.3 % of assets in listed, 8% in unlisted subsidiaries, and 7.3% in their parents. While average sales growth is smaller for parent firms than for either type of subsidiary, parents' Tobin's q is larger than for listed subsidiaries. Not surprisingly, on average, listed subsidiaries are much larger than unlisted subsidiaries in terms of number of employees, and parent firms are by far the largest. Parents on average hold around 2/3 of the equity in listed, but 94% in unlisted subsidiaries.

4 Empirical Evidence

4.1 Main results on internal capital markets

Table 3 includes only subsidiaries, where the parent firm owns more than 50% of the equity, so these are *"true"* subsidiaries and they are consolidated with the parent firm (9,018 subsidiaries, 2,048 parents; 34,937 observations). Parent cash flow displays a positive, sizeable (0.10), and significant (t = 8.9) coefficient, pointing to a financial relation between parent and subsidiary. Moreover, parent Tobin's Q has a negative and significant coefficient: the larger the investment opportunities of the parent firm compared to the subsidiary, the lower the investment rate of the subsidiary. Both coefficients together imply that funds for investment are redistributed within the group, and the redistribution of funds is responsive to investment opportunities. However, ICMs do not appear to work perfectly, since own (i.e. subsidiary) cash flow has a positive, large (0.15) and significant coefficient.

Before further discussing the determinants of the functioning of ICMs, we present some robustness estimates in columns two and three of Table 3. There are severe methodological problems measuring the diversification decisions of firms (for a survey see Martin and Sayrak (2003), e.g. there is a selection problem.[11] Internal capital markets are only observed for the selected sample of firms with parents. There is no ICM of a firm, which is not a subsidiary. We can address this problem via Heckman's selection correction model, where in the first stage

[11]For a critical view see e.g. Chevallier (2004). She finds out that the investment patterns that the literature has attributed to cross-subsidization between divisions of conglomerates are already apparent in the pairs of merging firms *prior* to their mergers. She argues that unknown *relatedness* between firms but no internal capital markets may drive the relationship between cash flow of one firm (segment) and the investment of the other in the study by Shin and Stulz (1998).

a probit model is used to predict the probability of being a subsidiary and in the second stage the inverse Mills' ratio is included as a regressor. We address the issue of possible endogeneity by applying the General Method of Moments (GMM) estimator.

In Table 3, OLS estimates are compared to GMM and Heckman estimates. All qualitative results carry over. The GMM model estimates the regression augmenting it by a lagged dependent variable using the systems GMM estimator developed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). This estimator eliminates firm fixed effects by first-differencing as well as controls for possible endogeneity of current explanatory variables. Endogenous variables lagged two or more periods will be valid instruments provided that there is no second-order autocorrelation in the first-differenced idiosyncratic error terms.[12] The Sargan tests do not suggest rejection of the over-identifying restrictions at conventional levels. While there is evidence of first order serial correlation in the residuals, the AR(2) test statistics reveal absence of second order serial correlation in the first differenced errors. Our GMM estimates therefore use variables lagged by two or more periods as instruments. With GMM, the coefficients on own and parent cash flow remain positive and significant, although their sizes diminish. Parent Tobin's q retains its negative coefficient (although it becomes insignificant). Thus, endogeneity does not seem to be a major issue in our regressions.

Column 3 presents the Heckman results, which are nearly identical to the OLS results, indicating that accounting for possible selection biases does not change our main results. The first stage results (see bottom of table 3) indicate that

[12]Of course, it would be preferable to use a set of truly independent instrumental variables (IV) instead. It was, however, impossible for us to identify and collect a set of IVs that varies across firms and time and that is uniformly valid for all countries in the sample.

subsidiaries tend to be larger, more profitable but slower growing than stand alone firms. Moreover, they are more likely to be located in Eastern and Western Europe rather than in the US or other parts of the world. While the inverse Mills ratio (the non-selection hazard) is significant in the investment equation, there is only marginal correlation in the error terms (rho = -0.05).

In sum, we do find that ICMs are at work. Parent cash flows positively affect subsidiary investment and parents "rank" their subsidiaries according to investment opportunities in the face of an overall group capital budget constraint.

4.2 Ownership concentration and internal capital markets

Table 4 analyzes whether the size of the control stake of the parent firm matters. Hypothesis 1 states that the larger the percentage holdings of the parent in the subsidiary, the better the ICM works, since fewer incentive and control (and legal and tax) problems arise. The extreme case is a 100% owned subsidiary: the residual claimant (i.e. the parent) gets all the benefits and bears all the costs of its actions (e.g. funding and monitoring), so there is no corporate governance problem. We tackle this issue in two ways. The first column of the table presents a regression using interaction terms of parent Tobin's q and the two cash flow terms with parent ownership stake. This specification assumes a continuous and linear relation between the strength of the ICM and the parent's ownership stake. The second column analyzes (1) companies with parent ownership stake below 50% [13], (2) between 50% and 99.9% (majority-controlled subsidiaries), and (3) wholly owned subsidiaries (the base category).

The results are striking. The interaction term of parent Tobin's Q and own-

[13] Actually, one would not want to call these firms subsidiaries, these are rather equity participants.

ership stake is negative and significant, thus the larger the interest of the parent in the subsidiary, the larger the role of internal rankings according to investment opportunities (see column 1). The impact of parent Tobin's Q on subsidiary investment becomes negative at a 45% parent ownership stake. The interaction term of parent ownership and parent cash flow is significantly positive: The larger the interest of the parent in the subsidiary, the more parent cash flow is used for funding subsidiary investment. The impact of parent cash flow becomes positive at around 20% ownership, and it is 0.1 at a parent ownership of 92%. The interaction term between own (subsidiary) cash flow and parent stake is significantly negative, thus the larger the interest of the parent in the subsidiary, the fewer cash constraints and/or managerial discretion problems the subsidiary faces, presumably because ICMs get more efficient.

Consistently, for the sub-sample of firms where the parent owns less than 50%, there is no ICM. "Parent" Q is even positive and significant, parent cash flow is insignificant, and the own cash flow influence (0.27) is particularly large for this sub-sample (see column 2). In contrast, both parent cash flow and Tobin's Q coefficients in the sub-sample 50-99.9% are significantly positive and negative, respectively, pointing to responsiveness of cash redistribution to investment opportunities within the group. The 100% ownership sub-sample exhibits the "best" results concerning ICMs. For this sub-sample of wholly owned subsidiaries, the parent cash flow coefficient is sizeable (0.11) and highly significant (t = 9.78), and Tobin's Q is negative and significant.

In sum, our results are consistent with agency theory, in that the efficiency of the ICM crucially depends on the incentives and the control means of the parent. The larger its interest in the subsidiary, the tighter the ICM and the better it functions. This implies that proper functioning ICMs are *costly*, in the sense that

the parent must have a sizeable stake in the subsidiary. We obtain the *"best"* (with respect to ICMs) results in the wholly owned subsidiary sub-group.

We now turn to country effects on the workings of ICMs. We conduct three tests for the effects of the quality of country institutions on the workings of ICMs. First, we use the overall World Bank Index of country governance constructed by Kaufmann et al. (2005). Second, we analyze the effects of legal systems. Finally, we group firms according to geographical criteria.

4.3 Quality of country governance and internal capital markets

Table 5 uses the average WGI index of the World Bank to differentiate among four sub-samples, namely: (1) quality of both parent and subsidiary country governance and financial system is *"strong"*, (2) quality of parent governance and financial system is *"strong"* and of subsidiary financial system *"weak"*, (3) quality of parent governance and financial system is *"weak"* and of subsidiary governance and financial system *"strong"*, and (4) quality of both parent and subsidiary governance and financial system is *"weak"*. Countries are separated on the basis of whether the WGI index is larger or smaller than one.

Hypothesis 2 states that ICMs are most relevant in case (2), where the parent financial system is strong, thus the parent should be able to fund profitable investments and exert monitoring, but where the subsidiary system is weak, thus the subsidiary needs an ICM because of a lack of good ECMs. We indeed get the strongest results in the (2) sub-sample *"strong/weak"* in so far as the parent cash flow coefficient is positive, large (0.21), and significant, and parent Tobin's Q is negative and significant. In the cases where the parent firm stems from a

weak system (*"weak/weak"* and *"weak/strong"*), the functioning and effectiveness of ICMs break down, as evidenced by much smaller and/or insignificant parent cash flow coefficients, positive parent q coefficients, and large positive own (i.e. subsidiary) cash flow coefficients.

In sum, crucial for the functioning of ICMs appears to be the country governance of the parent. A parent from a "strong" country can via its ICM covering a subsidiary from a *"weak"* country substitute for missing efficient institutions.

4.4 Legal systems and internal capital markets

Table 6 presents the results classifying parents and subsidiaries according to country legal systems. LaPorta et al. (1997, 1998) conjecture that the Anglo-Saxon and Scandinavian legal systems perform better than the Germanic and French legal systems in a number of dimensions that affect capital market development. It follows that the former have *deeper* external capital markets.[14] We test Hypothesis 3 regrouping firms into *"strong legal system"* firms including firms from the Anglo-Saxon and Scandinavian legal systems (AS), and *"weak legal system"* firms including firms from the Germanic and French legal systems (GF), (the latter category includes also all transition countries). As can be seen, the results using the legal systems splits are not so clear cut as the results using the WGI index. The best functioning ICMs are found in the group GF/GF, i.e. for the sub-sample of firms where the parent and the subsidiary stem from a *"weak legal system"* country. For this group of firms, the parent cash flow coefficient is largest, and it is the only group where parent Tobin's Q is significantly negative. Of course,

[14]This fact is also valid in our data e.g. the average stock market to GDP ratio of Anglo-Saxon and Scandinavian subsidiary countries is twice as large as for Germanic and French subsidiary countries (125% versus 61%), and the private credit to GDP ratio is 30% higher (132% versus 100%).

many German (e.g. Siemens AG) and other Continental European parents are in this sub-category, and they appear to know how to organize ICMs. We also experimented with other measures of country institutional development, especially financial development, such as the market capitalization to GDP ratio and the external debt to GDP ratio. Results are consistent with the results obtained with WGI, that is, ICMs substitute for not well functioning ECMs.[15]

4.5 Eastern Europe, Western Europe and the USA

Table 7 presents our results on geographical country groups. We test Hypothesis 4 that subsidiaries in Eastern Europe (the parents of which stem from Western countries in most cases) are more dependent on ICMs, since they lack well developed ECMs in their home countries. The evidence corroborates this hypothesis. While the parent cash flow coefficient is only 0.075 for non-Eastern European subsidiaries, this coefficient rises to 0.34 for Eastern European subsidiaries. The difference is significant at the 1% level. The negative effect of parent Tobin's Q is also stronger, albeit not significantly so. Thus, this is compelling evidence that ICMs substitute for missing or inefficient ECMs in Eastern Europe. The second specification in Table 7 additionally interacts our variables of interest with a US-subsidiary dummy. As becomes evident, US subsidiaries do not utilize ICMs. This is not surprising given the fact that ECMs are well developed in the US.[16]

[15] These results are available upon request.

[16] In regressions not reported, we show that our results do not depend on the industry relatedness of parent and subsidiary. Coefficients are similar for horizontal versus non-horizontal parent-subsidiary pairs. These results are available upon request.

4.6 Listed and unlisted subsidiaries

Hypothesis 5 states that ICMs are more relevant in unlisted than in listed subsidiaries. The third column of Table 7 presents the results of a regression including interaction terms of the variables of interest with a listed firm dummy. As predicted, ICMs are much more important for non-listed subsidiaries than for listed subsidiaries: while the Tobin's Q effect is not significantly different for the two types of subsidiaries, the coefficient on parent cash flow is significantly positive and significantly larger for non-listed subsidiaries than for listed subsidiaries, for which the coefficient is near zero. The coefficient on own cash flow of listed subsidiaries is nearly twice as large as that for non-listed subsidiaries (0.26 versus 0.15).

5 Conclusion

In this paper, we test several hypotheses about the inner workings of internal capital markets. We show that parent firms are involved in cash flow re-allocation activities and that subsidiaries with better investment opportunities get a larger share of the pie. We find (1) compelling evidence for the hypothesis that the tightness of control of the parent firm in the subsidiary plays a crucial role for the smooth functioning of ICMs. The larger the ownership stake of the parent, the better the functioning of the ICM. However, the ownership stake of the parent must be quite substantial for ICMs to work properly. We obtain the best results for wholly owned subsidiaries. The study further reveals that (2) the country institutional environment matters. Using World Bank indicators for country governance, the best functioning ICMs can be found in the sub-sample of firms

with parents from a country with high institutional development and subsidiaries from a country with a low level of institutional development. (3) Consistently, we find that subsidiaries in Eastern Europe are more dependent on ICMs than subsidiaries elsewhere, that US subsidiaries do not use ICMs, and that unlisted subsidiaries make much more use of ICMs than listed subsidiaries. Apparently better access to external capital markets diminishes the importance of internal capital markets for listed subsidiaries.

This paper sheds some light on the discussion on whether ICMs are *bright* or *dark*. Our answer is *it depends*. ICMs are not a priori good or bad, their proper functioning depends on the internal control structure of the parent-subsidiary relation and on the external constraints the two types of firms face.

References

M. Arellano and S. R. Bond. Some tests of specification of panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58:277–297, 1991.

M. Arellano and O. Bover. Another look at the instrumental-variable estimation of error component models. *Journal of Econometrics*, 68:29–52, 1995.

W. J. Baumol. *Business Behaviour, Value and Growth.* Macmillan, New York, 1959.

E. Bergloef and P. Bolton. The great divide and beyond: Financial architecture in transition. *Journal of Economic Perspectives*, 16(1):77–100, 2002.

E. Bergloef and A. Pajuste. Emerging owners, eclipsing markets: Corporate governance in Central and Eastern Europe. In *Corporate Governance and Capital Flows in a Global Economy.* Oxford University Press, 2003.

R. Blundell and S. Bond. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87:115–143, 1998.

W. Carlin, A. Charlton, and C. Mayer. Capital markets, ownership and distance. *CEP Discussion Paper*, 744, 2008.

R. E. Carpenter. Finance constraints or free cash flow? *Empirica*, 22:185–209, 2002.

J. A. Chevallier. What do we know about cross-subsidization: Evidence from merging firms. *Advances in Economic Analysis and Policy*, 4(1), 2004.

S. M. Fazzari, G. R. Hubbard, and B. Petersen. Financing constraints and corporate investment. *Brookings Papers on Economic activity*, 1:141–95, 1988.

S. M. Fazzari, G. R. Hubbard, and B. Petersen. Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales. *Quarterly Journal of Economics, May 2000, Vol. 115, No. 2, Pages 695-705*, 2000.

M. Glaser, Z. Sautner, and B. Villalonga. Corporate governance and internal capital markets. *Working Paper*, 2008.

H. G. Grabowski and D. C. Mueller. Managerial and stockholder welfare models of firm expenditures. *Review of Economics and Statistics*, 54:9–24, 1972.

K. Gugler and E. Peev. Institutional determinants of investment-cash flow sensitivities in transition economies. *Comparative Economic Studies*, 72:62–81, 2010.

K. Gugler, D. C. Mueller, and B. Yurtoglu. Marginal q, Average q, Cash Flow and Investment. *Southern Economic Journal*, 70(3):512–531, 2004.

R. Inderst and H. M. Mueller. Internal versus external financing: An optimal contracting approach. *Journal of Finance*, 58:1033–1062, 2003.

M. C. Jensen. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Association Papers and Proceedings, 1986, 323-329*, 1986.

M. C. Jensen and W. H. Meckling. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3: 305–360, 1976.

S. N. Kaplan and L. Zingales. Do investment-cash flow sensitivities provide useful measures of financing constraints? *Quarterly Journal of Economics*, CXII:169–215, 1997.

S. N. Kaplan and L. Zingales. Investment-cash flow sensitivities are not valid measures of financing constraints. *Quarterly Journal of Economics*, 2:707–712, 2000.

R. Kathuria and D. C. Mueller. Investment and cash flow: Asymmetric information or managerial discretion? *Empirica*, 22:211–234, 1995.

D. Kaufmann, A. Kraay, and M. Mastruzzi. Governance matters IV: Governance indicators for 1996-2004. *World Bank Working Paper*, 2005.

T. Khanna and K. Palepu. The right way to restructure conglomerates in emerging markets. *Harvard Business Review*, 77:125–134, 1999.

O. Lamont. Cash flow and investment: evidence from internal capital markets. *Journal of Finance*, 52:83–109, 1997.

R. LaPorta, F. Lopez de Silanes, A. Shleifer, and R. W. Vishny. Legal determinants of external finance. *Journal of Finance*, 3:1131–1150, 1997.

R. LaPorta, F. Lopez de Silanes, A. Shleifer, and R. W. Vishny. Law and finance. *Journal of Political Economy*, 106(6):1113–1154, 1998.

V. Maksimovic and G. Phillips. Do conglomerate firms allocate resources inefficiently across industries? Theory and evidence. *Journal of Finance*, 57(2): 721–767, 2002.

R. Marris. A model of the managerial enterprise. *Quarterly Journal of Economics*, 77:185–209, 1963.

R. Marris. The economic theory of managerial capitalism. *Glencoe: Free Press*, 1964.

R. Marris. Managerial capitalism in retrospect. *Macmillan, London*, 1998.

J. D. Martin and A. Sayrak. Corporate diversification and shareholder value: A survey of recent literature. *Journal of Corporate Finance*, 9:37–57, 2003.

M. Meyer, P. Milgrom, and D. J. Roberts. Organizational prospects, influence costs, and ownership changes. *Journal of Economics and Management Strategy*, 1:9–35, 1992.

P. Milgrom and D. J. Roberts. An economic approach to influence activities in organizations. *American Journal of Sociology*, 94:154–179, 1988.

M. H. Miller. The Modigliani-Miller propositions after thirty years. *Journal of Economic Perspectives*, 2:99–120, 1988.

D. C. Mueller. A life cycle theory of the firm. *Journal of Industrial Economics*, 20:199–219, 1972.

D. C. Mueller and E. Peev. Corporate governance and investment in Central and Eastern Europe. *Journal of Comparative Economics*, 35:414–437, 2007.

S. C. Myers and N. S. Majluf. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13:187–221, 1984.

K. Pistor. Patterns of legal change: Shareholder and creditor rights in transition economies. *European Business Organizations Law Review*, 1:59–100, 2000.

R. G. Rajan, H. Servaes, and L. Zingales. The cost of diversity: The diversification discount and inefficient investment. *Journal of Finance*, 55:35–80, 2000.

K. Samphantharak. Internal capital markets in business groups. *Working Paper: University of Chicago*, 2007.

D. S. Scharfstein and J. C. Stein. Herd behavior and investment. *American Economic Review*, 80:465–479, 2000a.

D. S. Scharfstein and J. C. Stein. The dark side of internal capital markets: Divisional rent-seeking and inefficient investment. *Journal of Finance*, 55:2537–2564, 2000b.

H. H. Shin and R. M. Stulz. Are internal capital markets efficient? *Quarterly Journal of Economics*, 113(2):531–552, 1998.

J. Stein. Information production and capital allocation: Decentralized versus hierarchical firms. *Journal of Finance*, LVII (5):1891–1922, 2002.

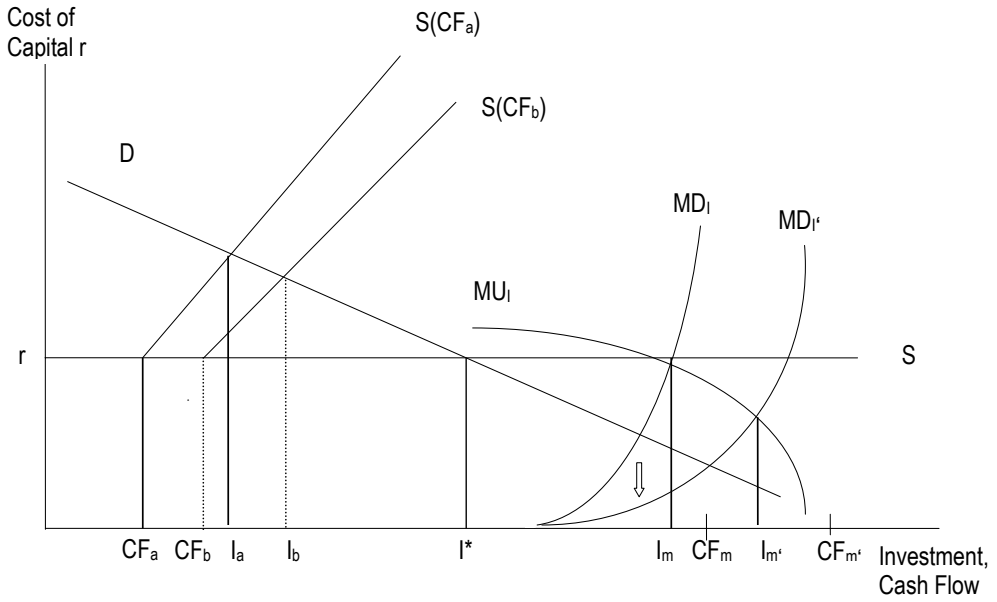
J. Stein. Agency, information and corporate investment. In M. H. G. Constantinides and R. Stulz, editors, *Handbook of the Economics of Finance*, pages 111–165. Elsevier New York, 2003.

J. Stiglitz and A. Weiss. Credit rationing in markets with imperfect information. *American Economic Review*, 71:393–410, 1981.

T. M. Whited. Is it inefficient investment that causes the diversification discount? *Journal of Finance*, 56 (5):1667–1691 (25), 2001.

O. E. Williamson. Management discretion and business behavior. *American Economic Review*, 53:1032–1057, 1963.

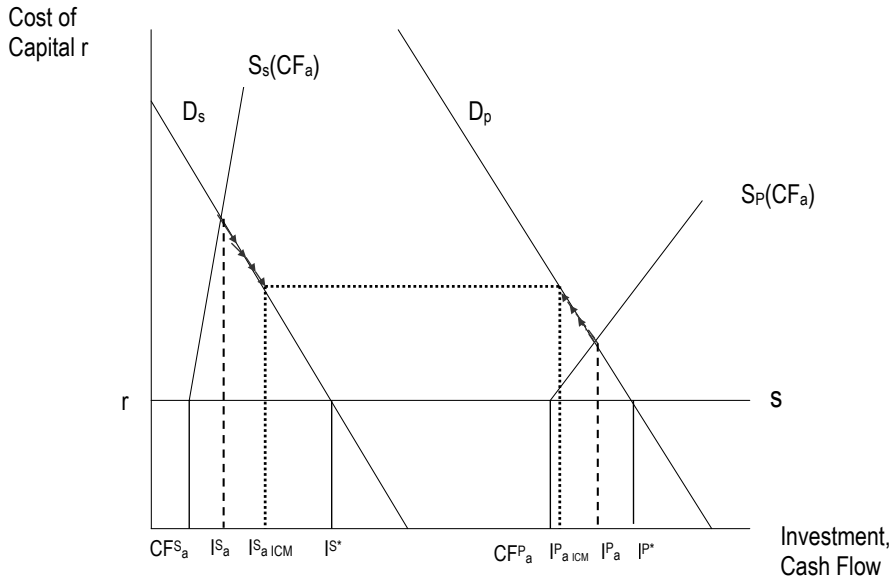
Figure 1: Cash Constraints and Managerial Discretion



Notes:
Figure 1 shows the different investment decisions with unconstrained, constrained access to capital markets and in presence of managerial discretion.

Variable Description:
r is the risk-adjusted market rate of interest
S is the unconstrained supply of capital
D is the demand for capital investment
I^* is the investment under S (unconstrained)
Two different cash-flow situations: CF_a is lower than CF_b
$S(CF_a)$ is the constrained supply given cash-flow CF_a
I_a is the investment under $S(CF_a)$ (constrained)
$S(CF_b)$ is the constrained supply given cash-flow CF_b
I_b is the investment under $S(CF_b)$ (constrained)
CF_m is lower than $CF_{m'}$
MU_I is the manager's indirect marginal utility of investment schedule at cash-flow CF_m
MD_I is the manager's indirect marginal disutility of investment schedule
I_m is the investment under managerial discretion with cash-flow CF_m
$MD_{I'}$ is the managers indirect marginal disutility of investment schedule at cash-flow $CF_{m'}$
$I_{m'}$ is the investment under managerial discretion with cash-flow $CF_{m'}$

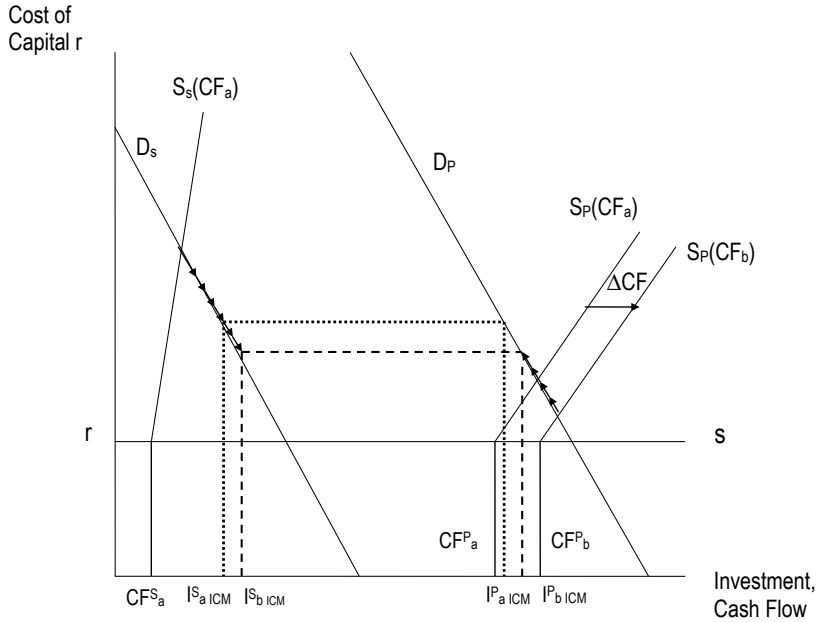
Figure 2: Equalization of risk-adjusted returns in an efficient ICM



Notes:
Figure 2 shows the workings of an ICM between a subsidiary (left part) and a parent (right part).

Variable Description:
r is the risk-adjusted market rate of interest
D_S is the subsidiary demand for capital investment
D_P is the parent demand for capital investment
$S_S(CF_a)$ is the constrained subsidiary's supply given cash-flow CF_a^S
I^{S*} is the unconstrained subsidiary investment under S
I_a^S is the subsidiary investment under $S_S(CF_a)$ (constrained)
I_{aICM}^S is the subsidiary investment under $S_S(CF_a)$ (constrained but with ICM)
$S_P(CF_a)$ is the parent market supply given cash-flow CF_a^P
I^{P*} is the unconstrained parent investment under S
I^{Pa} is the parent investment under $S_P(CF_a)$ (no ICM)
I_{aICM}^P is the parent investment under $S_P(CF_a)$ (with ICM)

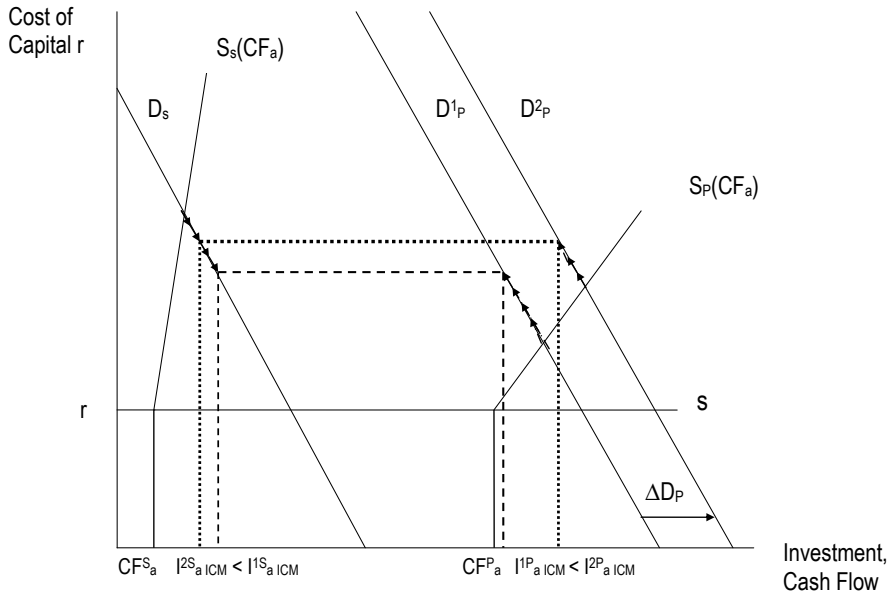
Figure 3: The effects of an increase in parent cash flow in an efficient ICM



Notes:
Figure 3 shows the effects of an increase in parent cash-flow, shifting the parent cost of funds schedule to the right.

Variable Description:
r is the risk-adjusted market rate of interest
D_S is the subsidiary demand for capital investment
D_P is the parent demand for capital investment
$S_S(CF_a)$ is the constrained subsidiary supply given cash-flow CF_a^S
I_{aICM}^S is the subsidiary investment under $S_S(CF_a)$ (constrained but with ICM)
I_{bICM}^S is the subsidiary investment if parents cash flow increases
Two different cash-flow situations for the parent: CF_a^P is lower than CF_b^P
$S_P(CF_a)$ is the parent market supply given cash-flow CF_a^P
I_{aICM}^P is the parent investment under $S_P(CF_a)$ (with ICM)
$S_P(CF_b)$ is the parent market supply given cash-flow CF_b^P
I_{bICM}^P is the parent investment under $S_P(CF_b)$ (with ICM)

Figure 4: The effects of an increase in parent investment opportunities in an efficient ICM



Notes:
Figure 4 shows the effects of an increase in parent investment opportunities, shifting the demand for capital to the right.

Variable Description:
r is the risk-adjusted market rate of interest
D_S is the subsidiary demand for capital investment
$S_S(CF_a)$ is the constrained subsidiary supply given cash-flow CF_a^S
I_{aICM}^{1S} is the subsidiary investment if parent has lower investment opportunities
I_{aICM}^{2S} is the subsidiary investment if parent has higher investment opportunities
A change in investment opportunities for the parent: D_P^1 is below D_P^2
D_P^1 is the parent demand for capital investment with lower investment opportunities
D_P^2 is the parent demand for capital investment with higher investment opportunities
$S_P(CF_a)$ is the parent supply given cash-flow CF_a^P
I_{aICM}^{1P} is the parent investment with lower investment opportunities
I_{aICM}^{2P} is the parent investment with higher investment opportunities

Table 1: **Descriptive Statistics by Country**

Legal System	Country	Nb of Unlisted Subsidiaries	Nb of Listed Subsidiaries	Nb of Parents	Average Worldwide Governance Indicator
Anglo-Saxon	Australia	422	83	93	1.5920
	Canada	2,467	12	415	1.6392
	Hong Kong	25	95	49	1.0941
	Ireland	150	35	31	1.5280
	India	115	19	40	-0.1917
	Malaysia	27	305	81	0.3897
	Singapore	317	36	116	1.5466
	South Africa	138	75	77	0.3365
	United Kingdom	4,594	831	852	1.5793
	United States	12,892	3,401	3,109	1.4173
	Total	*21,093*	*4,997*	*4,893*	*0.7447*
Scandinavian	Denmark	327	60	68	1.7659
	Finland	321	84	69	1.8553
	Island	3	18	15	1.7265
	Norway	223	93	74	1.7072
	Sweden	667	174	145	1.7270
	Total	*1,541*	*429*	*371*	*1.7564*
German	Austria	311	49	52	1.6166
	Germany	2,396	308	343	1.5382
	Japan	640	1,749	477	1.0882
	Korea	617	170	324	0.5620
	Switzerland	569	144	166	1.7908
	Taiwan	497	24	281	0.8624
	Total	*5,074*	*2,463*	*1,666*	*1.2804*
French	Argentina	257	0	15	-0.1294
	Belgium	560	66	82	1.3741
	Brazil	657	3	49	-0.0163
	Chile	104	12	23	1.1098
	France	2,613	307	371	1.2026
	Greece	198	69	87	0.7502
	Italy	1,140	171	165	0.7871
	Mexico	1,067	36	73	-0.0519
	Netherlands	981	106	127	1.7527
	Portugal	138	75	77	1.2081
	Spain	1,101	98	102	1.1846
	Turkey	10	23	9	-0.2030
	Total	*9,243*	*1,121*	*1,274*	*0.2843*
Transition	Bulgaria	29	1	3	0.1254
	Croatia	62	7	14	0.1542
	Czech Republic	263	14	9	0.7735
	Estonia	52	10	7	0.8935
	Hungary	58	12	11	0.8922
	Latvia	25	8	2	0.5447
	Lithuania	26	6	5	0.6131
	Poland	509	24	40	0.6202
	Romania	131	1	4	-0.0267
	Russia	128	20	29	-0.6707
	Serbia&Montenegro	11	4	0	-0.8395
	Slovenia	24	3	5	0.9258
	Slovakia	45	5	3	0.5532
	Total	*1,387*	*115*	*132*	*0.2349*
Rest	*Total*	*808*	*542*	*299*	*-0.0404*
All	*Total*	*39,346*	*9,699*	*8,677*	*0.4411*

Anglo-Saxon further includes:Barbados,Bermuda,Hong Kong,Jamaica,M&V Isl.,Kenia,New Zealand,Pakistan;
German further includes: Antilles,Liechtenstein,Luxembourg;
French further includes: Colombia,Ecuador,Egypt,Lebanon,Jordan,Indonesia,Peru,Philippines,Venezuela ;
Rest: East-and West-African, Asian and Arab Countries not included in other categories;

Table 2: **Descriptive Statistics by Firm Type**

Summary of main financial and ownership variables characterizing subsidiary and parent firms - distinguishing between listed and unlisted subsidiaries.
Sample Period 1988-2005

		(1) Listed Subsidiaries	(2) Unlisted Subsidiaries	(3) Listed Parents
Investment	Mean	0.073	0.063	0.087
	Median	0.064	0.043	0.076
Cash flow	Mean	0.083	0.080	0.073
	Median	0.081	0.075	0.075
Sales growth	Mean	0.150	0.150	0.120
	Median	0.090	0.080	0.080
Tobin's Q	Mean	1.44		1.63
	Median	1.14		1.25
Nb of employees	Mean	6,389	975	50,540
	Median	1,751	271	17,367
Parent's Ownership %	Mean	66.74	93.87	
	Median	60.81	100	
Nb of firms		608	8,410	2,048

Note:
Subsidiaries with an ownership percentage of $\geq 50\%$ *are included;*

Table 3: **Main Results**

Comparison of OLS, GMM and Heckman Estimates for equation (1) to adress issues of endogeneity and selection bias. Sample Period 1988-2005.

	(1)	(2)	(3)
	OLS	GMM	Heckman
Dependent Variable: Subsidiary Investment			
Sub: Investment lagged		-0.0174	
		(0.009)	
Sub: Sales Growth	0.0558*	0.0565*	0.0562*
	(0.002)	(0.003)	(0.002)
Par: Sales Growth	0.0134*	0.0170*	0.0128*
	(0.002)	(0.004)	(0.003)
Par: Tobin's Q	-0.0022*	-0.0007	-0.0022*
	(0.001)	(0.002)	(0.001)
Sub: Cash flow	0.1518*	0.0339*	0.1558*
	(0.006)	(0.015)	(0.006)
Par: Cash flow	0.0965*	0.0490*	0.0937*
	(0.011)	(0.025)	(0.010)
Constant	0.1574*	0.0354*	0.1576
	(0.080)	(0.004)	(0.080)
Inverse Mill's Ratio			-0.0062*
			(0.0016)
R-squared adj.	0.121		
Wald chi2(15)			4921.06
Wald chi2(8)		1391.42	
Nb of subsidiary firms	9,018	4,295	8,861
Nb of parent firms	2,048	1,246	2,011
Nb of obs	34,937	16,347	34,762

Note:
The estimation method in column (2) is one-step GMM; This method eliminates firm fixed effects by first differencing; Instruments include lagged levels of the dependent and the predetermined variables dated t-2 or earlier; instruments begin with $Investment_{Sub,t-2}$, Sales $Growth_{Sub,t-2}$, Sales $Growth_{Sub,t-3}$, Sales $Growth_{Par,t-2}$, Sales $Growth_{Par,t-3}$, etc.

First stage Probit for column (3)
The dependent variable is 1 if the firm is a subsidiary, 0 if a stand alone firm;

Total Assets	Sales Growth	Profit/Total Assets	Eastern Europe	Western Europe
0.000*	-0.076*	2.034*	3.502*	3.617*
(0.000)	(0.022)	(0.081)	(0.053)	(0.021)

Correlation coefficient rho = -0.055;

*Standard errors in parentheses; * $p < 0.05$*
Subsidiaries with an ownership percentage of $\geq 50\%$ are included;
Sub: refers to the corresponding variable of the subsidiary firm;
Par: refers to the corresponding variable of the parent firm;
Nb. of observations and firms vary because:
(1) we include only firms with more than 4 observations in column (2)
(2) we include only firms with observable first stage in column (3)

Table 4: **Regression Results: Ownership Concentration**

OLS Estimates of equation (1) including interaction terms for parent ownership in column (1), and including interaction terms for varying degrees of corporate control in column (2).
Sample Period 1988-2005

	(1) Interactions with Ownership Percentage of Parent	(2) Interactions with Range Dummies
Dependent Variable: Subsidiary Investment		
Sub: Sales Growth	0.0666*	0.0666*
	(0.001)	(0.001)
Par: Sales Growth	0.0193*	0.0191*
	(0.002)	(0.002)
Par: Tobin's Q	0.0038*	-0.0039*
	(0.001)	(0.001)
Par: Tobin's Q * Perct	-0.0001*	
	(0.000)	
Sub: Cash flow	0.2748*	0.1524*
	(0.012)	(0.007)
Sub: Cash flow * Perct	-0.0013*	
	(0.000)	
Par: Cash flow	-0.0160	0.1086*
	(0.015)	(0.013)
Par: Cash flow * Perct	0.0012*	
	(0.000)	
Par: Tobin's Q * Perct0050		0.0075*
		(0.001)
Par: Tobin's Q * Perct5099		0.0028*
		(0.001)
Sub: Cash flow * Perct0050		0.1134*
		(0.013)
Sub: Cash flow * Perct5099		0.0089
		(0.012)
Par: Cash flow * Perct0050		-0.0991*
		(0.018)
Par: Cash flow * Perct5099		-0.0462*
		(0.022)
Constant	0.1547	0.1543
	(0.081)	(0.081)
R-squared adj.	0.125	0.126
Nb of subsidiary firms	11,474	11,474
Nb of parent firms	2,541	2,541
Nb of obs	44,755	44,755

* p< 0.05

Note:
Standard errors in parentheses;
All subsidiaries are included (also those, that have parents with an ownership percentage $< 50\%$*);*
Sub: refers to the corresponding variable of the subsidiary firm;
Par: refers to the corresponding variable of the parent firm;
Perct: denotes the ownership stake of the parent in the subsidiary;
Perct0050: is a dummy variable taking the value 1 if "Perct" $< 50\%$*, 0 else;*
Perct5099: is a dummy variable taking the value 1 if $50\% \geq$ *Perct* $< 100\%$*, 0 else;*
The base category in column (2) are 100%*-owned subsidiaries;*

Table 5: **Regression Results: Country Governance**

OLS Estimates of equation (1) including interaction terms to distinguish the quality of governance institutions of parent and subsidiary. Sample Period 1988-2005.

Dependent Variable: Subsidiary Investment

Sub: Sales Growth	0.0553*
	(0.002)
Par: Sales Growth	0.0133*
	(0.002)
Constant	0.0479*
	(0.022)

	Interaction Country's WGI			
Parent's Country WGI Subsidiary's Country WGI	strong/ weak	strong/ strong	weak/ weak	weak/ strong
Par: Tobin's Q	-0.0064*	-0.0016*	0.0002	0.0019
	(0.001)	(0.0007)	(0.003)	(0.006)
Sub: Cash flow	0.1866*	0.1405*	0.2336*	0.177*
	(0.014)	(0.0063)	(0.0257)	(0.0501)
Par: Cash flow	0.2185*	0.0730*	0.109*	0.0763
	(0.028)	(0.0122)	(0.0408)	(0.0787)

R-squared adj.	0.123
Nb of subsidiary firms	8,994
Nb of parent firms	2,033
Nb of obs	34,852

* p< 0.05

Note:
Standard errors in parentheses;
WGI Worldwide Governance Indicator;
Subsidiaries with an ownership percentage of $\geq 50\%$ *are included;*
Sub: refers to the corresponding variable of the subsidiary firm;
Par: refers to the corresponding variable of the parent firm;
Country is "strong" if the country's WGI > 1;
Country is "weak" if the country's WGI $\leq$ *1;*
Strong/weak: parent is from "strong" country, subsidiary from "weak" country;
Strong/strong: parent is from "strong" country, subsidiary from "strong" country;
Weak/weak: parent is from "weak" country, subsidiary from "weak" country;
Weak/strong: parent is from "weak" country, subsidiary from "strong" country;

Table 6: **Regression Results: Country Legal System**

OLS Estimates of equation (1) including interaction terms to distinguish the origin of legal systems for parent and subsidiary firms. Sample Period 1988-2005.

Dependent Variable: Subsidiary Investment

Sub: Sales Growth	0.0557*
	(0.002)
Par: Sales Growth	0.0135*
	(0.002)
Constant	0.1574*
	(0.080)

	Interaction Country's Legal System			
Parent Legal System Subsidiary Legal System	anglo-scand/ german-french	anglo-scand/ anglo-scand	german-french/ german-french	german-french/ anglo-scand
Par: Tobin's Q	-0.0012	-0.0008	-0.0035*	-0.0061
	(0.001)	(0.001)	(0.001)	(0.004)
Sub: Cash flow	0.1538*	0.0864*	0.1732*	0.1461*
	(0.012)	(0.013)	(0.007)	(0.030)
Par: Cash flow	0.0827*	0.0412	0.1257*	-0.0136
	(0.020)	(0.025)	(0.014)	(0.0689)

R-squared adj.	0.123
Nb of subsidiary firms	8,999
Nb of parent firms	2,046
Nb of obs	34,876

* $p < 0.05$

Note:
Standard errors in parentheses;
Subsidiaries with an ownership percentage of $\geq$ 50% are included;
Sub: refers to the corresponding variable of the subsidiary firm;
Par: refers to the corresponding variable of the parent firm;
Country is "anglo-scand" if it's legal system is of Anglo-Saxon or Scandinavian origin;
Country is "german-french" if it's legal system is of German, French or Transition Country origin;
Anglo-scand/german-french: parent "anglo-scand" legal system, subsidiary "german-french" legal system;
Anglo-scand/anglo-scand: parent "anglo-scand" legal system, subsidiary "anglo-scand" legal system;
German-french/german-french: parent "german-french" legal system, subsidiary "german-french" legal system;
German-french/anglo-scand: parent "german-french" legal system, subsidiary "anglo-scand" legal system;

Table 7: **Regression Results: Geography & Stock Exchange Listing**

OLS Estimates of equation (1) including interaction terms to distinguish subsidiary location in Eastern Europe (EE), (2) EE and the USA and (3) subsidiaries being listed on the stock exchange. Sample Period 1988-2005.

	(1) EE	(2) USA and EE	(3) Listed
Dependent Variable: Subsidiary Investment			
Sub: Sales Growth	0.0547*	0.0547*	0.0558*
	(0.002)	(0.002)	(0.002)
Par: Sales Growth	0.0137*	0.0138*	0.0134*
	(0.002)	(0.002)	(0.002)
Par: Tobin's Q	-0.0020*	-0.0021*	-0.0023*
	(0.001)	(0.001)	(0.001)
Par-Sub: Par's Q * EE	-0.0015	-0.0013	
	(0.002)	(0.002)	
Sub: Cash flow	0.1489*	0.1473*	0.1453*
	(0.006)	(0.006)	(0.006)
Par-Sub: Sub's CF * EE	0.0158	0.0174	
	(0.017)	(0.017)	
Par: Cash flow	0.0746*	0.0780*	0.1073*
	(0.011)	(0.011)	(0.011)
Par-Sub: Par's CF * EE	0.2632*	0.2600*	
	(0.040)	(0.040)	
Par-Sub: Par's Q * USA		0.0103	
		(0.006)	
Par-Sub: Sub's CF * USA		0.2105*	
		(0.068)	
Par-Sub: Par's CF * USA		-0.2936*	
		(0.129)	
Par: Par's Q * listed			0.0002
			(0.002)
Sub: Sub's CF * listed			0.1141*
			(0.023)
Par: Par's CF * listed			-0.0961*
			(0.036)
Constant	0.1602*	0.1601*	0.1569*
	(0.080)	(0.079)	(0.080)
R-squared adj.	0.124	0.125	0.122
Nb of subsidiary firms	9,018	9,018	9,018
Nb of parent firms	2,048	2,048	2,048
Nb of obs	34,937	34,937	34,937

* $p < 0.05$

Note:
Standard errors in parentheses;
Subsidiaries with ownership percentage of $\geq$ 50 % are included
Sub: refers to the corresponding variable of the subsidiary firm;
Par: refers to the corresponding variable of the parent firm;
Par-Sub: refers to the corresponding variable of the parent-subsidiary pair (interaction terms);
"EE" is a dummy variable taking the value 1 if the subsidiary is located in Eastern Europe
"USA" is a dummy variable taking the value 1 if the subsidiary is located in the USA;
The base category are subsidiaries <u>not</u> located in Eastern Europe or in the USA;
"Listed" is a dummy variable taking the value 1 if the subsidiary is listed on a stock exchange, 0 otherwise;
The base category are subsidiaries <u>not</u> listed on a stock exchange;

Institutional Determinants of Domestic and Foreign Subsidiaries' Performance*

Klaus Gugler†, Esther Kalkbrenner‡, Dennis Mueller§, Evgeni Peev¶

Abstract

We utilize a unique data set of more than 23,000 listed and unlisted subsidiaries of parent firms worldwide over the period 1994-2005. Our results indicate that good institutions (measured by the Worldwide Governance Indicators of the World Bank) lead to better performance for subsidiaries of other companies. When we categorize countries in terms of the origins of their legal systems, we also find that this dimension of institutional quality is generally associated with better performance. Our results are also consistent with the transfer of good corporate governance by the parent firm to its subsidiaries. Some evidence of agency problems worsening company performance is found when we examine the performance of the largest multinationals.

*This research was supported by the FWF project P 19522-G14 on "Corporate Governance in Central and Eastern Europe", and the Austrian National Bank Jubiläumsfondsproject Nr. 12325.

†University of Vienna, Department of Economics, Bruenner Strasse 72, A-1210 Vienna, e-mail: klaus.gugler@univie.ac.at (corresponding author)

‡University of Vienna, Department of Economics, Bruenner Strasse 72, A-1210 Vienna, e-mail: esther.kalkbrenner@univie.ac.at

§University of Vienna, Department of Economics, Bruenner Strasse 72, A-1210 Vienna, e-mail: dennis.mueller@univie.ac.at

¶University of Vienna, Department of Economics, Bruenner Strasse 72, A-1210 Vienna, e-mail: evgeni.peev@univie.ac.at

I Introduction

A great deal of interest has been devoted in recent years to the role of institutions in determining both company and country performance. The inspiration for this research can be traced back to the work of North (1990) illustrating the importance of institutional quality as a determinant of long-run economic growth in Western countries, and one segment of the literature focuses on the relationship between institutional factors and country growth rates.[1] Other parts examine the relationships between institutional quality and various measures of company performance. Our article adds to this strand of the literature. Because we focus on the performance of subsidiaries, our article is also related to work on the effects of decentralization within firms, the creation of domestic and foreign subsidiaries, and more generally to the literature on foreign direct investment (FDI).

Although there is considerable agreement that good institutions lead to good performance, there is disagreement over how good institutions should be defined, or put differently, authors differ as to *which* institutions are important for determining performance. One set of studies argues that it is the quality of a country's governmental institutions that is important. Companies perform better in countries with strong property rights enforcement, independent judiciaries, strong contract enforcement, and the like.[2] Another set of studies, precipitated by the work of LaPorta et al. (1997, 1999, 2000) (hereafter, LLSV), emphasizes the importance of a country's *legal* institutions - whether it has a common law or a civil law system - in protecting shareholders and thus reducing agency problems and improving company performance. These hypotheses are not mutually inconsistent, of course. Common law systems may offer both greater shareholder protection and better enforcement of property rights. Indeed, Mahoney (2001) has made just such a claim. In this article, we test the relative explanatory

[1] See, Knack and Keefer (1995, 1997).

[2] See, for example, Besley (1995) and Johnson et al. (2002).

power of both types of institutions. The existing literature tests for the importance of institutions by relating differences in company performance across countries to differences in institutional structures. Thus, company A in country X is expected to perform worse by some criterion than company B in country Y, if Y's institutions are better than X's. The overwhelming conclusion of the literature is that 'institutions matter', and good institutions do improve companies' performances. In this paper, we examine the effects of the institutional environment on the performance of *subsidiaries* - companies for which some other company has an ownership stake of fifty percent or more. Our objective is to see whether institutional quality also affects the performance of subsidiaries, and in particular, when the subsidiary is in a different country, whether it is the institutional quality in the parent firm's country that affects the performance of a subsidiary, the institutional quality in the subsidiary's country that is important, or both. One might hypothesize, for example, that a company located in a country with a strong institutional environment will perform well not only in its own country, but that it will also transfer this good performance to its subsidiaries, even when they are located in countries with weak institutional environments. Alternatively, one might posit that a subsidiary in a country with weak institutions performs like other companies in this country, even if its parent is located in a country with strong institutions. Finally, good performance might be observed only when both a parent and its subsidiary are located in countries with strong institutions. In addition to testing these hypotheses, we are interested in identifying the institutions that have the greatest impact on performance.

To investigate the determinants of subsidiaries' performance, we have constructed a unique data set of more than 23,000 listed and unlisted subsidiaries worldwide over the period 1994-2005. We identify the country of both a subsidiary and its parent, and examine the effects on subsidiary performance of the institutional quality in the countries of both the parent and its subsidiary. Because the sample includes both listed and unlisted companies, it is not possible to use performance measures, like marginal

and average Q's, that require stock market data. We thus are limited to accounting data, and use profits over total assets to measure subsidiary performance.

The FDI literature, especially for developing and transition countries, focuses on performance differences between domestically-owned and foreign-owned firms, and usually treats the foreign firms as a homogenous group.[3] The samples used in these studies typically include detailed information on the foreign subsidiaries, but not on their parents. Our study thus adds to the literature by examining the effects of institutional quality in *both* the parents' and subsidiaries' countries. Our article also contributes to the debate in the literature on the effects of government policies for attracting FDI by identifying *which* governmental institutions have the greatest impact on performance. While most studies use aggregate indexes of institutional quality, we separate the effects of legal institutions and various aspects of country governance on the performance of domestic and foreign subsidiaries.

If good institutions lead to higher profits, then one might expect all companies engaging in FDI to locate subsidiaries in countries with good institutions. But competition in these countries for customers, for natural resources, for workers, etc. might then drive down profits making a country with weaker institutions more attractive. To the extent that weak institutions lead to greater risk, subsidiaries in countries with weak institutions might actually exhibit higher average profitability along with greater risk. Thus, a simple generalization from where companies choose to locate subsidiaries and the profits they earn is not possible.

Briefly, we find that the quality of the institutions in both the parent's and the subsidiary's countries has a positive impact on subsidiary profits, but that the institutions in the parent country tend to be more important. In the next section, we turn to a more explicit statement of the hypotheses tested. Section III describes data and methodology. Section IV discusses basic results. The last section outlines the main

[3]See, for example, a survey of privatization studies on developed, developing and transition countries Meggison and Netter (2001) and a survey of enterprize restructuring in transition countries Djankov and Murrel (2002).

conclusions.

II Hypotheses

Companies with high profits typically have some asset or set of assets that account for these profits - a patent, brand image, organizational structure. It is reasonable to expect that a subsidiary of a company benefits from the possession of such assets as does the parent. FDI, for example, may occur to exploit in a foreign market, a competitive advantage a company has in a domestic market. Recent theoretical work concludes that more productive firms will choose FDI over exports into foreign markets Helpman et al. (2004). Many researchers use John Dunning's three conditions for a firm to undertake FDI: ownership, location, and internalization (also known as the OLI framework).[4] Ownership advantages of multinational enterprizes (MNEs) are created by their firm-specific, proprietary or knowledge-based assets. Location advantages consist of profitable investment opportunities in foreign countries based on factors such as tariffs, quotas, transport costs, low factor prices, and access to customers. Internalization advantages arise when production in dispersed plants under common ownership generates lower costs than production organized at arm's length through markets.[5] Both the *O* and the *I* of the *OLI* approach imply a positive association between a parent's and a subsidiary's profits. We thus put forward

Hypothesis 1. A subsidiary's profits are positively related to the profits of its parents.

Numerous studies have established a relationship between the quality of a country's political and economic institutions and its growth rate.[6] Institutions, which reduce corruption, can, for example, lead to greater trust in a country and thereby to faster

[4]See Dunning (2000) and Dunning and Lundan (2008). See, also, the survey by Caves (1996).

[5]Markusen (1995) presents six arguments why foreign direct investment occurs instead of licensing.

[6]See Knack and Keefer (1995), Knack (1996), DeHaan and Siermann (1998), Wu and Davis (1999) and the survey by DeHaan et al. (2006).

growth.[7] As a broad proxy for country institutional quality, several studies have used indicators computed by Kaufmann et al. (2007) as part of the Worldwide Governance Indicators (WGI) project.[8] Drawing on the data sources provided by the institutions mentioned in footnote 8, Kaufmann et al. (2007) estimate six different dimensions of institutional quality: voice and accountability, government effectiveness, rule of law, regulatory quality, absence of corruption and political stability.[9] Our investigation of the individual effects of these institutions, reported below, reveals that subsidiary performance is not positively related to the WGI measure of political stability. We thus construct an aggregate index of institutional quality by averaging the remaining five WGI indicators, however, results are nearly identical if we use all six indexes. High quality governance institutions in a country should increase company profitability by reducing the transaction costs of writing and enforcing contracts, of obtaining licenses and permits, and more generally of conforming to the laws and regulations of the country. We thus expect

Hypothesis 2. A subsidiary's profits are higher in a country with high quality governance indicators.

By the same logic, we expect a parent's profits to be higher if it operates in a country with high quality governance indicators. It may also be the case, however, that some of the benefits a parent company obtains from operating in a country with high quality institutions are passed on to its subsidiaries raising their profits. For example, good institutions in a parent's county may lower the transaction costs of writing and enforcing contracts with its subsidiaries. The internal capital markets that characterize multi-plant companies may function better, if the parent operates in a country with a

[7] See, Knack and Keefer (1997).

[8] Other measures of institutional quality have been constructed by Freedom House, the Heritage Foundation, the Business Environment Risk Intelligence (BERI), Gallup International, and the International Country Risk Guide (ICRG) compiled by the Political Risk Services group. There is considerable overlap across these various indexes.

[9] By using the WGI measures researchers avoid having to choose among the different, but highly correlated, variables provided by various institutions.

good institutional environment. Cash constraints are then lower and more profitable investment projects can be financed by the subsidiary using the internal capital market.[10] Good institutions in a parent's country may also raise its subsidiary's profits by facilitating the transfer of technology and know how. Finally, good institutions in a parent's country may lead to better management practices, which can be transferred to its subsidiaries. We thus put forward

Hypothesis 3. A subsidiary's profits are higher if its parent is located in a country with high quality governance indicators.

The WGI governance indicators used to test Hypotheses 2 and 3 measure the quality of a country's institutional environment as it impacts the *external* environment of a firm - its transaction with other firms, with the state, and so on. The corporate governance literature focuses on institutions that affect the *internal* environment of a firm, most importantly the extent of agency problems.[11] This literature has demonstrated that there are significant differences in performance across firms related to (1) the legal institutions of the country in which a company is located, (2) the identity of the controllers of a firm, and (3) the degree of entrenchment of those in control.[12] In particular, companies operating in countries with legal environments, which provide weak shareholder protection, have significantly worse investment performance and payout less in dividends than companies in countries with legal environments offering strong shareholder protection. The greater agency problems are, the larger the share of potential profits that gets transformed into managerial rents of one form or another. We thus predict higher profits in countries which offer owners strong legal protection against managers. Hypothesis 4 postulates the same hierarchy in the quality of legal institutions as put forward by LLSV. To their four categories of legal institutions we

[10] See, Gugler et al. (2010).

[11] See, LaPorta et al. (1997, 1999, 2000), Mueller and Yurtoglu (2000), Gugler et al. (2004a,b, 2008), Demirguc-Kunt and Maksimovic (1998), and Gedajlovic and Shapiro (1998). See for developing and developed countries, Gugler et al. (2003), see for transition countries Mueller and Peev (2007).

[12] See, LaPorta et al. (2000), Morck et al. (1998), Faccio et al. (2001).

have added a fifth - transition countries. We expect the weakest legal protection for owners in the countries, which have most recently taken up capitalist institutions.

Hypothesis 4. The highest subsidiary profits are reported in countries of Anglo-Saxon origin with successively lower profits observed in countries with legal systems of Scandinavian, German and French origin. The lowest subsidiary profits are expected in the transition countries.

It seems reasonable to assume that if agency problems are not serious in a parent firm that they will not be serious in its subsidiaries. Hypothesis 5. The highest profits are reported for subsidiaries of parent companies located in countries of Anglo-Saxon origin with successively lower profits observed for subsidiaries with parents in countries with legal systems of Scandinavian, German and French origin. The lowest subsidiary profits are expected in when a subsidiary's parent is in a transition country.

III Data and Methodology

We construct a unique data set of parent firms as well as their listed and unlisted subsidiaries. The data come from the Amadeus and Osiris databases.[13] Each database assigns a unique identification number to each company. Using this identification key, it was possible to interlink the two databases. Amadeus contains ownership and financial firm-level data for mainly unlisted companies from 38 European countries. The second database, Osiris, contains ownership and financial firm-level data for publicly listed companies for around 120 countries.

We link the ownership structure data provided by Osiris to the financial data for unlisted subsidiaries from Amadeus to construct a panel covering the period 1994-2005 consisting of 4,135 parent firms and 23,241 subsidiaries, both foreign- and domestically-owned. The average number of subsidiaries per parent firm is 6.

As noted above, we evaluate the quality of a country's governance institutions

[13]Data are provided by Bureau van Dijk electronic publishing.

using five of the Worldwide Governance Indicators (WGI) of the World Bank: Voice and Accountability, Government Effectiveness, Regulatory Effectiveness, Rule of Law, and Control of Corruption. Each index is briefly defined in the appendix.

Following LLSV, country legal systems are classified into four major, legal-origins categories: Anglo-Saxon, Scandinavian, German, and French. We also introduce a fifth category, Transition, for post-communist transition economies. Although it would be possible to try and trace the origins of transition countries' legal systems back to one of the other four categories, we think that each transition country's long experience with communism has probably sufficiently altered its legal institutions enough to warrant separate treatment. Table 1 gives the number of subsidiaries in each category. Columns identify the origin of a parent country, rows of a subsidiary. Thus, there are 318 subsidiaries in a German-origin country with a parent in an Anglo-Saxon country. The upper in the diagonal entries is the number of domestic subsidiaries in the legal system identified by the column or row, the entry below the line is the number of foreign subsidiaries in the same legal system. Thus, in our sample, 4,882 subsidiaries in an Anglo-Saxon country had a parent from the same Anglo-Saxon country (US parent and US subsidiary, Canadian parent and subsidiary). Such companies are labeled domestic subsidiaries throughout the article. At the same time, 2,029 subsidiaries in the Anglo-Saxon countries had parents from a different Anglo-Saxon country (US parent with a Canadian subsidiary). The Anglo-Saxon countries constitute the largest fraction of subsidiaries, while transition countries had the smallest fractions in each category. Nevertheless, over 13,000 subsidiaries come from non-Anglo-Saxon countries.

We measure company performance as after tax profits divided by total assets. Profitability is the most relevant measure of performance for the owners of a company, but is also the measure that is most easily manipulated by accountants and subject to different country accounting conventions. Nevertheless, we think that this is the best measure of performance that we can construct with the data available.

Table 2 presents the means and standard deviations for each variable used in the

study. There is considerable variation in subsidiary profit rates with their standard deviation being roughly double the mean.

IV Results

A *Aggregate Results for Hypotheses 1-3*

We first measure institutional quality as the average of the five WGI measures listed above. Later we look at the results for each index. The WGI is published by country and year, so we can test hypotheses 1-3 by running regressions with panel data for 1994-2005. The dependent variable is defined as profit to assets ratio of subsidiary s in year t, π_{st}. Hypothesis 1 is tested by using the profits of the parent of subsidiary s as an explanatory variable, π_{spt}. Hypotheses 2 and 3 are tested by including the institutional quality indexes for the country of the parent, GI_{spt}, and of the subsidiary, GI_{st}, as explanatory variables. To these we add as control variables the sizes of the parent and subsidiary measured as the logs of their total assets, lnK_{spt} and lnK_{st}, and the age of the parent, A_{spt}. This gives us the following basic equation.

$$\pi_{it} = a + b\pi_{spt} + cGI_{spt} + dGI_{st} + elnK_{spt} + flnK_{st} + gA_{spt} + \mu_{st} \tag{1}$$

For domestic subsidiaries GI_{spt} and GI_{st} are, of course the same. Thus, we estimate two versions of (1), one for domestic subsidiaries with only GI_{st} included, and one for foreign subsidiaries with separate governance indexes for both parent and subsidiary included.

Table 3 presents the results for the two regressions. Hypothesis 1 receives resounding support. Each percentage point increase in a parent's profit rate increases a domestic subsidiary's profit rate by 39 percent of a percentage point. The relationship between a parent's and a foreign subsidiary's profits is not as strong, but nevertheless is also highly significant. The stronger link between parent and subsidiary profits for domestic subsidiaries suggests greater difficulty in transferring knowledge and other assets

to subsidiaries in other countries. The coefficient on institutional quality for domestic subsidiaries is positive and also highly significant. GI has a range of five. Its coefficient of 0.017 for domestic subsidiaries implies that an increase of only one point in the index raises the return on assets by about 40 percent of their mean value. Both coefficients on the GI_s are significant in the foreign subsidiary equation. Together they sum to roughly the same value as the coefficient in the domestic subsidiary equation. The impact of the governance institutions in the parent's country is much greater than for the subsidiary's country, however. The results for both equations in Table 3 offer strong support for Hypotheses 2 and 3. Here it should also be noted that the effects on subsidiary profits from strong institutional quality will be understated if institutional quality also raises a parent's profits, since the parent's profits are also included in the equation.

We also estimated the two equations in Table 3 using the lagged profits instead of the current profits of the parent on the right-hand-side to remove the possibility of parent's profits being endogenous. The coefficient on lagged profits for domestic subsidiaries fell from 0.38 to 0.32 (t = 42.16), while the coefficient on lagged profits for foreign subsidiaries fell from 0.21 to 0.19 (t = 22.85). All other coefficients remained substantially the same. Thus, our findings are robust to the use of current or lagged parent profits as an explanatory variable. The same holds true for the extended versions of the model discussed below.

Three of the four size variables have negative coefficients, although one of these three is insignificant. Having a relatively small parent raises the profits of domestic subsidiaries, but lowers it for foreign subsidiaries. The latter result suggests the possibility of some form of economy of scale when companies establish subsidiaries abroad. The third control variable, the age of the parent company, has a positive and significant coefficient for foreign subsidiaries.

B *Aggregate Results for Hypotheses 1-5*

We now add dummy variables to equation (1) to capture the effects of legal institutions on subsidiary profitability. One can, of course, expect some relationship between the quality of a country's governance institutions as measured by the GI and its legal institutions. Transition countries have more corruption than Anglo-Saxon countries. But the relationship is not one to one. Some countries with relatively weak protection of shareholders, like Germany, score highly on the rule-of-law index.

Table 4 reports results for both domestic and foreign subsidiaries with the addition of dummies for the legal institutions in the subsidiaries' and parents' countries. The coefficients on the parent's profitability are again both highly significant and very close to their values in Table 3. Hypothesis 1 continues to receive strong support. In the sample of foreign subsidiaries, the coefficient on the governance institutions in the parent's country preserves the same value and is significant. Controlling for the legal institutions in the parent's and subsidiary's countries slightly weakens the relationship between the GI_s and profitability, however. Two of the three coefficients are smaller in Table 4 than in Table 3, although still positive, and now only two are statistically significant. The four size variables have the same pattern of coefficients as in Table 3, and the age of the parent firm is again only significant in the foreign subsidiary equation. Both equations in Table 4 were estimated without intercepts so that the country dummies in the domestic subsidiary equation can be interpreted as intercepts for subsidiaries in the five legal-system categories. The pattern of coefficients on these dummies conforms roughly to the predictions of the law and finance literature. Domestic subsidiaries in Anglo-Saxon and Scandinavian legal-origin countries are predicted to have a profit rate over 5 percent, with the rate in the Scandinavian countries actually being somewhat the higher of the two. In the German and French legal-origin countries the domestic subsidiaries' profit rate is predicted to be a bit over 4 percent, and in the transition countries about 3 percent.

The equation for foreign subsidiaries has been estimated by constraining the coeffi-

cients on the legal-system dummies for the subsidiaries' countries to sum to zero.[14] The coefficients on the dummies for the parents' countries can now be interpreted as country intercepts. To get the predicted profit rate for a subsidiary based on the legal-systems in its own country and its parent's, one adds the two coefficients. Thus, a subsidiary in a Scandinavian country with a parent in an Anglo-Saxon company is predicted to have a profit rate of 0.018 (0.005 + 0.013) taking account only the legal origins of the two countries. The legal origins of the parents' countries generally have a greater impact on the profits of a subsidiary than the legal origins of its own country. This is consistent with the assumption that legal systems, as categorized by LLSV, protect shareholders. The ultimate owners of subsidiaries are the owners of their parent companies. If they are located in countries, which provide strong legal protection, both they and their parents tend to report higher profits. Nevertheless, subsidiaries in countries with Anglo-Saxon and Scandinavian legal systems are expected to have profit rates significantly above the average, while subsidiaries in countries with German- and French-origin legal systems are expected to have profit rates significantly below the average. The coefficients on the transition dummies for both parents and subsidiaries were insignificant. The one finding in Table 4 that runs against Hypotheses 4 and 5 is that subsidiaries with parents in French-origin countries are predicted to have as high a profitability as subsidiaries with parents in Scandinavian countries and somewhat higher than subsidiaries with parents in Anglo-Saxon countries. This anomaly aside, the results in Table 4 indicate that the origins of the legal systems in parent and subsidiary countries do impact their profitability in accordance with Hypotheses 4 and 5.

B *Decomposing Institutional Quality*

The index of institutional quality used above is an average of five different measures of institutional quality. Some World Bank indexes of institutional quality, like 'the

[14]The coefficients in Table 4 have been rounded, which explains why they do not exactly sum to zero.

rule of law' measure an attribute of a country's institutional structure. Others, like 'political stability' or 'government effectiveness' represent consequences of a country's institutional structure. It seems likely that these country characteristics might affect the performance of companies differently. High corruption and the absence of the rule of law should seriously handicap businesses, but political instability might leave them unaffected. Italy had by most measures considerable political instability during the last half of the 20th century, but its companies performed very well over most of this period. It is worth examining, therefore, whether we get similar results for the individual measures of institutional quality as we obtained for the aggregate measure. As one might expect, the six World Bank indexes of institutional quality are highly correlated with their average and with one another (see Table 5). Three of the indexes have correlations with the average of around 0.95. The lowest correlation with the average is for political stability (r = 0.73), and this index is also more weakly correlated with the other indexes. We might, thus, expect somewhat different results when we classify countries with this index, and this is what we observe.

In Table 6, we report the results for domestic subsidiaries when the aggregate index used in Tables 3 and 4 is replaced sequentially with the six individual World Bank indexes. Four of the six coefficients on the GI_s are positive and significant with values equal to or near the 0.006 coefficient reported in Table 4. The two insignificant GI coefficients are for voice and accountability and political stability. This pattern is sensible. The important governance institutions for subsidiary performance are those that affect its economic environment - rule of law, corruption, etc. The political environment appears to be unimportant. Our decision to omit political stability when constructing the aggregate index used in Tables 3 and 4 was based on its performance in Tables 6 and 7. The coefficients on the other variables reported in Table 6 tell a similar story to those reported for domestic subsidiaries in Table 4.

In Table 7, the two average GI indexes used in Table 4 for foreign subsidiaries are replaced by the individual indexes. All six indexes have positive and significant coef-

ficients for the countries of the parents of foreign subsidiaries, with the coefficient on political stability being considerably smaller than for the other five indexes.

Only one GI index for the subsidiary's country has a positive and significant coefficient - Control for Corruption. Even subsidiaries of companies in countries with good institutions appear to suffer if they themselves are located in countries with high corruption. The coefficients on the other five GI indexes are all insignificant for the subsidiaries' countries. Thus, the results for foreign subsidiaries reported in Table 7 reveal, as did those in Table 4, that the quality of institutions in a parent's country has a greater impact on a subsidiary's profitability that the quality of institutions in its own country. The remaining variables in Table 7 exhibit a similar pattern of coefficients as in Table 4.

V Conclusion

A great deal of research has established that 'institutions matter' when it comes to the performance of countries. Good institutions produce higher incomes per capita, higher growth rates and other dimensions of social welfare. Companies in countries with good institutional environments have higher returns on investment, pay out more in dividends and exhibit other attributes of good performance. In this article, we have tested to see whether good institutions also lead to better performance of subsidiaries using two sets of definitions of good institutions.

Our results indicate that good institutions do lead to better performance for subsidiaries. Both the quality of the parent country's institutional environment, and that of the country in which the subsidiary is located are positively related to the profitability of a subsidiary. Of the two, it was the quality of institutions in the parent's country, which had the largest impact on the profitability of a subsidiary. This finding combined with the large coefficients on the profitability of the parents in all of our models indicates that profitable companies located in countries with strong institutional envi-

ronments are able to transfer some of their advantages to their subsidiaries, domestic or foreign.

We also found that the origins of the legal systems had significant effects. When parent and subsidiary came from the same country, the highest profits were observed in the countries with the best legal protections for shareholders - Anglo-Saxon and Scandinavian countries. Domestic subsidiaries' profits were lowest in the transition countries, with the profits of domestic subsidiaries in French and German-origin countries falling in between these two extremes. With a couple of exceptions the same pattern was observed for foreign subsidiaries' performance. As was the case with the country governance institutions, the legal origins of the parents' countries generally have a greater impact on the profits of a subsidiary than the legal origins of its own country. The emphasis placed on institutional quality by international agencies like the World Bank and International Monetary Fund for improving economic performance seems well founded, and in particular reducing corruption in both parent and subsidiary country can lead to better performance. Moreover, the parent firm can transfer some of its intangible asset advantages to its subsidiaries.

VI Worldwide Governance Indicators (WGI) of the World Bank

Various institutions (e.g. Freedom House, the Heritage Foundation, the Business Environment Risk Intelligence (BERI), Gallup International, the World Economic Forum, the International Country Risk Guide (ICRG) compiled by the Political Risk Services group) construct measures of institutional quality. Drawing on the data sources provided by the institutions mentioned above and other sources, Kaufmann et al. (2007) estimate six different dimensions of institutional quality: voice and accountability, government effectiveness, rule of law, regulatory quality, absence of corruption and political stability. The indicators are constructed using unobserved components methodology and are measured in units ranging from -2.5 to 2.5, with higher values corresponding

to better governance:

Voice and Accountability - measuring perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political Stability and Absence of Violence - measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

Government Effectiveness - measuring perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Regulatory Quality - measuring perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of Law - measuring perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Control of Corruption - measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

References

T. Besley. Property Rights and Investment Incentives: Theory and Evidence from Ghana. *Journal of Political Economy*, 103:903–937, 1995.

R.E. Caves. *Multinational Enterprise and Economic Analysis*. Cambridge University Press, 1996.

J. DeHaan and C. Siermann. Further Evdence on the Relationship between Economic Freedom and Economic Growth. *Public Choice*, 95:363–80, 1998.

J. DeHaan, S. Lundstrom, and J. Sturm. Market Oriented Institutions and Policies and Economic Growth: A Critical Survey. *Journal of Economic Surveys*, 20(2):157–191, 2006.

A. Demirguc-Kunt and V. Maksimovic. Law, Finance, and Firm Growth. *Journal of Finance*, 53(6):2107–2137, 1998.

S. Djankov and P. Murrel. Enterprise Restructuring in Transition: A Quantitative Survey. *Journal of Economic Literature*, 60(3):739–792, 2002.

J.H. Dunning. The Eclectic Paradigm as an Envelope for Economic and Business Theories of MNC Activity. *International Business Review*, 9:163–190, 2000.

J.H. Dunning and S.M. Lundan. *Multinational Enterprises and the Global Economy*. Cheltenham: Edward Elgar, 2008.

M. Faccio, L.H.P. Lang, and L. Young. Dividends and Expropriation. *American Economic Review*, 91(1):54–78, 2001.

E.R. Gedajlovic and D.M. Shapiro. Management and Ownership Effects: Evidence from Five Countries. *Strategic Management Journal*, 19(6):533–553, 1998.

K. Gugler, D.C. Mueller, and B.B. Yurtoglu. The Impact of Corporate Governance on Investment Returns in Developed and Developing Countries. *Economic Journal*, 113:511–539, 2003.

K. Gugler, D.C. Mueller, and B.B. Yurtoglu. Corporate Governance and the Returns on Investment. *Journal of Law and Economics*, 67:589–633, 2004a.

K. Gugler, D.C. Mueller, and B.B. Yurtoglu. Globalization and Corporate Governance. *Oxford Review of Economic Policy*, 20(1):129–156, 2004b.

K. Gugler, D.C. Mueller, and B.B. Yurtoglu. Insider Ownership, Ownership Concentration and Investment Performance: An International Comparison. *Journal of Corporate Finance*, 14(5):688–705, 2008.

K. Gugler, E. Kalkbrenner, and E. Peev. The Effects of Ownership and Institutional Quality on Internal Capital Markets: Cross-Country Evidence. *mimeo University of Vienna*, 2010.

E. Helpman, M.J. Melitz, and S.R. Yeaple. Export versus FDI with Hetergenous Firms. *American Economic Review*, 94(1):300–316, 2004.

S. Johnson, J. McMillan, and C. Woodruff. Property Rights and Finance. *American Economic Review*, 92:1335–1356, 2002.

D. Kaufmann, A. Kraay, and M. Mastruzzi. Governance Matters VII: Governance Indicators for 1996-2007. *World Bank Working Paper*, 2007.

S. Knack. Institutions and the Convergence Hypothesis: The Cross-National Evidence. *Public Choice*, 87:207–228, 1996.

S. Knack and P. Keefer. Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures. *Economics and Politics*, 7:207–228, 1995.

S. Knack and P. Keefer. Does Social Capital have an Economic Payoff? A Cross-Country Investigation. *Quarterly Journal of Economics*, 112(4):1251–1288, 1997.

R. LaPorta, F. Lopez de Silanes, A. Shleifer, and R.W. Vishny. Legal Determinants of External Finance. *Journal of Finance*, 3:1131–1150, 1997.

R. LaPorta, F. Lopez de Silanes, A. Shleifer, and R.W. Vishny. Corporate Ownership around the World. *Journal of Finance*, 54(2):471–517, 1999.

R. LaPorta, F. Lopez de Silanes, A. Shleifer, and R.W. Vishny. Agency Problems and Dividend Policies Around the World. *Journal of Finance*, 55(1):1–33, 2000.

P.G. Mahoney. The common law and economic growth: Hayek might be right. *Journal of Legal-Studies*, 30(2):503–25, 2001.

J.R. Markusen. The Boundaries of Multinational Firms and the Theory of International Trade. *Journal of Economic Perspectives*, 9:169–189, 1995.

W.L. Meggison and J.M. Netter. From State to Market: A Survey of Empirical Studies on Privatization. *Journal of Economic Literature*, XXXIX:321–389, 2001.

R. Morck, A. Shleifer, and R. Vishny. Management Ownership and Market Valuation: An Empirical Analysis. *Journal of Financial Economics*, 20(1):293–315, 1998.

D.C. Mueller and E. Peev. Corporate Governance and Investment in Central and Eastern Europe. *Journal of Comparative Economics*, 35:414–437, 2007.

D.C. Mueller and B.B. Yurtoglu. Country Legal Environments and Corporate Investment Performance. *German Economic Review*, 1(2):187–220, 2000.

D. North. *Institutions, Institutional Change, and Economic Performance*. Norton New York, 1990.

W. Wu and O. Davis. The Two Freedoms, Economic Growth and Development: An Empirical Study. *Public Choice*, 100:39–64, 1999.

Table 1: **Number of domestic/foreign Subsidiaries according to Legal Origin**

Legal Origin of Subsidiaries	Legal Origin of Parent: Anglo-Saxon Parent	Scandinavian Parent	German Parent	French Parent	Transition Parent	Total Subsidiaries per Subsidiary legal origin
Anglo-Saxon Subsidiary	*4,882* / *2,029*	163	609	764	2	8,449
Scandinavian Subsidiary	401	*1,499* / *398*	184	212	5	2,699
German Subsidiaries	318	67	*977* / *267*	250	2	1,881
French Subsidiaries	1,837	259	1,141	*4,154* / *1,399*	2	8,792
Transition Subsidiaries	284	132	313	353	*308* / *30*	1,420
Total Subsidiaries per Parent's legal origin	9,751	2,518	3,491	7,132	349	23,241

Notes:
Subsidiaries with an ownership percentage of $\geq 50\%$ *are included.*
The diagonal elements on the upper right indicates the nb. of domestic subsidiaries in the legal system.
The diagonal elements on the lower left indicates the nb. of foreign subsidiaries in the legal system.

Anglo-Saxon includes: Australia, Barbados, Bermuda, Canada, Hong Kong, Ireland, India, Jamaica, Malaysia, M&V Isl., New Zealand, Pakistan, Singapore, United Kingdom, United States.
Scandinavian includes: Denmark, Finland, Island, Norway, Sweden.
German includes: Antilles, Austria, Germany, Japan, Korea, Liechtenstein, Luxembourg, Switzerland, Taiwan.
French includes: Argentina, Belgium, Brazil, Chile, Colombia, Ecuador, Egypt, France, Greece, Italy, Lebanon, Jordan, Indonesia, Mexico, Netherlands, Peru, Philippines, Portugal, Spain, Turkey, Venezuela.
Transition includes: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia/Montenegro, Slovenia, Slovakia.

Table 2: **Descriptive Statistics**

	Subsidiaries				Parents	
	Domestic		Foreign			
	Mean	Std	Mean	Std	Mean	Std
Profit/Loss over Total Assets	0.040	0.08	0.037	0.08	0.044	0.05
Log of Total Assets	10.901	2.090	10.915	1.78	14.746	2.05
Age					62.4	57.1
Word Governance Index (GI)	1.537	0.36	1.480	0.43	1.550	0.33
Voice and Accountability	1.233	0.24	1.247	0.25	1.260	0.23
Rule of Law	1.562	0.37	1.480	0.45	1.587	0.33
Regulatory Quality	1.327	0.37	1.304	0.39	1.334	0.34
Control of Corruption	1.796	0.52	1.674	0.63	1.794	0.47
Governmental Efficiency	1.768	0.39	1.695	0.50	1.777	0.37
Political Stability	0.890	0.28	0.898	0.32	0.930	0.29

Note:
Subsidiaries with an ownership percentage of $\geq 50\%$ *are included;*

The 6 dimensions of the Worldwide Governance Indicator by Kaufmann, Kraay and Mastruzzi (2005):
Voice and Accountability: Citizens participation in governmental processes.
Political Stability: Likelihood of governmental destabilization by unconstitutional means.
Government Effectiveness: Quality of public services, policy implementation and commitments.
Regulatory Quality: Formulation of governmental regulations.
Rule of Law: Law and contract enforcement, likelihood of crime and violence, etc.
Control of Corruption: extend to which public power is exercised for private gain.

Table 3: **Tests of Hypotheses 1 and 3**

	Domestic Subsidiaries	Foreign Subsidiaries
GI_P		0.013***
		9.82
GI_S	0.017***	0.005***
	14.86	5.09
$(\text{Log Total Assets})_P$	-0.002***	0.001**
	-9.60	3.17
$(\text{Log Total Assets})_S$	-0.000	-0.002***
	-0.93	-8.04
Age_P	-4.67e-06	1.55e-04*
	-0.68	2.49
$(\text{Profit/Total Assets})_P$	0.386***	0.210***
	55.81	28.35
Constant	0.029***	0.012**
	8.51	2.65
R-squared	0.075	0.021
Nb. of obs.	48,504	50,727

Note:
Subsidiaries with an ownership percentage of $\geq 50\%$ *are included.*
Domestic: Subsidiary country is the same as the parent country.
Foreign: Subsidiary country is not the same as the parent country.
Subindex P refers to parent, subindex S to subsidiary.
Below the regression coefficient the t-value is reported.

Table 4: **Tests of Hypotheses 1-5**

	Domestic Subsidiaries	Foreign Subsidiaries
GI_P		0.013***
		9.31
GI_S	0.006**	0.001
	2.96	0.87
$(\text{Log Total Assets})_P$	-0.002***	0.001***
	-7.47	4.30
$(\text{Log Total Assets})_S$	-0.001*	-0.002***
	-2.50	-7.74
Age_P	2.37e-06	6.34e-06*
	0.34	2.27
$(\text{Profit/Total Assets})_P$	0.383***	0.201***
	55.07	26.72
Anglo-Saxon_S	0.050***	0.003**
	11.14	3.12
Scandinavian_S	0.054***	0.005***
	11.14	4.12
German_S	0.042***	-0.004*
	9.15	-2.55
French_S	0.040***	-0.004***
	10.28	-6.30
Transition_S	0.032***	0.000
	7.62	0.25
Anglo-Saxon_P		0.013**
		2.78
Scandinavian_P		0.016**
		3.12
German_P		0.007
		1.35
French_P		0.017***
		3.60
Transition_P		0.002
		0.24
R-squared	0.075	0.024
Nb. of obs.	48,504	50,727

Note:
Subsidiaries with an ownership percentage of $\geq 50\%$ *are included.*
Domestic: Subsidiary country is the same as the parent country.
Foreign: Subsidiary country is not the same as the parent country.
Subindex P refers to parent, subindex S to subsidiary.
Anglo-Saxon, Scandinavian, German, French and Transition refers to the legal origin.
Below the regression coefficient the t-value is reported.

Table 5: **Correlation of Individual Components of the Worldwide Governance Indicator**

	Rule of Law	Regulatory Quality	Control for Corruption	Governmental Efficiency	Political Stability	Average
Voice-Accountability	0.732	0.684	0.732	0.739	0.746	0.772
Rule of Law		0.795	0.969	0.962	0.685	0.857
Regulatory Quality			0.820	0.794	0.521	0.769
Control for Corruption				0.951	0.646	0.853
Governmental Efficiency					0.636	0.847
Political Stability						0.706

The 6 dimensions of Worldwide Governance Indicator by Kaufmann, Kraay and Mastruzzi (2005) include the following:
Voice and Accountability: Citizens participation in governmental processes, freedom of association, free media, etc..
Political Stability: Likelihood of governmental destabilization by unconstitutional means, etc.
Government Effectiveness: Quality of public services, policy implementation and commitments, etc.
Regulatory Quality: Formulation of governmental regulations that promote private sector development.
Rule of Law: Law and contract enforcement, likelihood of crime and violence, etc.
Control of Corruption: extend to which public power is exercised for private gain.

Table 6: **Domestic Subsidiaries, Individual Components World Governance Index and Legal Origin**

	Voice and Accountability	Rule of Law	Regulatory Quality	Control for Corruption	Governmental Efficiency	Political Stability
GI_S	0.001	0.004*	0.005***	0.006**	0.006***	-0.002
	0.54	2.32	3.50	3.03	3.81	-1.03
$(\text{Log Total Assets})_S$	-0.001**	-0.001*	-0.000*	-0.001**	-0.000*	-0.001**
	-2.75	-2.53	-2.34	-2.67	-2.37	-2.79
$(\text{Log Total Assets})_P$	-0.002***	-0.002***	-0.002***	-0.001***	-0.002***	-0.002***
	-7.42	-7.53	-7.60	-7.21	-7.57	-7.45
Age_P	3.21e-06	2.46e-06	3.17e-06	1.88e-06	1.64e-06	3.313-06
	0.46	0.35	0.27	0.46	0.24	0.47
$(\text{Profit/Total Assets})_P$	0.383***	0.383***	0.383***	0.382***	0.383***	0.383***
	55.07	55.10	55.09	54.99	55.07	55.03
Anglo-Saxon_S	0.058***	0.052***	0.049***	0.049***	0.047***	0.062***
	14.60	11.84	11.83	10.86	10.82	18.26
Scandinavian_S	0.063***	0.056***	0.053***	0.055***	0.051***	0.067***
	13.28	11.73	11.60	12.28	10.85	15.72
German_S	0.050***	0.044***	0.042***	0.043***	0.040***	0.054***
	11.09	9.42	9.62	9.74	8.98	12.96
French_S	0.046***	0.042***	0.041***	0.041***	0.038***	0.050***
	11.81	10.73	11.27	11.06	9.65	14.47
Transition_S	0.034***	0.033***	0.034***	0.031***	0.032***	0.036***
	7.66	8.07	8.27	7.25	7.61	8.68
R-squared	0.077	0.077	0.077	0.077	0.077	0.077
Nb. of obs.	48,504	48,504	48,504	48,504	48,504	48,504

The 6 dimensions of Worldwide Governance Indicator by Kaufmann, Kraay and Mastruzzi (2005) include the following:
Voice and Accountability: Citizens participation in governmental processes, freedom of association, free media, etc.
Political Stability: Likelihood of governmental destabilization by unconstitutional means, etc.
Government Effectiveness: Quality of public services, policy implementation and commitments, etc.
Regulatory Quality: Formulation of governmental regulations that promote private sector development.
Rule of Law: Law and contract enforcement, likelihood of crime and violence, etc.
Control of Corruption: extend to which public power is exercised for private gain.
Below the regression coefficient the t-value is reported.

Table 7: **Foreign Subsidiaries, Individual Components World Governance Index and Legal Origin**

	Voice and Accountability	Rule of Law	Regulatory Quality	Control for Corruption	Governmental Efficiency	Political Stability
GI_S	-0.001	-0.001	-0.000	0.006***	0.001	-0.002
	-0.60	-1.16	-0.00	4.72	1.19	-1.38
GI_P	0.012***	0.014***	0.011***	0.009***	0.012***	0.005**
	6.79	8.66	10.41	7.39	9.91	2.81
$(\text{Log Total Assets})_S$	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	-7.76	-7.66	-7.62	-7.93	-7.80	-7.73
$(\text{Log Total Assets})_P$	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	3.96	3.99	4.25	4.41	4.50	3.93
Age_P	16.1e-04*	14.9e-04*	16.7e-04*	12.4e-04**	13.8e-04*	17.5e-04**
	2.55	2.35	1.95	2.64	2.18	2.76
$(\text{Profit/Total Assets})_P$	0.204***	0.203***	0.202***	0.203***	0.201***	0.208***
	27.05	26.99	26.81	26.91	26.58	27.67
Anglo-Saxon_S	0.003***	0.003***	0.003***	0.000	0.003**	0.002*
	3.40	3.77	3.55	0.46	3.09	2.55
Scandinavian_S	0.006***	0.006***	0.005***	0.004***	0.005***	0.006***
	5.00	5.03	4.17	3.99	4.06	5.45
German_S	-0.003*	-0.003*	-0.003*	-0.004**	-0.004**	-0.003*
	-2.39	-2.10	-2.27	-2.92	-2.63	-2.26
French_S	-0.004***	-0.005***	-0.005***	-0.004***	-0.004***	-0.004***
	-6.50	-6.68	-6.41	-5.18	-6.55	-6.43
Transition_S	-0.001	-0.002	-0.001	0.003*	0.001	-0.001
	-0.61	-0.97	-0.30	1.99	0.44	-0.58
Anglo-Saxon_P	0.024***	0.016***	0.016***	0.014**	0.012*	0.035***
	4.94	3.34	3.48	3.07	2.52	8.28
Scandinavian_P	0.027***	0.019***	0.017***	0.020***	0.015**	0.038***
	5.10	3.63	3.38	4.08	2.95	7.99
German_P	0.016***	0.008	0.008	0.009*	0.005	0.026***
	3.33	1.59	1.78	1.97	1.14	5.66
French_P	0.025***	0.020***	0.019***	0.018***	0.015**	0.036***
	5.29	4.22	4.37	4.16	3.12	8.31
Transition_P	0.003	0.008	0.007	-0.004	0.001	0.009
	0.44	0.98	0.88	-0.45	0.15	1.14
R-squared	0.024	0.024	0.024	0.025	0.025	0.023
Nb. of obs.	50,727	50,727	50,727	50,727	50,727	50,727

The 6 dimensions of Worldwide Governance Indicator by Kaufmann, Kraay and Mastruzzi (2005) include the following:
Voice and Accountability: Citizens participation in governmental processes, freedom of association, free media, etc.
Political Stability: Likelihood of governmental destabilization by unconstitutional means, etc.
Government Effectiveness: Quality of public services, policy implementation and commitments, etc.
Regulatory Quality: Formulation of governmental regulations that promote private sector development.
Rule of Law: Law and contract enforcement, likelihood of crime and violence, etc.
Control of Corruption: extend to which public power is exercised for private gain.
Below the regression coefficient the t-value is reported.

Acquired versus Non-Acquired Subsidiaries - Which Entry Mode do Parent Firms Prefer?

Esther Kalkbrenner*†

Abstract

Despite the economic importance of international foreign direct investment (FDI) flows, it seems that investment decisions of multinational firms are not well understood. A multinational firm can either establish a subsidiary in a foreign country through greenfield investment or through acquiring an existing firm in the target country. The subsidiary can either be wholly owned or jointly owned. How do those firms organize their international production? Which investment mode serves best domestic/foreign markets? The goal of this paper is to shed some light on the determinants of foreign market entry modes. In particular to analyze the systematic variation in the mode choice of FDI, namely acquisition versus non-acquisition (greenfield) investments. We propose a transparent and general applicable method of data base construction. This database includes information about parent firms and their subsidiaries (majority owned affiliates) in foreign countries. A particular feature is the construction of a variable which indicates how the subsidiaries were established, either by acquisition or not. This variable allows to differentiate the establishment mode of parent firms into foreign markets. For this purpose two databases from the Bureau van Dijk are interlinked: Osiris and Zephyr. We provide evidence that firm heterogeneity is important for U.S. multinational firms in determining their entry mode choice. However, this is not a distinguishing feature for European multinational firms. For both sets of parents the host country characteristics play an important role in deciding on the entry mode. Higher institutional quality increases the likelihood of acquisitions versus greenfield investments

*University of Vienna, Department of Economics, Brünner Straße 72, A-1210 Vienna; E-mail: esther.kalkbrenner@univie.ac.at

†I gratefully acknowledge financial support from the Austrian Marshall Plan Foundation. I would like to thank the Institute for European Studies at the UC Berkeley for their hospitality during the spring semester 2010, where part of this research was facilitated. Further I would like to thank my two advisors Prof. Dennis Mueller and Prof. Klaus Gugler for all their inspiration and great advice. Thanks goes also to Prof. Christine Zulehner for her valuable suggestions. I am grateful to Prof. Maarten Jansen and all seminar participants at the graduate seminar of the University of Vienna for helpful comments.

1 Introduction

Despite the economic importance of international foreign direct investment (FDI) flows, it seems that investment decisions of multinational firms are not well understood. A multinational firm can either establish a subsidiary in a foreign country through greenfield investment or through acquiring an existing firm in the target country. The subsidiary can either be wholly owned or jointly owned. How do those firms organize their international production? Which investment mode serves best domestic/foreign markets? What matters more the parent firm characteristics or the characteristics of the target country to be entered? The goal of this paper is to shed some light on the determinants of foreign market investment modes. In particular to analyze the systematic variation in the mode choice of FDI, namely acquisition versus non-acquisition (e.g. greenfield) investments. Such questions have been studied in the international business literature and more recently in the international trade literature. We seek to contribute to the literature in several ways.

First, we propose a transparent and general applicable method of data base construction. This method can overcome the lack of data regarding the entry mode decision of multinational corporations. We use existing empirical studies as a benchmark for the validity of our data base.

Second, using this method we analyze the determinants of the mode of foreign market entry for a sample of U.S. and Western European parent firms. We are the first to report results for so many countries of parent firms. Most studies in the international trade literature base their empirical results on one U.S. data set. We show that results obtained for U.S. parent firms do not necessarily carry over to European parent firms.

Summarizing the key results we find evidence, that profitable U.S. parents prefer greenfield investments as entry mode into foreign markets. We do not find significant variation in the mode choice of Western European parent firm characteristics. Our results imply that empirical evidence regarding the entry mode decision of U.S. parent firms do not necessarily answer questions about the behavior of Western European parent firms. Valid for both sets of parent firms is, that the higher the institutional quality of the subsidiary country, the more

likely will parent firms choose to acquire the subsidiary rather than to undertake a greenfield investment.

The paper is structured as follows. Section 2 gives an overview of the existing research and relevant literature. Section 3 describes the tested hypotheses regarding the determinants of entry mode. Section 4 and section 5 describe the data and estimation methodology. Section 6 shows the empirical results and section 7 concludes with a summary. In the appendix the reader will find a critical and detailed description of the data base construction.

2 Literature Review

The literature on the effects of foreign direct investment on acquiring firms is quite large. It compromises contributions from several fields of economic research such as i.e. the international business literature, the international trade literature, the institutional economics literature and the international organizations literature. We are most interested in the following questions: What explains best the behavior of multinational firms either setting up subsidiaries by greenfield investment and/or acquisition investments? Can we observe differences in parents choosing one alternative over the other? We would like to take a look at the literature from different angles and evaluate inspiring contributions from different lines of research.

Markusen (1995) provides an overview of the determinants for multinational economic activities. He describes six macro facts from the aggregate data and six micro facts from industry and firm-level data regarding the activities of multinational firms.[1] The underlying determinants for a firm to enter foreign markets seem to depend on the nature of FDI either being horizontal or vertical. Analysis of horizontal FDI roots its arguments mostly on the

[1]Macro facts: 1. FDI is growing rapidly around the world. 2. Developed countries are the performers and recipients of FDI. 3. We observe large two-way FDI flows between developed countries. 4. Most FDI seems to be horizontal. 5. 30% of trade is intra-firm trade. 6. There is little evidence that FDI is correlated with differences in factor endowments across countries.
Micro facts: 1. FDI is hugely different across industries. 2. Multinational firms usually have a higher share of R&D/Sales. 3. Multinational firms are tentatively firms with a high ratio of book to market value. 4. There is little evidence that plant level scale economies are negatively correlated with multinationality. 5. There exists a threshold size for multinational firms. 6. Mixed evidence is found to wether FDI is related to trade barriers or transport costs.

proximity-concentration trade off, where transport costs are larger than costs of establishing of a foreign market presence. Arguments for vertical FDI usually compromise rent and market power appropriation as main driving forces. Next to the cost minimization and market failure arguments, the transfer of intangible firm-specific assets (e.g. corporate culture) and comparative advantages seem to be relevant for either type of FDI.[2] A complementary question to the determinants of multinational activity of firms needs to explain why multinationals choose FDI instead of arm's length licensing agreements with a foreign firm. Antras et al. (2009) propose that in the presence of monitoring problems and financial frictions, firms engage rather in FDI than in arm's length technology transfers. An other important line of discussion treats the question if the engagement of multinational firms in a foreign market is a complement or a substitute to domestic economic activities. Paffermayer (2004) analyzes the domestic growth performance of multinational firms with foreign affiliates in the Austrian manufacturing sector. According to the author, firms in the possession of intangible firm specific assets do not substitute their domestic economic activities with foreign economic activities (export/affiliates). Desai et al. (2009) show that expansion of US firms abroad results in higher domestic investment and strengthen the hypothesis that domestic and foreign economic activities are rather complements than substitutes. Only recently a small but constantly growing literature is investigating the impact of different strategies to enter a foreign market (FDI mode choices). The major drawback for empirical applications is the availability of data sources. Usually the entry mode is not registered systematically in most countries an exception is the mandatory survey of the Bureau of Economic Analysis in the USA.[3]

The international business literature provides many empirical applications with different methodologies e.g. focusing on individual industries, individual countries or on multi-country/multi-industry studies. The studies vary quite substantially in data bases, sample sizes and scope.[4] This literature can broadly be divided into two streams. One is the foreign establishment mode literature, distinguishing between foreign market entry types such as acquisition or greenfield investment. Second the management literature, which concentrates

[2]For horizontal FDI see Helpman et al. (2004). For vertical FDI see Hortacsu and Syverson (2009).

[3]Other examples are survey data for Sweden and Japan.

[4]One needs to distinguish between country variation in one or both regarding host and target countries, correspondingly industry variation in one or both regarding host and target industries.

on the choice of ownership such as wholly owned and joint ownership. The first is called establishment mode and the second entry mode. In the context of the international business literature our contribution lies within establishment mode literature. Slangen and Hennart (2007) provide an overview over the most important studies in the establishment mode literature. Dikova and van Witteloostuijn (2007) are also studying the factors determining the choice between acquisition and greenfield, as well as the establishment of wholly owned or joint owned subsidiary.[5] Equivalent they use the worldwide governance index to evaluate the importance of a country's level of institutional factors and control for firm-specific variables such as experience and technology/advertising intensity. A distinguishing feature to our study is the scope of firm-specific variables, model specification and source of data. The authors use survey collected data of 160 Western European multinational firms investing in a pre-selected set of Central and Eastern European countries over the period 1992-2002. The number of observations is not given, industry specific variables are neglected and the timing of the investment decisions of the parent firms is not clear. Their results show that the institutional environment of the subsidiary country is an important factor for the type of entry and ownership choice. Larimo (2003) has a sample of 3,524 foreign entry mode decisions for parent firms from Denmark, Finland, Norway and Sweden. He controls for firm and target country related variables, though not for industry effects. His results show that the investment behavior regarding the entry type is not identical in all the Nordic countries. Swedish firms' behavior is more determined by target country variables, whereas Finnish and Norwegian firms are influenced by both firm and target country related variables.[6]

The international trade literature developed theoretical models to formalize the investment decisions of multinational firms across countries. Only recently those models incorporate differences in the modes of entry into foreign markets. Helpman et al. (2004) explains that firms within industries will engage differently in FDI according to their cost schedules. By

[5]The authors present factors simultaneously determining both choices and estimate two different types of models separately for each decision. They essentially test for 2 main hypothesis: 1. Higher institutional development is positively correlated with the likelihood of acquisition and full ownership 2. Higher institutional development results in a more pronounced likelihood for greenfield subsidiaries and joint ownership within technology-intensive industries. Other studies in this field stress the importance of potential sequential decision design Chang and Rosenzweig (2001).

[6]The sample is based on manufacturing firms undertaking foreign acquisitions and greenfield investments during the period 1960-1999.

paying a fixed cost, a firm can move its production facility to where it wants to serve the foreign market and incurs for that reason no trade costs. The most productive firms will engage in FDI, the intermediate productive firms will export and the least productive firms will serve the domestic market. The authors do not yet distinguish the mode choice of FDI but distinguish more traditionally between exporting and FDI. But it seems that the FDI they have in mind is a greenfield investment. Yeaple (2009) suggests a *"pecking order"* of investing firms across countries according to their firm productivity and country specific characteristics. Nocke and Yeaple (2007) explore the nature of firm heterogeneity more closely. They distinguish between mobile and non-mobile capabilities and how those affect the choice of FDI mode. Nocke and Yeaple (2008) provide not only a theory for parent's investment decision but also an empirical estimation of their model predictions. Their model compromises firm heterogeneity and countries differ by the cost of labor. Using U.S. data from the Bureau of Economic Analysis they confirm three of their model predictions.

> First, U.S. multinational firms engaging in greenfield FDI are more efficient than those engaging in cross-border acquisitions. Second, U.S. multinational firms are more likely to choose cross-border acquisition over greenfield FDI the more developed the host country. Third, U.S. multinational firms are more likely to choose cross-border acquisition over greenfield FDI the closer is the geographical proximity of the host country to the U.S.[7]

In their model the two foreign market establishment modes have different set-up costs. The greenfield investment involves set-up costs as a function of the country specific wage rate and the labor productivity in that country. Whereas the acquisition investment is the market price of the target. Cross-border acquisitions allow a multinational firm to combine its asset in an optimal way, whereas greenfield set-ups allow the firm to transfer it's own capabilities to the foreign market. This difference in motives across the establishment modes is the reason for the here presented empirical study.

Another aspect of this topic are the effects of entry mode on the subsidiary side. Not

[7] See Nocke and Yeaple (2008).

exhaustively but rather by example we would like to mention studies in this area. One of the first to mention is the literature on firm entry and exit as determinants for market performance. The focus lies on post-entry performance of subsidiaries depending on the entry type. New plant (greenfield) versus acquisition entry are compared within the manufacturing sector in individual countries. For Canada see Baldwin (1995).[8] For USA see Dunne et al. (1988).[9] The key results from this line of research is that not only does entry matters (it does not happen only at the fringe), but the type of entry matters. Greenfield and acquisition entry are both significant and long-lasting, but the types of entry follow quite different post-entry growth patterns.[10] We use this literature as a building stone to hypothesize, that not only the established plants/subsidiaries are affected by the entry type, but most likely also the majority owning parent firms. Still looking at subsidiary performance, Bertrand et al. (2009) provide empirical results using Swedish firm survey data on how the entry mode affects subsidiaries R&D activities. Their findings show that acquired subsidiary have a higher propensity for R&D than greenfield subsidiaries. The authors conclude that 'asset-seeking' is the main motive behind the acquisition.[11]

We would like to explore a new path of using data regarding the type of multinational investment decision. The here presented method relies on ownership data and balance-sheet

[8]The author uses plant-level data of the Canadian Census data for the time 1970-1982. Plants belonging to the same producers can be identified. Entry and exit are measured by examining changes in firm identifiers. Various forms of control changes e.g. purchase of a plant, subsuming of one company under another or integration of two corporate entities into a new one, can not be distinguished and all refer to merger activity. Further he differentiates between outsiders and continuing firms at the industry level. Outsiders classify as firms opening/closing a new plant across industries. Continuous firms are expanding/contracting within the same industry level. This means that new plants can be created by new firms (outsiders) or by existing firms (continuers); Existing plants can be acquired by new firms or by existing firms.

[9]The authors use U.S. data for the manufacturing industry for 5 census years (1963,1967,1972,1977,1982) Three categories of entrants are analyzed. Entry through the construction of a new plant, diversifying firms entering through the construction of a new plant and diversifying firms entering through change in their product mix. The authors do not distinguish entry by acquisition, but the first two categories can be interpreted as greenfield entry.

[10]Greenfield entering firms have a higher infant mortality rate and they tend to fail at higher rates than older firms, but also a significant percentage of them exhibit strong post-entry growth and are still active a decade after their entry. The two entry processes follow different paths in the post-entry growth phase. The average share in terms of value-added for each type (greenfield/acquisition) of entry cohort increases at first for both, the one for greenfield entrants continues to grow, whereas that of acquisition entrants begins to fall. For more information see Baldwin (1995).

[11]In their basic probit estimation they have 2,063 observations of greenfield/acquisition subsidiaries from 5 surveys: 1970,1978,1990,1994,1998. We don't observe enough Swedish firms in our data set to allow comparisons regarding our proposed data methodology.
Regarding entry mode and R&D activities on the parent firms see Stiebale (2010). He estimates the effects of foreign acquisitions on German parent firm R&D level.

data that are compared at different point in times. This method might allow a wider access to entry mode information for firms. The ultimate goal for this paper is to obtain results about the determinants of parents entry mode decision in a given year for a variety of countries.[12] The focus lies on a short-run analysis[13] and compares the establishment of new subsidiaries with acquired subsidiaries in several industries and countries. Comparing acquisition processes to other changes affecting a parent firm such as the establishment of new subsidiaries allows to get a better picture of determinants of investment decisions. Parent firms are continually active multinational firms. New non-acquired subsidiaries are defined as firms that did not previously exist in that industry/country and have not been acquired. New acquired subsidiaries are firms that did exist previously in that industry/country and a transfer of ownership on the parent level took place. One drawback of the here presented analysis is its short-run nature, as acquisition and merger activities come in waves. This implies that the pattern of mode choice through subsidiary creation and acquisition may well differ across time, because of variations in the timing and the intensity of merger and acquisition waves.[14]

3 Determinants of entry mode

Only recently the theoretical economic literature regarding trade and FDI is investigating differences in the entry decision of multinational firms. The focus lies on three major lines of arguments. The entry decision for a multinational firm depends on the firm characteristics, but also on the industry and host/target country to be entered. Several studies have discussed how a mix between firm ownership-industry-host country variables are decisive for the entry mode.[15]

[12]The term entry of a new subsidiary is used here as the establishment of a subsidiary which is either newly build or newly acquired. Entry does not necessarily refer to the *first* establishment within an industry/country.

[13]Theoretically the method can be extended to include several points in time. Due to data limitations we focus on the decision within a one-year horizon.

[14]See Mueller (2003).

[15]See Larimo (2003), Slangen and Hennart (2007), Dikova and van Witteloostuijn (2007), the empirical part of Nocke and Yeaple (2008).

3.1 Firm characteristics

Firm size: The transaction cost theory argues that an acquisition is initially more capital intense and therefore larger firms, with better access to capital funds, will tend to acquire than to undertake greenfield investments. This leads to the following hypothesis.

H1: Larger firm will more likely do an acquisition investment than a greenfield investment.

Firm R&D intensity: Firm specific technological knowledge, e.g. marketing knowledge or R&D needs to be protected against unwilling dissemination. Greenfield investments are usually considered to be more appropriate than acquisitions if firm specific assets are sensible. The transaction costs of a greenfield might be lower, as the knowledge can be installed directly. Firms lacking firm specific technology knowledge have an incentive to internalize it through acquisition.[16] The threat of unprotected firm-specific know-how dissemination might be lower in countries with high institutional quality. This leads to the following hypothesis:

H2: R&D intensive firms will more likely undertake a greenfield investments than acquisition investments.

Firm Efficiency: Nocke and Yeaple (2008) present theoretical and empirical evidence suggesting that firms favoring greenfield investment over cross-border acquisition are systematically more efficient due to differences in their cost structures.[17]

H3: Efficient firms will more likely undertake greenfield investment than acquisition investments.

3.2 Host country characteristics

Country institutional development: Corporate governance theory suggests that more developed countries provide a less risky environment for multinational's investments. According to Caves (1982) less risk is involved in acquiring a firm than setting up a greenfield, because the latter requires more in depth market information, is more time consuming and involves

[16] See Nocke and Yeaple (2007) and Slangen and Hennart (2007).

[17] The authors use sales and value added per employee to measure the efficiency of U.S. multinational firms.

higher management costs. On the other hand, the higher the institutional environment, the better are investors protected and the more able they are to enforce their rights. Even though Antras et al. (2009) do not distinguish the different types of FDI, they show that in the presence of monitoring problems between inventor and local entrepreneur, and due to financial frictions the necessity for an external investor, leads to more FDI activity the higher the institutional environment. Further strengthening this line of arguments, looking at the empirical evidence of acquisition streams around the world, we observe that the majority of foreign acquisitions are taking place between highly developed countries (e.g. U.S. and Europe). This leads us to the following hypothesis.

H4: Firms tend to favor acquisition investments the higher developed the host country.

Country openness for trade: The possibility to acquire firms depends on the *openness* of the trade policies and knowledge of the host country. The more open a host country, the more readily available is information about the value of potential target firms. Information asymmetries are more prevailing the less accessible a host country for international trade. A multinational firm may opt for a greenfield investment to internalize those information asymmetries. This strategy helps the multinational firm to avoid having to pay a higher premium on target firms, if the true value of the firm is difficult to assess. This leads to the following hypothesis.

H5: Firms tend to favor greenfield investment in countries less exposed to international trade.

Geographical distance: Many studies in the establishment mode literature argue that the cultural distance is an important factor for the establishment mode decision, but also regarding the ownership type.[18] Controlling for a distance measure allows to account for differences in

[18]Kogut and Singh (1988) analyze the effects of firms steaming from a variety of industries and countries entering the USA. They distinguish in the choice of ownership type between joint venture and wholly owned and entry type between acquisition and greenfield establishments. Using an index for cultural distance (based on power distance, risk avoidance, importance of individualism) they conclude that cultural distance matters significantly for the entry mode. The more cultural distance the more likely a firm will choose a joint venture greenfield/acquisition over a wholly owned greenfield/acquistion. Cho and Padmanabhan (2005) analyze differences in the ownership mode between Japanese firms and other host countries. They do not find significant differences regarding cultural distance if one uses a single index for cultural distance. Instead if a measure for firm-specific experience interacted with cultural distance is used, it is positively correlated with full ownership of Japanese foreign manufacturing entities.

the relative costs of the acquisition/greenfield entry modes depending on the geographical proximity of the host country.[19]

H6: Firms tend to favor acquisition investments the further away the target country.

4 Data

Ideally we would like to use information about the incorporation (birth) of subsidiaries in different host countries for a stable set of parents, for which the mode of incorporation by parent firm can unambiguously be determined. Either the newly incorporated subsidiary has been acquired through an acquisition/merger or built as a greenfield investment by the parent firm. Annual reports do not clearly identify greenfield investments, unlike acquisition and merger activities. Sometimes new investment strategies are outlined, but in most annual reports the information about greenfield investments is held rather general. Merger and acquisition databases are commercially available, but firm-level greenfield databases are not widespread. The very few data sets that exist, which distinguish the incorporation mode between greenfield and acquired subsidiaries are based on firm surveys. The U.S. Bureau of Economic Analysis (BEA) conducts a mandatory survey each year and therefore collects firm-level data about U.S. parents' foreign affiliates and their incorporation mode.[20] The Swedish Research Institute of Industrial Economics sends out a firm-level survey every 4 years to Swedish multinationals to inquire about the incorporation mode of their foreign, majority-owned affiliates.[21] Several studies use a Japanese database, which provides a complete list of firms and countries for Japanese overseas investments.[22] Most empirical studies regarding FDI in the economics literature have used the data set of the BEA, which is not accessible for non-U.S. citizens. It is important to evaluate if results obtained from U.S. multinational firms can directly infer conclusions on the behavior of European multinational firms. European parent firms might

[19] See Nocke and Yeaple (2008).

[20] See Nocke and Yeaple (2008) and Antras et al. (2009).

[21] The survey is not mandatory for firms to complete and covers all Swedish multinational firms in the manufacturing sector Bertrand et al. (2009).

[22] Cho and Padmanabhan (2005) describe that for the period 1969-1991 the database consists of 1,519 manufacturing FDI's by 402 manufacturing firms in 45 countries.

follow very different investment strategies due to the diversity of legal backgrounds, institutional environments, development of financial markets and corporate structure. We want to explore the applicability of U.S. obtained results for European multinationals.

Various databases provide detailed firm-level, financial and ownership information, which are quite accessible. The idea of this paper is to propose an alternative use of commonly accessible databases to construct a data sample, which allows to investigate determinants of incorporation mode choices for subsidiaries. We choose to concentrate on foreign subsidiaries in order to compare our results to existing research. In the future we plan on extending the analysis to domestic subsidiaries. In order to allow for a tight definition of acquisition and greenfield investment, several criteria have been placed on the parent and the subsidiaries to construct the sample. Implicit in the proposed data construction is the assumption, if the subsidiary is new and has not been acquired, then it is a greenfield subsidiary. We concentrate on listed parent firms and their decision to establish a new subsidiary in a foreign country in 2005.[23] Ownership structures and financial information of parent firms are take from the Bureau van Dijk Osiris database. Information about merger and acquisition have been provided by Bureau van Dijk Zephyr database. Zephyr includes data on M&A, IPOs, Joint Ventures and private equity transactions. The advantage of Zephyr compared to other M&A databases such as Thompson Financial Securities is that in Zephyr all deals regardless of the deal value are included.[24]

The first step is to determine which subsidiaries are newly established. Incorporation dates for unlisted subsidiary firms are not available.[25] For this reason we are using the ownership structure provided by Osiris at two different points in times and observe subsidiaries entering as being newly established. A critical description of this step can be found in the appendix. We concentrate on listed parent firms in the year 2005 and their decision to establish

[23]The methodology can potentially be extended to include several years of decision making by the parent firm; For a dynamic entry decision over time, the choice should allow for investment (by acquisition or greenfield) and no investment in a given time period.

[24]Thompson Financial Securities includes only deals above USD 10 million. Stiebale (2010) compares aggregate statistics for Zephyr and Thompson Financial Securities and reports that the coverage of transactions above USD 10 million is very similar.

[25]Amadeus by BvD is a data base of listed and unlisted European firms including incorporation year. We are interested in gathering the effects of multinational parent firms locating subsidiaries across the globe. We especially emphasize the country dimension of subsidiary location. One could concentrate on the European sub-sample of subsidiaries but the research question would be a different one.

a subsidiary in a foreign country. We focus on subsidiaries with a direct ownership percentage of at least 50 percent. To be a foreign subsidiary the subsidiary country needs to be different to the parents origin country. For all parent firms of newly established subsidiaries, which are majority owned, we find the corresponding acquisition activities for the whole time coverage in the Zephyr database.[26] Based on this information we determine which subsidiary has been acquired and which one has not been acquired for each parent-subsidiary pair. For more details on the sample construction see the appendix.

Using this method 1,470 listed parents from a variety of different origin countries have been identified with at least one new subsidiary. Those parent firms include many of the top 500 largest parent firms in the Osiris database in 2006.[27] 1,271 of those parent firms are included in the M&A database and have made an acquiring investment at least once since 1998. A total of 6,631 subsidiaries have been identified as being newly established between 2005 and 2006. For the analysis of determinants of entry mode we will concentrate on U.S. parent firms and European parent firms.

5 Estimation Methodology

In general the probability that a firm n chooses alternative i over j depends on the known utility value V_{ni} and the unknown part ϵ_{ni}.

$$P_{ni} = Prob(V_{ni} + \epsilon_{ni} > V_{nj} + \epsilon_{nj}) \qquad \forall j \neq i \tag{1}$$

The estimation technique here is a binary logit model of the likelihood of parents to acquire a subsidiary or not, whereby V_n is linear in parameters with coefficient β, such that the choice

[26] This step assures that all acquisition activities of a parent firm are accounted for. For example the parent firm acquires 10% of a subsidiary in 2000 and holds 50% of the same subsidiary in 2005, whereby the last acquisition is missing in the data, then the subsidiary is still considered to be acquired.

[27] Not all top 500 largest firms are manufacturing firms.

probability is given as

$$P = G(X\beta) = \frac{1}{1 + e^{X\beta}} \tag{2}$$

X is a linear combination of variables such as a set of parent characteristics, industry characteristics and host country characteristics and G is the logistic function.[28] The dependent variable is a binary variable for every subsidiary-parent-industry-country pair being 1 if the subsidiary has been acquired, and 0 otherwise.[29] The parent characteristics include a performance measure such as Tobin's Q averaged over the years 2003/2004, a firm size determinant such as log of sales averaged over the years 2003/2004 and parent's research and development expenses averaged over the years 2003/2004. Tobin's Q is defined as market capitalization plus long term debt over total assets.[30] The FDI literature measures the multinational activity by counting the number of foreign subsidiaries or the number of countries with foreign subsidiaries. Regarding the count of subsidiaries we use the status at the beginning of 2004. For the other time varying we are using averages over the years 2003/2004 in order to reflect parent's status prior to the investment decision.[31] The host country characteristics include relevant variables for the location decision of the parent. We evaluate the quality of a subsidiary country's institutions using the worldwide governance index provided by the World Bank. We average the six indicators over the years 2003/2004: (1) voice and accountability (2) political stability (3) government effectiveness (4) regulatory quality (5) rule of law, and (6) control of corruption. The indicators are constructed using the unobserved components methodology described in Kaufmann et al. (2007). The indicators are measured in units ranging from -2.5 to +2.5, with higher values corresponding to better governance. Further we use other country development variables such as the log of GDP, population, import plus export

[28] See Train (2009).

[29] Note that Dikova and van Witteloostuijn (2007) define the dependent variable as being 1 if greenfield and 0 otherwise. We use the term establishment/entry mode interchangeably, which implies that the decision of ownership is independent to the decision about the entry type. In our setting subsidiaries can either be wholly owned greenfield (100%), majority owned greenfield ($> 50\%$ and $< 100\%$), wholly owned acquisitions (100%) or partially owned acquisitions ($> 50\%$ and $< 100\%$).

[30] For a discussion on marginal versus average Tobin's Q see Gugler et al. (2007).

[31] We have experimented with averages over the years 2004/2005 also 2003/2005 and the results are quantitatively the same.

over GDP and distance between parent and host country. Further we are adding colonial past and common language in a later specification. All specifications include parent industry and parent country of origin fixed effects. Our approach follows closely the estimation technique of Nocke and Yeaple (2008) in order to assess if the methodology applied yields similar results for a U.S. sample.

6 Results

Unlike any other empirical analysis previously, we use Tobin's Q as a measure for firm efficiency. Nocke and Yeaple (2008) use parent firm sales and value-added per employee as a measure of firm efficiency. Believing that sales is highly correlated with firm's size, we opted for Tobin's Q as an alternative efficiency measure combined with firm's sales. In a second specification we include R&D expenses as a determinant for the entry mode decision. The availability of R&D expenses cuts the sample size roughly in half. Regarding the host country characteristics, geographical distance between home and host country is included to account for entry mode preferences based on proximity. FDI might depend on the ease of access to international trade, therefore a measure for a host country's openness to international trade is included. This is our basic specification, where we control for parent industry and country fixed effects. We try to mirror the model specification used in Nocke and Yeaple (2008) to evaluate the fit of our data base. They relate a parent's mode choice to parent's efficiency and host country characteristics. Beside the difference in the firm efficiency measure, the authors provide additional specifications including more firm characteristics such as a measure for firm's diversification across industries, a measure for vertical integration (the parent's ratio of intra firm imports to total imports) and an experience dummy variable for wether the parent owned a subsidiary prior to the sample period in that country.[32]

Starting with the sample for U.S. parent firms, we are able to reproduce the key results by

[32]With our data set we can not compute the first two additionally employed variables as we don't have industry information of the subsidiary. We measure multinational experience as the number of majority owned, foreign subsidiaries of a parent at the beginning of the sample period.

Nocke and Yeaple (2008).[33] Comparing the results for the first specification in table 3 to the results of Nocke and Yeaple (2008), where they use sales as a firm efficiency measure and we complement Tobin's Q to it, we find a quantitatively similar effect. With respect to the other coefficients, three out of four have the same sign. The country variables GDP, population and distance are all increasing the likelihood of an acquisition. All of them are significant in our data set. GDP and distance are significant in most specifications of Nocke and Yeaple (2008). The measure for a country's openness to trade is significantly negative in Nocke and Yeaple (2008) but insignificantly positive in our specifications.[34] In short, U.S. efficient parent firms will more likely undertake greenfield investments than acquisition investments (H3). U.S. parent firms tend to favor acquisition investments the higher the development status of the host country (H4). U.S. parent firms are more likely to undertake an acquisition the farther away the host country (H6). It seems that U.S. firms will favor greenfield investments in countries which are less exposed to trade (H5), but this result is not statistically significant. Like in Nocke and Yeaple (2008) the result about the efficiency of firms is robust, when we introduce host country fixed effects (specification (3) of table 3). This is an important result as it provides validity to the constructed database.

We therefore proceed to first narrow down the factors of host country development influencing the entry mode choice, secondly to extend the analysis to European parent firms. In specification (2) we introduce a measure for institutional quality of the host country ranging from -2.5 to +2.5 according to 6 dimensions of institutional governance. We expect that including such a measure will clarify through which channel the development of the host country is influencing the entry mode of the parent. Indeed the institutional quality is an important and significant determinant for the parent's choice. The higher the institutional quality of the host country, the more likely favor U.S. parent firms an acquisition over greenfield investment.

[33]The Bureau of Economic Analysis only includes U.S. firms with foreign subsidiaries above a certain size threshold. Nocke and Yeaple (2008) pool over 5 years of firms together but they aggregate the data such that 'for each firm, a country-industry pair appears at most once', but the number of parent/subsidiary firms is not given for their sample.

[34]Likelihood of acquisition results showing logit coefficients and (se) using U.S. data:

Nocke and Yeaple (2008)		Sales	GDP	Population	Open	Distance	Obs.	LL
		-0.217**	0.768**	0.049	-0.656**	0.199	856	-487.5
		(0.076)	(0.172)	(0.092)	(-0.187)	(0.130)		
Table 3	Tobin's Q	Sales	GDP	Population	Open	Distance	Obs.	LL
	-0.275*	0.083	0.821***	0.543**	0.302	1.084***	1,342	-627.32
	(0.13)	(0.06)	(0.18)	(0.12)	(0.22)	0.17		

The coefficient on GDP becomes surprisingly negative but remains insignificant.[35] All other coefficients remain quantitatively the same. In specification (4) of the same table, we include R&D/sales as a measure for the parent firm research intensity. The sample size becomes much smaller. The country relevant variables do not change much, but the coefficient on firm's efficiency looses its significance. At a later stage we no longer include R&D expenses as a variable due to the small sample size. We could produce a measure for industry level R&D expenses, but we control at the 3-digit level for all industry effects, such that the R&D channel is compromised within those industry effects.

Turning now to the sample of European firms[36] in table 4 we observe a different pattern for the entry mode choice. First the firm efficiency measure remains insignificant varying positively/negatively around zero in the different specifications. GDP, population and openness for trade are still positive and therefore increase the likelihood of acquisition. The distance measure becomes significantly negative, indicating that European parent firms tend to favor greenfield acquisitions the farther away the host country (this result is contradicting H6). Acquisition activities are certainly in a closer range of geographical proximity and many European parent firms have acquired strongly in neighboring Eastern European countries. This can also be seen in the appendix figure 6. Introducing the measure for institutional quality increases the likelihood of acquisition by a European parent firm. Those results imply that results obtained for U.S. multinational firms can not straight forwardly be applied to explain the behavior of European multinational firms.

In our last step we want to concentrate even more on country relevant variables. We introduce a measure for the parent firm multinationality, one for corporate control and an alternative distance measure. An ideal measure regarding the impact of transportation cost differences on the entry mode would be the exact geographical distance between the home and foreign location. In the absence of such a distance measure[37] we experiment using land border dummy instead of geographical country distance from capital to capital. In a large

[35]The governance index is highly correlated with GDP ($\rho = 0.88$).

[36]The estimation sample includes parents from Belgium (7.62%), Switzerland (5.34%), Germany (12.48%), Spain (2.65%), France (22.67%), UK (11.92%), Italy (22.90%), Netherlands (11.73%), Portugal (0.15%) and Sweden (2.54%).

[37]The main address of parent firm is available but the exact subsidiary location within the host country is not.

country such as the U.S. most industrial firms will not be located close to the capital e.g. Silicon Valley firms will have a greater proximity to Canada or Mexico than to their own capital. The distance measure might in such cases be misleading. To proxy the degree of multinationality of the parent firm we count the majority owned, foreign subsidiaries prior to acquisition/greenfield investment. Corporate control is the degree of ownership a parent has in the subsidiary. Based on the data base construction we allow subsidiaries in either entry mode to have an ownership percentage between 50% and 100%. In table 5 provides results for U.S. parent firms and table 6 for Western European parent firms. For comparison purposes, the first column of the tables is identical to specification (2) of table 3 and respectively table 4.

With respect to characteristics of U.S. parent firms, including the additional variables absorbs the effect of parent firms productivity.[38] The higher the number of foreign subsidiary, the higher the likelihood of acquisition compared to greenfield investment. Both variables are highly significant for U.S. parent firms, which can not be shown for European parent firms. It seems that firm characteristics do not have a distinguishing effect on the mode of entry for European parent firms. Regarding the host country characteristics, not surprisingly the land border dummy is negative and significant for U.S. parent firms. But for European parent firms this variable does not seem to pick up the effect that the distance measure had before. Including common colonial history or language is not a distinguishing feature regarding the entry mode decision neither for U.S. nor Wester European parent firms. The worldwide governance index remains significant for both sets of parent firms in all specifications.

In summary, the evidence shows that firm heterogeneity is important for U.S. multinational firms in determining their entry mode choice. This is not a distinguishing feature for European multinational firms. For both sets of parents the host country characteristics play an important role in deciding on the entry mode. Higher institutional quality increases the likelihood of acquisitions versus greenfield investments.

[38]This result is mainly driven by the ownership percentage of the parent firm in the subsidiary. The tighter the ownership, the higher the probability of an acquisition. This could be explained because the tighter the ownership the less different are the two entry modes as asymmetric information is reduced in both entry modes.

Table 1: Number of firms and regional distribution

Parent home country	USA	Europe
Parents	302	591
Subsidiaries	1,465	3,346
Percentage of Subsidiaries		
Western Europe	33.29	41.64
Eastern Europe	5.74	12.27
North America	10.02	23.63
Middle/South America	19.58	10.77
Asia	20.50	13.49
Africa	2.11	3.12
Arab	2.57	2.45
South Pacific	6.20	2.63

Table 2: Descriptive statistics parent firm and subsidiary country by parent origin

Parent home country	USA		Europe	
	Mean	Std	Mean	Std
Parent firm				
Acquisition	0.26	0.44	0.32	0.46
Sales (1000 mil USD)	9.9	2.4	11.1	1.98
(Profit-loss)/total assets (th USD)	0.044	0.096	0.032	0.067
Market capitalization (mil USD)	22.6	52.7	9.7	21.5
Tobin's Q	2.19	1.45	1.43	0.89
$R\&D$/sales (th USD)	0.125	0.78	0.06	0.35
Ownership percentage	72.6	24.01	87.9	19.99
Number of subsidiaries	79.7	125.4	142.4	192.1
Number of foreign subsidiaries ownership $> 45\%$	44.6	91.5	71.8	106.3
Number of shareholders	16.9	6.4	9.9	13.1
Percentage largest shareholders: Bank	0.29	0.46	0.23	0.42
Percentage largest shareholders: Family	0.13	0.39	0.14	0.35
Percentage largest shareholders: State	0	0	0.04	0.18
Percentage largest shareholders: Industrial Firm	0.05	0.23	0.38	0.48
Percentage largest shareholders: Dispersed	0.52	0.49	0.22	0.41
Host country				
Governance index (GI)	0.78	0.84	0.79	0.84
Distance (th miles) btw. home/host countries	2,729	1,332	2,633	2090
(Import+export)/GDP	93.5	90.1	77.1	66.7
GDP	21,847	12,584	23,173	13,472
Population	$1.40e^8$	$3.14e^8$	$1.77e^8$	$3.25e^8$
Land border btw. home/host countries	0.18	0.38	0.14	0.35
Stock market capitalization/GDP	0.78	0.79	0.73	0.59
Private credit/GDP	0.83	0.47	0.97	0.62

Notes:

All variables represent mean values per firm/country over years 2003/2004. Acquisition is a dummy variable 1 if subsidiary was acquired. To reflect the status influencing the actual choice of the parent firm. Tobin's Q is market capitalization + depreciation over total assets. Ownership is the percentage the parent owns of the subsidiary. Number of subsidiaries a parent firm holds regardless of ownership percentage. Number of foreign subsidiaries a parent firm holds with ownership of at least 45%. Number of shareholders that hold stakes in parent firm. Percentage of largest shareholder refers to the stake being held in the parent firm. GI is an indicator for institutional quality of country. Distance is the geographical distance between home/host country. Land border is a dummy variable 1 if common border, 0 otherwise.

Table 3: Likelihood of acquisition of subsidiaries depending on parent firm and host country

	U.S. parent firms			
	(1)	(2)	(3)	(4)
Parent firm characteristics				
Log Sales	0.083	0.087	0.096	-0.081
	(0.06)	(0.06)	(0.06)	(0.08)
Tobin's Q	-0.275*	-0.278*	-0.236*	-0.226
	(0.13)	(0.13)	(0.12)	(0.12)
Log R&D/Sales				-0.153
				(0.15)
Host country characteristics				
Log (Import+Export)/GDP	0.302	0.301		0.255
	(0.22)	(0.21)		(0.29)
Log Distance	1.084***	0.970***		1.084***
	(0.17)	(0.17)		(0.24)
Log GDP	0.821***	-0.149		-0.709*
	(0.18)	(0.28)		(0.32)
Log Population	0.543***	0.547***		0.483**
	(0.12)	(0.11)		(0.16)
GI		0.998***		1.455***
		(0.27)		(0.39)
FE: Parent Industry	Yes	Yes	Yes	Yes
FE: Parent Country	Yes	Yes	Yes	Yes
FE: Subsidiary Country	No	No	Yes	No
Nb of Subsidiaries	1,342	1,342	1,252	715
Nb of Parents	271	271	265	156
Log-Likelihood	-627.32	-618.37	-555.29	-332.42
Pseudo-R^2	0.21	0.22	0.27	0.23

Notes:

The standard errors are in parentheses, robust to heteroscedasticity, allow for clustering by parent firm.

* Significance level at 10%, ** Significance level at 5%, *** Significance level at 1%.

Log Sales is log sales of parent firm averaged over the years 2003/2004.

Tobin's Q is parent's market capitalization plus depreciation over total assets averaged over the years 2003/2004.

Log R&D/Sales is the log of parent's R&D expenses over total sales averaged over the years 2003/2004.

Log (Import+Export)/GDP is the trade ratio to GDP btw. parent and host country averaged over the years 2003/2004.

Log Distance is the geographical distance in miles between parent and host country.

Log GDP is the log of real GDP of the host country averaged over the years 2003/2004.

Log Population is the log of population of the host country for year 2003/2004.

GI is the worldwide governance index averaged per host country over the years 2003/2004.

Table 4: Likelihood of acquisition of subsidiaries depending on parent firm and host country

	European parent firms			
	(1)	(2)	(3)	(4)
Parent firm characteristics				
Log Sales	0.033	0.037	-0.004	0.077
	(0.05)	(0.05)	(0.05)	(0.08)
Tobin'S Q	0.047	0.055	-0.011	-0.022
	(0.08)	(0.08)	(0.08)	(0.10)
Log R&D/Sales				0.126
				(0.17)
Host country characteristics				
Log (Import+Export)/GDP	0.348*	0.372*		0.245
	(0.16)	(0.16)		(0.17)
Log Distance	-0.260***	-0.208**		-0.148
	(0.08)	(0.07)		(0.10)
Log GDP	0.683***	0.199		0.181
	(0.12)	(0.21)		(0.27)
Log Population	0.442***	0.472***		0.454***
	(0.07)	(0.08)		(0.08)
GI		0.550*		0.583*
		(0.24)		(0.28)
FE: Parent Industry	Yes	Yes	Yes	Yes
FE: Parent Country	Yes	Yes	Yes	Yes
FE: Subsidiary Country	No	No	Yes	No
Nb of Subsidiaries	2,677	2,677	3,109	1,337
Nb of Parents	433	433	533	198
Log-Likelihood	-1304.94	-1299.69	-1514.10	-726.81
Pseudo-R^2	0.21	0.21	0.24	0.17

Notes:

The standard errors are in parentheses, robust to heteroscedasticity, allow for clustering by parent firm.

* Significance level at 10%, ** Significance level at 5%, *** Significance level at 1%.

Log Sales is log sales of parent firm averaged over the years 2003/2004.

Tobin's Q is parent's market capitalization plus depreciation over total assets averaged over the years 2003/2004.

Log R&D/Sales is the log of parent's R&D expenses over total sales averaged over the years 2003/2004.

Log (Import+Export)/GDP is the trade ratio to GDP btw. parent and host country averaged over the years 2003/2004.

Log Distance is the geographical distance in miles between parent and host country.

Log GDP is the log of real GDP of the host country averaged over the years 2003/2004.

Log Population is the log of population of the host country for year 2003/2004.

GI is the worldwide governance index averaged per host country over the years 2003/2004.

Table 5: Likelihood of acquisition of subsidiaries additional ownership and country variables

	U.S. parent firms		
	(1)	(2)	(3)
Parent firm characteristics			
Log Sales	0.087	-0.087	-0.089
	(0.06)	(0.10)	(0.10)
Tobin's Q	-0.278*	-0.146	-0.133
	(0.13)	(0.12)	(0.12)
Foreign Subsidiaries		0.007***	0.007***
		(0.00)	(0.00)
Ownership		0.050***	0.049***
		(0.01)	(0.01)
Host country characteristics			
Log (Import+Export)/GDP	0.301	-0.204	-0.098
	(0.21)	(0.23)	(0.27)
Log Distance	0.970***		0.502**
	(0.17)		(0.21)
Land Border		-0.589*	
		(0.28)	
Log GDP	-0.149	-0.199	-0.109
	(0.28)	(0.32)	(0.36)
Log Population	0.547***	0.232*	0.292**
	(0.11)	(0.10)	(0.12)
GI	0.998***	0.895**	0.660*
	(0.27)	(0.29)	(0.32)
Colony			0.213
			(0.33)
Language			0.048
			(0.23)
FE: Parent Industry	Yes	Yes	Yes
FE: Parent Country	Yes	Yes	Yes
FE: Subsidiary Country	No	No	No
Nb of Subsidiaries	1,342	1,165	1,165
Nb of Parents	271	219	219
Log-Likelihood	-627.32	-469.52	-467.92
Pseudo-R^2	0.21	0.31	0.31

The standard errors are in parentheses, robust to heteroscedasticity, allow for clustering by parent firm.

Foreign Subsidiaries is the number of foreign subsidiaries of parent firm with ownership > 49% in 2004.

Ownership is ownership percentage of parent firm in the subsidiary.

Land Border is a dummy variable indicating 1 for a common land border btw. parent/subsidiary countries.

Colony is a dummy variable indicating 1 if parent and subsidiary have a common colonial past.

Language is a dummy variable indicating 1 if parent and subsidiary share a common language.

Table 6: Likelihood of acquisition of subsidiaries additional ownership and country variables

	European parent firms		
	(1)	(2)	(3))
Parent firm characteristics			
Log Sales	0.037	0.026	0.035
	(0.05)	(0.06)	(0.06)
Tobin's Q	0.055	0.051	0.042
	(0.08)	(0.08)	(0.08)
Foreign Subsidiaries		-0.001	-0.001
		(0.00)	(0.00)
Ownership		0.003	0.002
		(0.00)	(0.00)
Host country characteristics			
Log (Import+Export)/GDP	0.372*	0.484**	0.410**
	(0.16)	(0.18)	(0.18)
Log Distance	-0.208**		-0.213**
	(0.07)		(0.08)
Land Border		-0.098	
		(0.24)	
Log GDP	0.199	0.051	0.211
	(0.21)	(0.23)	(0.23)
Log Population	0.472***	0.475***	0.501***
	(0.08)	(0.08)	(0.09)
GI	0.550*	0.860**	0.605**
	(0.24)	(0.29)	(0.27)
Colony			-0.0003
			(0.32)
Language			0.283
			(0.25)
FE: Parent Industry	Yes	Yes	Yes
FE: Parent Country	Yes	Yes	Yes
FE: Subsidiary Country	No	No	No
Nb of Subsidiaries	2,677	2,590	2,587
Nb of Parents	422	429	429
Log-Likelihood	-1304.94	1224.76	1218.63
Pseudo-R^2	0.21	0.21	0.21

The standard errors are in parentheses, robust to heteroscedasticity, allow for clustering by parent firm.

Foreign Subsidiaries is the number of foreign subsidiaries of parent firm with ownership > 49% in 2004.

Ownership is ownership percentage of parent firm in the subsidiary.

Land Border is a dummy variable indicating 1 for a common land border btw. parent/subsidiary countries.

Colony is a dummy variable indicating 1 if parent and subsidiary have a common colonial past.

Language is a dummy variable indicating 1 if parent and subsidiary share a common language.

7 Conclusion

The decision on how to enter a foreign market - by acquiring an existing subsidiary or by establishing a new subsidiary - gives important insights about the workings of multinational firms. This area of research still offers an amplitude of possibilities for theoretical and empirical studies. The empirical evidence is quite heterogenous and replicability of estimates is difficult due to data limitations. We propose a transparent and replicable method to construct a data base. This method allows to compare the investment behavior of U.S. based multinationals to the one of Western European based multinationals. Our key results show, that profitable U.S. parents prefer greenfield investments as entry mode into foreign markets. Firm specific characteristics of Western European parent firms do not have a significant effect with respect to variation in the mode choice. Our results imply that empirical evidence regarding the entry mode decision of U.S. parent firms do not necessarily answer questions about the behavior of Western European parent firms. But for both sets of parent firms it shows, that the higher the institutional quality of the subsidiary country to be entered, the more likely will parent firms choose to acquire the subsidiary rather than to do a greenfield investment.

Appendices

This section provides detailed information regarding the sample construction and underlying assumptions. We present a unique approach to construct a database to differentiate the establishment mode of parents entering a foreign market. We combine several different databases to obtain such database. First, we present an overview of the different data sources, see table 7. The main data sources are an ownership (Osiris) and an acquisition (Zephyr) data base from the Bureau van Dijk (BvD). We complement those with information for country related variables. We use a three step procedure to combine the data bases and present empirical evidence on each of the three steps.

Step one is to select a sample of parents, which have established new subsidiaries domestically and/or abroad. We define a parent-subsidiary pair as being new if the subsidiary was not observed in t but is observed in t+1. Parent-subsidiary pairs being observed at both points in time, t and t+1, are called matched subsidiaries. Parent-subsidiary pairs that are observed in t and no longer in t+1 are called divested subsidiaries. The term divestiture usually means the disposal of an asset through sale or closure. Another reason here could be that a parent firm changes the direct ownership structure within its business conglomerate. E.g. parent firm holds 100% of both subsidiaries B and C in t. The parent firm changes the corporate control structure such that in t+1 B owns C with 100% and the parent holds only an ultimate 100% ownership in C. In this sense divested subsidiaries are the result of either a sale, closure or change of corporate control structure.[39]

Step two involves the merger and acquisition data base. We use the same parents identified in the first step and find all acquisition activities corresponding to that parent. A dummy variable indicates, if the new and foreign subsidiaries can be matched to an acquisition activity. This results in the final sample (the third step).

In the next section, we present the criteria that we applied to the data to select the firms at each step. In figure 1 we show how the different data sources, together with the selection criteria that have been applied to obtain the final data sample. Table 8 presents the number

[39]Throughout the text we do not refer to the classical term of 'divestiture', but rather to the one described above.

of observations corresponding to each of the selection criteria. In the last two sections, we present descriptive statistics regarding the first and second step of the data base construction. Our goal is to provide a transparent and replicable guide for this database. The summary statistics presented in the main part of the paper refer to the final sample.

A Data sources

Table 7 provides an overview of the data sources used to create the data sample.

Table 7: Data Sources

Variables	Source	Provider
Ownership	Osiris disc 45, 53, 62	BvD
Financial variables listed firms	Osiris disc 45, 53, 62	BvD
Financial variables unlisted firms	Amadeus disc 128	BvD
Governance indicators (GI)	Kaufmann et al. (2007)	Worldbank
GDP, Population	Penn World Tables 6.3	webpage (2010a)
Country distance, colony and Country language, border	Rose (2005)	webpage (2010b)
Country (import+export)/GDP	Rose (2007)	webpage (2010b)
	Rose and Spiegel (2010)	webpage (2010b)

B Criteria for samples selection

Selection criteria for firms in the ownership data base.

- Parent firms need to be observable for at least 2 consecutive years (that means to be included in three consecutive Osiris data disks, namely 45, 53, 62;)
- Parent firms main industry is in the tradable good sector. This implies all industries within SIC 100 to 399.
- Parent firms have a direct ownership stake in the subsidiary of at least 50%.

- Subsidiary firms must be classified as industrial companies (in order to exclude pure financial investment e.g. fund participation).

For this selection, we determine all subsidiaries that can be matched based on the same firm identifier or by the same name. The subsidiary name match requires that the subsidiary with an identical name needs to be located in the same country. In a second step we determine the subsidiaries disappearing and newly appearing by comparing the ownership structure in 2005 (Osiris BvD disk 53) to the one in 2006 (Osiris BvD disk 62). In a third step we want to ensure that we correctly identify the newly appearing subsidiaries. If a subsidiary newly appears and one with an almost identical name in the same country disappears, we do not consider this subsidiary as being new (but rather mismatched). This is a precautious step in order to avoid miss-categorization due to spelling mistakes.

Selection criteria for firms in the acquisition data base.

- Acquiring firms must have at least one M&A activity since 1995 to be included in the Zephyr data base.
- Acquiring firm main industry activity lies within SIC 100 to 399.
- First we match the deals to new subsidiaries using all completed deal types.
- Second we augment the database with deals, where we don't find a matching new subsidiary, if the deal type has a final stake of more than 50% and the acquiring country is not equal to the target country.[40]

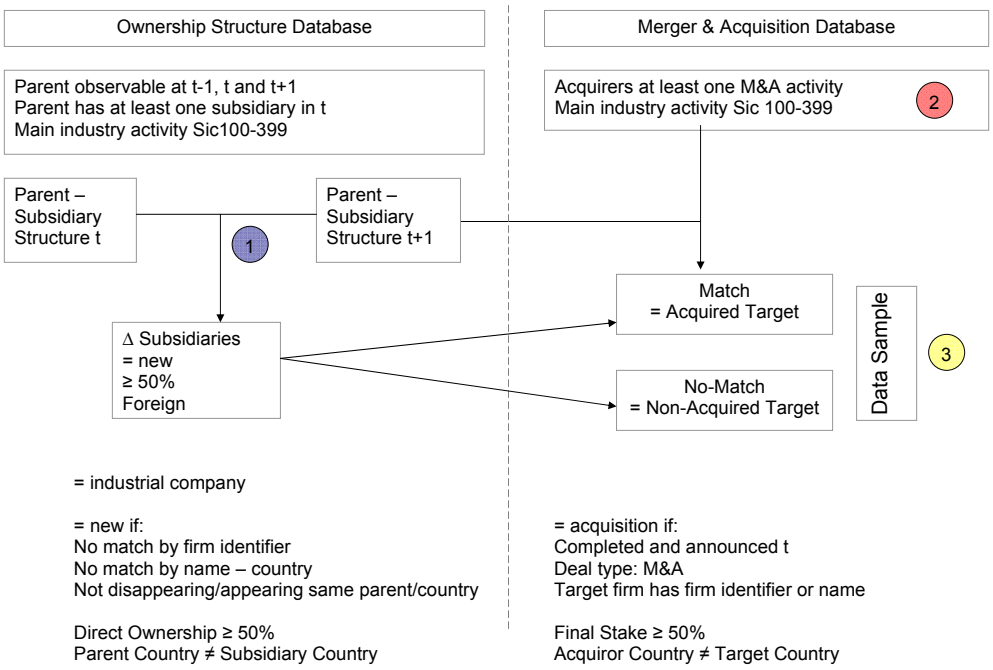
Osiris and Zephyr are offered by the same database provider Bureau van Dijk (BvD). Each firm is assigned a unique firm identifier, which is then used for both databases. Unfortunately firm identifiers for identical firms do not seem to match in all cases. We relied not only on matching firm identifiers but also resorted to name matching. From all the parent firms

[40] This step makes sure that *all* relevant merger & acquisition deals of a parent are included, even if for some reason we do not find a *'new'* subsidiary using the ownership structure between the two points of time. Less than 5% of all acquired subsidiaries account to this procedure.

having newly established subsidiaries only 5% cannot be linked to the merger and acquisition database. 10 firms have been selected randomly and their online annual reports have been searched to find indication if those firms should have been included in the merger database. The random sample for parent firms showed that those firms are indeed not acquiring firms. For those parent firms that have been matched between Osiris and Zephyr, all acquisition activities for targets are matched against the subsidiaries. This match has been performed by target/subsidiary firm identifier, target/subsidiary name and hand selection to account for spelling differences.

Figure 1 and table 8 provide a scheme of the selection rules and how the different data sources have been combined. The encircled numbers in the figure refer to the three different steps on how we have constructed the database. Step 1 refers to the raw data on ownership structure. Step 2 refers to the raw data from the merger and acquisition data base. Finally step 3 applies the selection rules to the ownership and acquisition data and results in the data sample that we base our estimations on. The table 8 shows the number of parent/subsidiary firms by parent home country at each step of the selection.

Figure 1: Construction of data base



Notes:
Figure shows the combination of different data sources. The encircled numbers correspond to the different steps.

C Analysis of ownership structure (step 1)

C.1 Descriptive statistics

Figure 2 looks at the ownership data before selection rules are applied and gives answers to the question how many subsidiaries do firms from Europe/USA have in general, how many domestic and how many foreign ones. How many of those subsidiaries do not observe an ownership change for the same parent, how many do observe an ownership change from within the year 2005. We observe that European parent firms have more than a third more subsidiaries than U.S. parent firms. The distribution of matched, new and divested subsidiaries is quite heterogenous across parent countries. Figure 3 seeks to answer the question concentrating on European/US parents, in which world region are their subsidiaries located? Do we observe regional differences with respect to the change in ownership of subsidiaries within the year 2005. European parent firms have most subsidiaries in Western Europe. Compared to

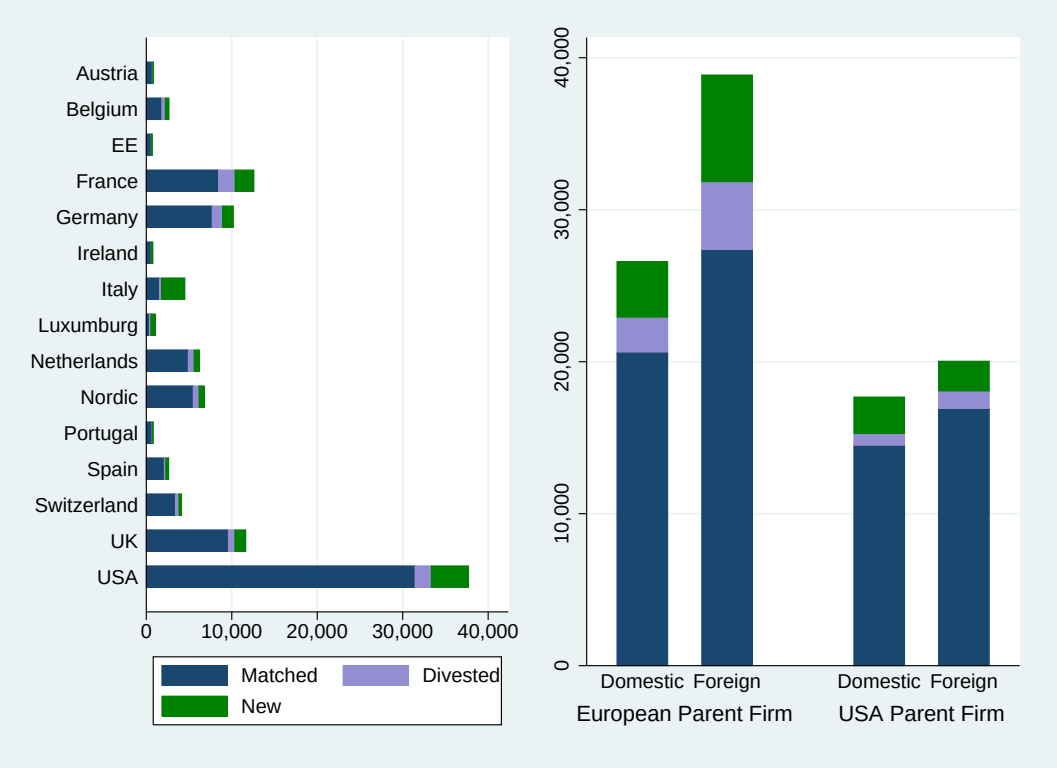
Table 8: Number of firms from different data sources

	Parent/ Acquirer	Subsidiary/ Target	Parent/ Acquirer	Subsidiary/ Target
Parent home country	USA		Europe	
Ownership data step 1	2,250	37,045	1,920	62,743
new entry	757	4,224	1,130	10,482
industrial firm	752	4,102	1,115	10,207
$> 50\%$ & not missing	701	3,613	917	5,077
Cross-country	378	1,518	667	3,576
Acquisition data step 2	1,583	2,765	2,555	3,881
Cross-country	492	721	1,068	1,736
Sample data step 3	302	1,465	591	3,346

Notes:
The tables indicates each step of the data base construction.
Step 1: Basic ownership structure. Step 2: Basic acquisition structure.
Step 3: Selection rules applied to basic ownership and acquisition structure.

U.S. parents, European parents have more subsidiaries in Eastern Europe. Surprisingly U.S. parent firms are not more engaged in Middle/South America than European multinationals.

Figure 2: Where do parent firms with subsidiaries come from?

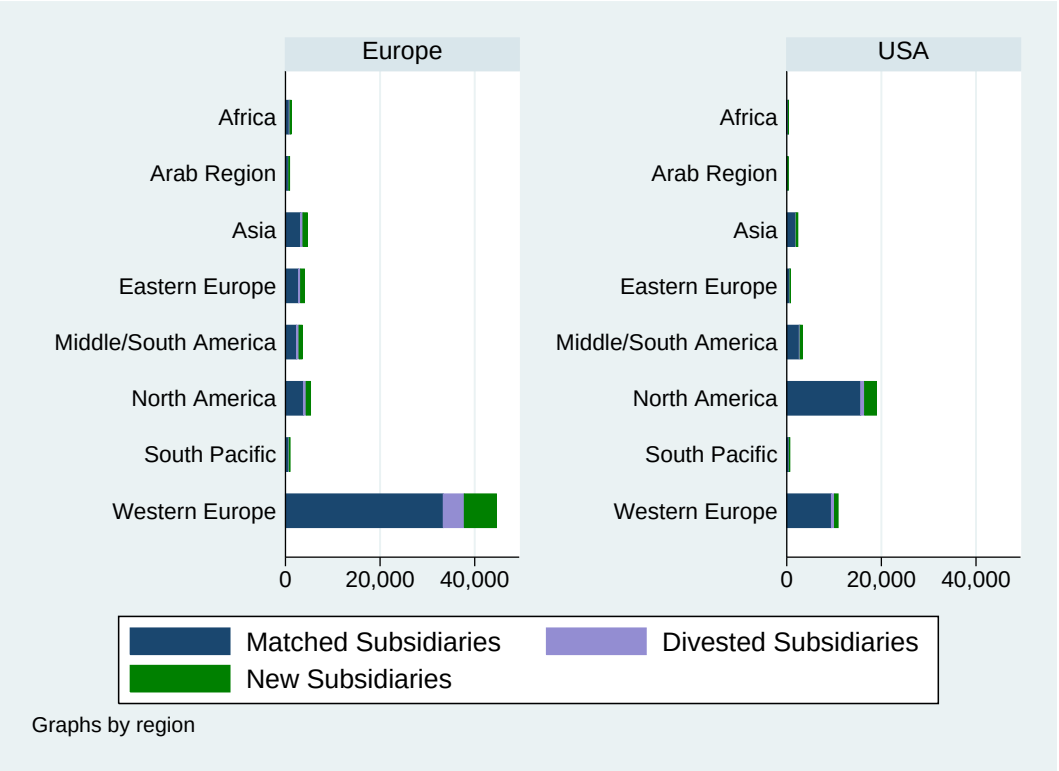


Notes:
Panel left shows subsidiaries matched, divested and new by parent origin country.
E.g. US parent firms have approx. 38,000 subsidiaries. Approx. 1/7 are new subsidiaries.
Panel right shows domestic/foreign subsidiaries matched, divested and new by parent origin country.
E.g. European parent firms have more than 39,000 foreign subsidiaries. 1/5 are new subsidiaries.
Matched subsidiary means that the subsidiary belongs in t and t+1 to the same parent.
Divested subsidiary means that the subsidiary belongs in t but not in t+1 to the same parent.
New subsidiary means that the subsidiary belongs in t+1 but not in t to the same parent.

C.2 Miss-classification of subsidiaries

Due to the lack of data on the incorporation date of subsidiary firms we resort to comparing the parent-subsidiary structure at two different point in time, to assess which subsidiary was newly established. One might be concerned that miss-matching of parent-subsidiary pairs between t and t+1 is an issue e.g. subsidiary B in a particular country is present in t and not in t+1. Therefore we classify B as a divested subsidiary. Subsidiary C of the same parent in the same country is not present in t but appears in t+1. We classify C as a new subsidiary. Unobserved to us - a name change/change in firm identifier causes B and C to be the same

Figure 3: Where do European/US parent firms have their subsidiaries?

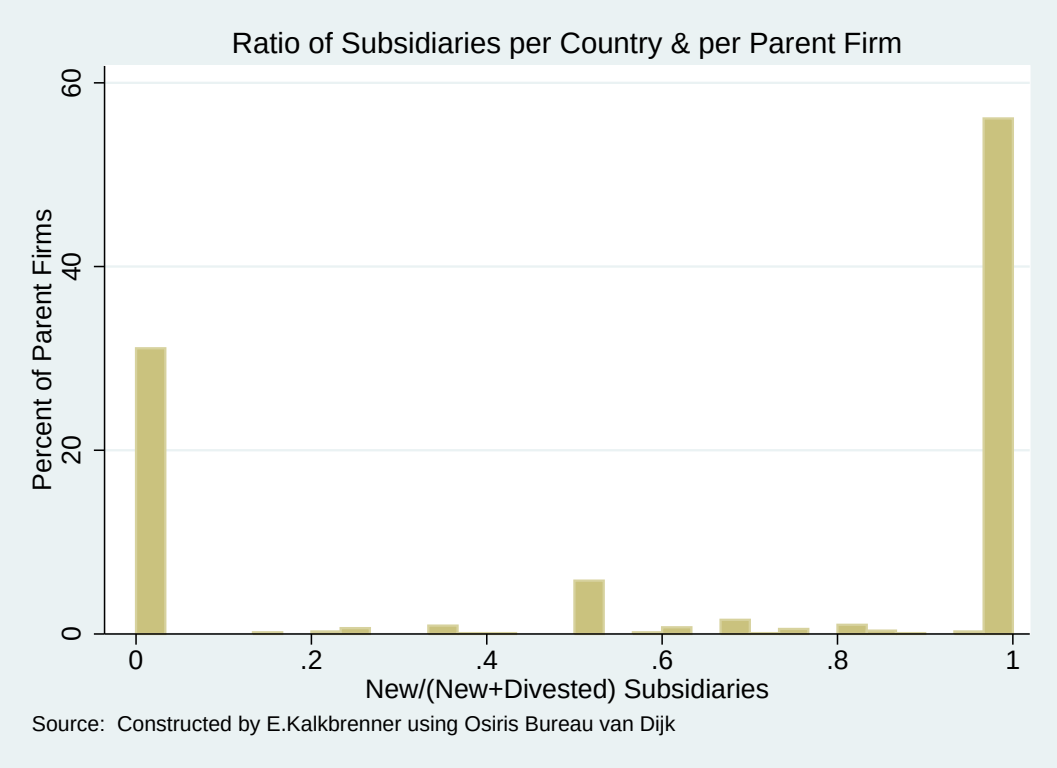


Notes:
The figure shows the regional distribution of all subsidiaries by parent origin country.
E.g. European parents have ca. 45,000 subsidiaries in Western Europe. Only 1/6 are new subsidiaries.
Matched subsidiary means that the subsidiary belongs in t and t+1 to the same parent.
Divested subsidiary means that the subsidiary belongs in t but not in t+1 to the same parent.
New subsidiary means that the subsidiary belongs in t+1 but not in t to the same parent.

subsidiary. If such cases are frequently observed in the data then the ratio of new over the sum of new and divested subsidiaries per country and parent firm would show an accumulation around the midpoint of the distribution (possibly bell shaped). We plot the ratio in figure 4 and find that most cases occur at the opposing ends of the distribution. We are not able to resolve the issue of renaming of subsidiaries as such, but conclude that miss-matching between new and divested subsidiaries within the same country and parent firm does not seem to be frequent.

Another concern is the classification of subsidiaries being acquired or a greenfield investment. A greenfield investment is a newly established subsidiary, which has not been acquired.

Figure 4: Are new subsidiaries in reality divested subsidiaries due to miss-matching?



Notes:
The figure shows the ratio of new/(new+divested) subsidiaries per country and parent firm.
Divested subsidiary means that the subsidiary belongs in t but not in t+1 to the same parent.
New subsidiary means that the subsidiary belongs in t+1 but not in t to the same parent.

How can it be verified if a subsidiary, which has not been acquired (according to the here presented methodology) is indeed a greenfield subsidiary? With respect to greenfield investments annual reports and business journals usually report investment expansions e.g. creating a new plant or increasing investment in a particular region. Such an investment might or might not go hand in hand with incorporating a new subsidiary. This makes it very difficult to verify if a subsidiary, which is a new subsidiary in the organizational structure of the firm (according to the Osiris ownership structure) is indeed a greenfield investment.[41] Not being acquired,

[41] Harsco announces 2004/2005 to expand its division line MultiServ in several regions such as in Guatemala, Mexico, United Kingdom and Spain. Using the here presented methodology, we find newly established greenfield subsidiaries belonging to the MultiServ division line in Guatemala, Mexico and Spain. Although quite likely that increased investment in a region is correlated with incorporating a new establishment in the region, we don't know for certain that those subsidiaries are indeed incorporated as greenfield start-ups.

means that for the same parent, we are not able to find a match in the merger database based on the subsidiaries name or firm identifier.

What - if not a greenfield investment - could those subsidiary mistakenly represent?

(a) The subsidiary is not new:

We observe approximately 25 parent firms for which more than 20 subsidiaries are newly established within the year period. This could either be a firm heavily expanding or a data entry problem in the ownership structure. Whereas the latter occurs in the case that the ownership structure of Osiris does not provide an exact account of the subsidiaries belonging to each parent at a particular point in time. Example: The ownership structure reveals that a parent firm, Harsco Corporation, has no subsidiary in Guatemala by the end of fiscal year 2004; but by the end of fiscal year 2005, Harsco owns a subsidiary in Guatemala called *Multiserv Guatemala SA*. According to the SEC 10-K filing of Harsco *Multiserv Guatemala SA* is a 100% owned subsidiary already by the end of fiscal year 2002. This results in a false classification of Harsco corporation subsidiaries as greenfield investments in 2005. If this is due to a data entry problem of the ownership structure of the parent firm, then several subsidiaries will appear to be newly established, when in reality they are not. Although such a database mistake is potentially observable, there is no reason to believe that such a database error is the result of a systematic pattern. Knowing the exact incorporation date of a subsidiary would certainly help. Due to the lack of this data, we resort to other data sources. The U.S. Securities and Exchange Commission requires publicly traded firms to disclose information among other things about their ownership structure (Ex.21 of the K-10 form to be filed); A list of subsidiaries/affiliates from the end of fiscal year 2004 was compared to the list from the end of fiscal year 2005. This allows us for a sample of US firms to verify if a subsidiary is indeed newly established within the applicable time period. Securities and Commission (2010) [42] The Amadeus database contains unlisted and listed

[42] U.S. parent firms sample background check:
Arch Chemicals Inc: none of the 4 new subsidiaries appear in SEC filings 31.12.2003. All subsidiaries can be found in the SEC filing of 31.12.2005.
Conocophillis: only 4 of the 25 new subsidiaries appear in SEC filings 31.12.2003 and have been dropped from the sample.
Federal Mogul Corp: none of the 42 new subsidiaries appear in SEC filings 31.12.2003. All subsidiaries can be

firms in Europe. Further it includes the incorporation year of firms. The last available Amadeus database to us (Amadeus disc 128) includes firms up to incorporation year 2004 (mostly up to 2003). As an additional consistency check we would expect a poor match of the subsidiaries in our sample to the Amadeus disc 128, as the firms in our sample should be incorporated after 2004. If we find the majority of subsidiaries matching the firms in the Amadeus disc 128, it would be an indicator that subsidiaries have been incorporated at a prior time and are therefore not newly established subsidiaries. Indeed we don't find a high percentage of matches (approximately 10%), suggesting that most of the European subsidiaries in our sample are not incorporated prior to 2004. The ones for which we found a positive match were then not included in the final sample.

(b) The 'greenfield' subsidiary is in fact an acquired subsidiary:

It is important to define what a greenfield investment really represents. The empirical applications in the literature differ with respect to the definition of greenfield investment. For the US, the Bureau of Economic Analysis provides firm-level survey data about all U.S. foreign affiliates above a certain size threshold detailing the mode choice of the affiliate Nocke and Yeaple (2008). Larimo (2003) defines greenfield investment as a start-up investment involving a new facility. He uses data drawn from annual reports, business journals and direct contacts with the firms. The exact definition was not provided. Bertrand et al. (2009) do not provide an explicit definition of greenfield investment but distinguish them from acquired affiliates using survey data on Swedish multinational firms. According to our definition a greenfield subsidiary is a subsidiary, for which we can not find a match in the acquisition data base. It is although possible not to find a match with an acquisition due to the fact that a re-arrangement of ownership hierarchy takes place. E.g. Firm A acquires firm B

found in the SEC filing of 31.12.2005.
Hewlett Packard: none of the 7 new subsidiaries appear in SEC filings 31.12.2003. 5 subsidiaries can be found in the SEC filing of 31.12.2005, 2 in SEC filing 31.12.2006.
European Parent firms background check:
Henkel KGAA: about one third of new 99 subsidiaries appear in SEC filings 31.12.2003 and have therefore been dropped from the sample.
UCB NV SA: none of the subsidiaries appear in SEC filings 31.12.2003. All subsidiaries can be found in the SEC filing of 31.12.2005. But one subsidiary was not recognized as being an acquired subsidiary (UCB NV SA (BE) acquires Celltech (GB) all new subsidiaries from the Celltech acquisition are coded as *acquired* but one subsidiary Medeva Pharma Suisse AG not.

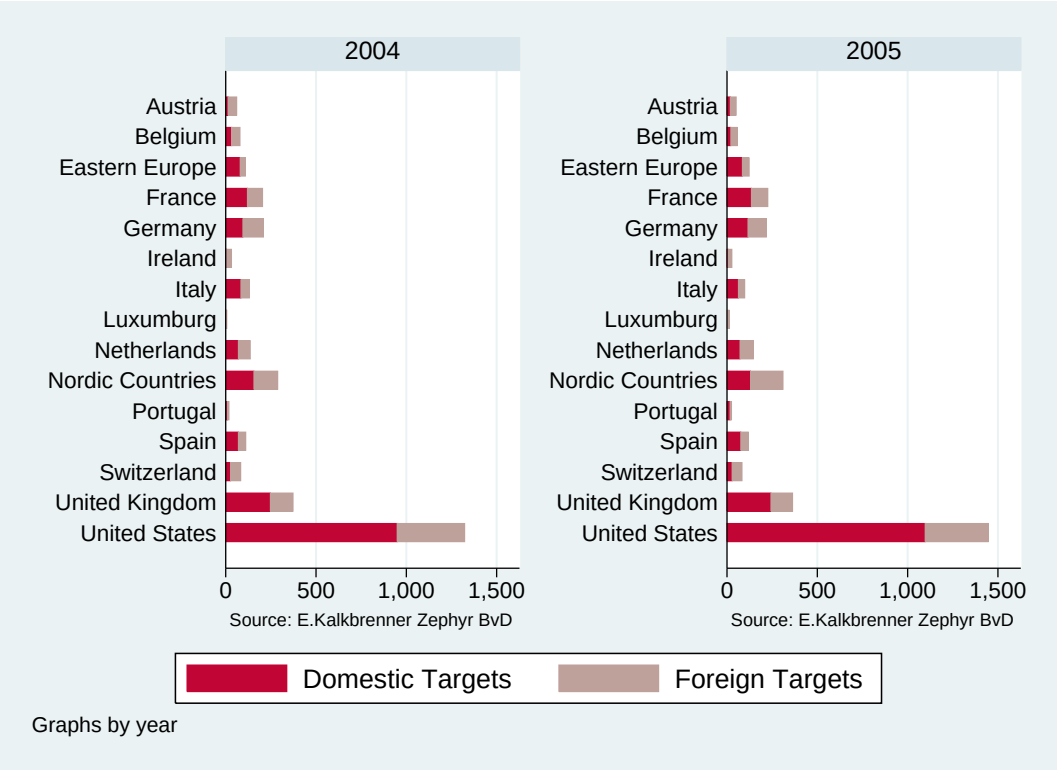
and firm C is a 100% subsidiary of firm B. After the acquisition Firm A changes the total ownership structure of the corporation and A now owns C directly. C does not show up for the acquisition of B by A. We would falsely classify C as a new subsidiary, which has not been acquired. This is indeed problematic, but we believe that on average corporations do not immediately after acquisitions change the ownership hierarchy and therefore don't believe in a systematic pattern creating such observations.

D Descriptive analysis of acquisition structure (step 2)

We use the Zephyr data base and select acquiring firms active in the tradable good industry and acquisition deals with a final stake of at least 50% in the year 2004 and 2005. We can observe the domestic and foreign acquisitions per parent country in figure 5. U.S. parent firms account for the majority of acquisition deals. Approximately two-thirds of acquisitions by U.S. parent firms are domestic, an indication that for future research domestic subsidiaries should not be neglected. With respect to European parent firms not surprisingly the UK shows the highest frequency of acquisition deals, whereby only a third involves a foreign target. Parent firms from Germanic and Nordic countries exhibit half of their acquisition deals being foreign targets.

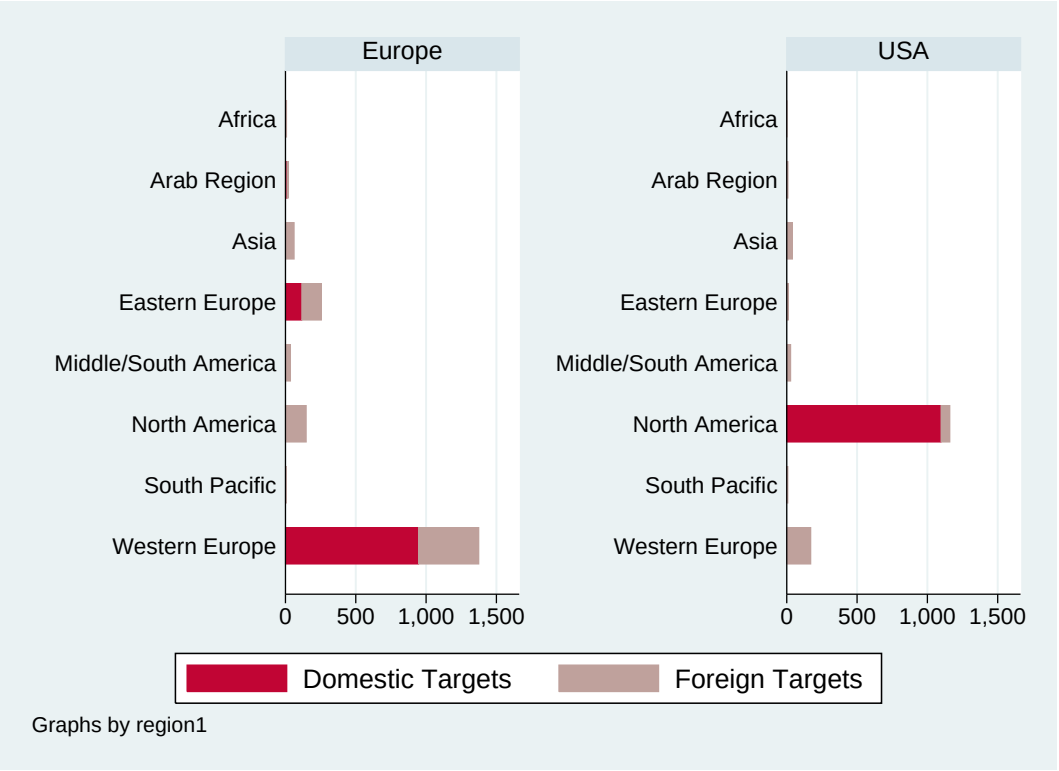
If we are interested in the question where are the target firms of U.S. and European parent firms located, figure 6 provides the answer. It shows that European parent firms acquire heavily in Eastern Europe domestically and foreign, in North America and predominantly in Western Europe. U.S. parent firms acquired predominantly in North America and to a much smaller extend in Western Europe. Surprisingly small is the acquisition frequency in Middle/South America and Asia.

Figure 5: How many domestic/foreign acquisitions do we observe per parent country?



Notes:
The figure shows the number of majority acquiring merger and acquisitions within 2004/2005 for parents from the manufacturing industry. We differentiates between domestic and foreign targets;
e.g. In 2005 US parent firms have acquired approx. 1,500 targets, 1/3 of it are foreign acquisitions.

Figure 6: What are the target regions of European/US acquiring parents?



Notes:
The figure shows the number of majority acquiring merger and acquisitions in 2005 for parents from the manufacturing industry by target region, differentiating by domestic/foreign acquisitions. E.g. European parents acquired approx. 1,400 Western European targets. 1/3 are foreign acquisitions.

References

P. Antras, M. Desai, and F. Foley. Multinational Firms, FDI Flows and Imperfect Capital Markets. *The Quarterly Journal of Economics*, 8:1171–1219, 2009.

J.R. Baldwin. The dynamics of industrial competition. *Cambridge University Press*, 1995.

O. Bertrand, K. Hakkala, and P.J. Norback. Cross-Border Acquisition or Greenfield Entry: Does it matter for Affiliate R&D. *Working Paper*, 2009.

R.E. Caves. Multinational Enterprise and Economic Analysis. *Cambridge University Press*, 1982.

S.J. Chang and P.M. Rosenzweig. The Choice of Entry Mode in Sequential Foreign Direct Investment. *Strategic Management Journal*, 22:747–776, 2001.

K.R. Cho and P. Padmanabhan. Revisiting the Role of Cultural Distance in MNC's Foreign Ownership Mode Choice. *International Business Review*, 14:307–324, 2005.

M.A. Desai, F.C. Foley, and J.R. Hines. Domestic Effects of the Foreign Activities of US Multinationals. *American Economic Journal: Economic Policy*, 1(1):181–203, 2009.

D. Dikova and A. van Witteloostuijn. Foreign Direct Investment Mode Choice: Entry and Establishment Modes in Transition Economies. *Journal of International Business Studies*, 38:1013–1033, 2007.

T. Dunne, M.J. Roberts, and L. Samuelson. Patterns of Firm Entry and Exit in U.S. Manufacturing Industries. *The RAND Journal of Economics*, 19(4):495–515, 1988.

K. Gugler, D.C. Mueller, and B.B. Yurtoglu. Corporate Governance and Determinants of Investments. *Journal of Institutional and Theoretical Economics*, 163:598–626, 2007.

E. Helpman, M.J. Melitz, and S.R. Yeaple. Export versus FDI with Heterogenous Firms. *American Economic Review*, 94(1):300–316, 2004.

A. Hortacsu and C. Syverson. Why do Firms own Production Chains? *Working Paper*, CES 09-31, 2009.

D. Kaufmann, A. Kraay, and M. Mastruzzi. Governance Matters VI: Aggregate and Individual Governance Indicators 1996-2006. *World Bank Policy Research Working Paper*, 4280, 2007.

B. Kogut and H. Singh. The Effect of National Culture on the Choice of Entry Mode. *Journal of International Business Studies*, pages 411–432, 1988.

J. Larimo. Form of Investment by Nordic Firms in World Markets. *Journal of Business Research*, 56:791–803, 2003.

J.R. Markusen. The Boundaries of Multinational Enterprises and the Theory of International Trade. *Journal of Economic Persepectives*, 9(2):169–189, 1995.

D.C. Mueller. The Corporation: Investment, Mergers and Growth. *Routeledge Studies in Business Organizations and Networks*, 25, 2003.

V. Nocke and S. Yeaple. Cross-Border Mergers and Acquisitions versus Greenfield Foreign Direct Investment: The Role of Firm Heterogeneity. *Journal of International Economics*, 72(2):336–365, 2007.

V. Nocke and S. Yeaple. An Assignment Theory of Foreign Direct Investment. *The Review of Economic Studies*, 75:529–557, 2008.

M. Paffermayer. Eyport Orientation, Foreign Affiliates, and the Growth of Austrian Manufacturing Firms. *Journal of Economic Behavior and Organization*, 54:411–423, 2004.

A. Rose. Which International Institutions promote International Trade? *Review of International Economics*, 13(4):682–698, 2005.

A. Rose. The Foreign Service and Foreign Trade: Embassies as Export Promotion. *World Economy*, 30(1):22–38, 2007.

A. Rose and M. Spiegel. The Olympic Effect. *Working Paper*, 2010.

U.S. Securities and Exchange Commission. Information about K-10 Filing, May 2010. URL `http://www.sec.gov/answers/form10k.htm`.

A. Slangen and J.F. Hennart. Greenfield or Acquisition Entry: A Review of the Empirical Foreign Establishment Mode Literature. *Journal of International Management*, 13:403–429, 2007.

J. Stiebale. The Impact of Foreign Acquisitions on the Investors' RD activities. *Ruhr Economic Papers*, 161, 2010.

K.E. Train. Discrete Choice Methods with Simulation. *Cambridge University Press*, 2009.

Penn webpage. World Penn Tables University of Pennsylvenia, May 2010a. URL `http://pwt.econ.upenn.edu/`.

Rose webpage. Andrew Rose Webpage University of Berkeley, May 2010b. URL `http://faculty.haas.berkeley.edu/arose/`.

S.R. Yeaple. Firm Heterogeneity and the Structure of U.S. Multinational Activity. *Journal of International Economics*, 78(2):206–215, 2009.

Essays on Multinational Corporations, Investment and Economic Performance

Esther Kalkbrenner[*†]

Abstract

The dissertation investigates the economic relationship between subsidiary and parent firms. Subsidiaries and their parent firms are economic entities tied together by varying degrees of ownership. This special structure allows for within the firm corporate governance transfers and investment streams that influence the performance of the group-firm as a whole. A variety of data sources was used to construct a firm-level data set consisting of subsidiary firms and their corresponding parent firms. Such a data set allows investigation of important economic questions. Several econometric methods are applied to obtain empirical estimates documenting the underlying dynamics between subsidiaries and parent firms. Three lines of questions have been studied and are presented in separate chapters.

The first one asks the question, what determines the investment performance of group firms?[1] Do subsidiaries belonging to a group of firms behave differently in their investment behavior compared to stand-alone firms. We derive empirical predictions from the standard investment cash flow framework on the functioning of internal capital markets. We test these predictions using a data set of parent firms and their listed and unlisted subsidiaries in 82 countries over the period 1988-2005. In the presence of capital market imperfections subsidiaries are able to benefit from their group structure by accessing capital funds provided by parent firms. Furthermore the study reveals that company and country institutional structures matter.

[*]University of Vienna, Department of Economics, Brünner Straße 72, A-1210 Vienna; e-mail: esther.kalkbrenner@univie.ac.at

[†]I would like to thank my two advisors Prof. Dennis Mueller and Prof. Klaus Gugler for all their inspiration and great advice. Thanks goes also to Prof. Christine Zulehner for her valuable suggestions. I am grateful to Prof. Maarten Jansen and all seminar participants at the graduate seminar of the University of Vienna for helpful comments.

[1]'The Effects of Ownership and Institutional Quality on Internal Capital Markets: Cross-Country Evidence' Co-authored: K.Gugler, E.Kalkbrenner and E.Peev.

Another set of questions concern the institutional determinants of subsidiaries' performance.[2] The quality of country institutions has an important impact on a firm's performance. We use a country-specific measure for institutional quality, which is based on six time varying dimensions: Voice and accountability, rule of law, regulatory quality, control of corruption, governmental efficiency and political stability. Firms belonging to a group of firms originating in different institutional backgrounds are exposed to influences from different countries with varying degrees of institutional quality. Is it the institutional quality in the parent firms country that affects the performance of a subsidiary, the institutional quality in the subsidiary's country that is important, or both. We utilize the data set of more than 23,000 listed and unlisted subsidiaries of parent firms worldwide over the period 1994-2005. The results indicate that good institutions (measured by a worldwide governance indicator) lead to better performance for subsidiaries of parent firms. A transfer of good corporate governance by parent firm to its subsidiaries can be observed.

Yet the third line poses the question: Do we observe differences in multi-national firms depending on how they choose their market entries in foreign markets?[3] Multinational firms expand their firm's reach into new markets through acquisition of existing assets, namely investment through merger & acquisition (M&A), or through investment in new assets, namely greenfield investment. Those two entry modes are types of foreign direct investment (FDI). Accurately differentiating between M&A activities and other FDI strategies is important for a number of reasons. First, such events represent a substantial restructuring of economic activity for both the parent and the subsidiary firm. Secondly, the entry strategy might be directly correlated with characteristics of the host country e.g. countries with high institutional quality may attract more of one type of entry decisions by the parent. A new and unique method of constructing a data base, which allows to differentiate between acquired and non-acquired subsidiaries, is presented. The study reveals that the determinants for the entry decision of parent firms is different if they are located in the U.S.A. or in Western Europe. Higher institutional development in the host country increases the probability of entry through an acquisition investment relative to a greenfield investment.

[2] 'Institutional Determinants of Domestic and Foreign Subsidiaries' Performance'
Co-authored: K.Gugler, E.Kalkbrenner, D.C.Müller and E.Peev.

[3] 'Acquired versus Non-Acquired Subsidiaries - Which Entry Mode do Parent Firms Prefer?'
Single-authored: E.Kalkbrenner.

Essays on Multinational Corporations, Investment and Economic Performance

Esther Kalkbrenner[*†]

Zusammenfassung

Die einzelnen Forschungsfragen dieser Dissertation untersuchen verschiedene Aspekte der wirtschaftlichen Beziehungen zwischen Mutter- und Tochtergesellschaften. Eine Tochtergesellschaft ist ein rechtlich unabhängiges Unternehmen, welches allerdings in einer wirtschaftlichen Kontrollbeziehung, abhängig vom Anteilsbesitz, zu einem Mutterkonzern steht. Aufgrund dieser Konstellation kann eine abgestimmte Unternehmensführung die wirtschaftliche Gebarung des gesamten Unternehmenskonzerns beeinflussen. Um Fragestellungen dieser multinationalen Konzerne empirisch zu untersuchen, wurde eigens eine Datenbank geschaffen. Diese Datenbank verknüpft Informationen über Mutter- und Tochtergesellschaften anhand des Anteilsbesitzes der Mutterkonzerne. Wir können damit auf Firmenebene die wirtschaftlichen Investitionsströme darstellen. Im Wesentlichen werden drei Fragestellungen aufgeworfen und mit Hilfe von ökonometrischen Modellen empirisch analysiert.

Die erste Frage, die sich stellt, ist, welche Faktoren den Gesamterfolg einer Konzerngruppe beeinflussen und ob Tochtergesellschaften eine andere Investitionsstrategie verfolgen als allein operierende Unternehmen. [1] Wir stellen dabei mehrere Hypothesen über die innerbetrieblichen Kapitalströme auf, die auf den Grundsätzen der 'Investment Cash-Flow' Literatur basieren. In der Folge testen wir diese Hypothesen mit Hilfe des erstellten Datensatzes, welcher sowohl börsennotierte als auch nicht börsennotierte Unternehmen in 82 Ländern über einen Zeitraum von 1988-2005 beinhaltet. Im Falle von Spannungen im externen Kapitalmarkt profitiert eine Tochtergesellschaft von der Zugehörigkeit zu einem Konzernverbund, indem der Mutterkonzern benötigte Geldmittel zur Verfügung stellt. Die Studie zeigt, dass sowohl die Konzernstruktur als auch die institutionellen Rahmenbedingungen großen Einfluss auf ein Tochterunternehmen haben.

[*]University of Vienna, Department of Economics, Brünner Straße 72, A-1210 Vienna e-mail: esther.kalkbrenner@univie.ac.at

[†]Ich möchte mich bei meinen Betreuern, Prof. Dennis Mueller und Prof. Klaus Gugler, für viele Gedankenanregungen und umfassede Unterstützung bedanken. Vielen Dank auch an Prof. Christine Zulehner für zahlreiche Ratschläge bezüglich meiner Forschungsarbeit. Desweiteren bin ich dankbar für vielfältige Diskussionen mit Prof. Maarten Jansen und den Teilnehmern des Graduierten Seminars an der Universität Wien.

[1]'The Effects of Ownership and Institutional Quality on Internal Capital Markets: Cross-Country Evidence' Autoren: K.Gugler, E.Kalkbrenner, E.Peev.

Die zweite Fragestellung konzentriert sich auf die institutionellen Rahmenbedingungen von Ländern, welche als Standort für Tochtergesellschaften gelten.[2] Wir verwenden eine Messgröße für institutionelle Qualität, welche sich aus den folgenden sechs Dimensionen zusammensetzt: Mitsprache und gesetzliche Haftpflichten, Rechtsstaatlichkeit, Korruptionsbekämpfung, Qualität der staatlichen Regulierungsmaßnahmen, Regierungseffizienz und politische Stabilität. Die Qualität staatlicher Institutionen beeinflusst die wirtschaftliche Gestaltbarkeit von Unternehmen. Firmen innerhalb eines globalen Unternehmensnetzwerks sind von den Wirkungsbereichen verschiedener, zum Teil unterschiedlich entwickelter Institutionen betroffen. Bezüglich der Wirtschaftlichkeit von Tochterunternehmen stellt sich die Frage, wessen Institutionen für den Erfolg ausschlaggebend sind. Sind es die Institutionen des Landes, in welchem die Tochtergesellschaft operiert, sind es die Institutionen des Landes der Muttergesellschaft, oder sind es gar beide? Mit Hilfe eines Datensatzes von 23,000 weltweit agierenden, börsennotierten und nicht-börsennotierten Unternehmungen untersuchen wir diese Fragestellung. Die Ergebnisse zeigen, dass Länder mit starken Institutionen sich positiv auf die Wirtschaftlichkeit von Tochtergesellschaften auswirken. Außerdem kann man einen Transfer von 'good corporate governance' von der Muttergesellschaft auf die Tochtergesellschaft beobachten.

Das dritte und letzte Kapitel wirft die Frage auf, ob multinationale Unternehmungen aufgrund ihrer Standortwahl unterschiedliche Formen des Markteintrittes wählen.[3] Multinationale Unternehmen können entweder durch den Kauf von bestehenden Vermögenswerten, Merger & Acquisition (M&A), oder durch die Neugründung von Firmenobjekten, Greenfield Investment, in neue Märkte eintreten beziehungsweise ihren Marktauftritt ausbauen. Eine neuartige Methode zur Herstellung eines Datensatzes wird vorgestellt, sodass die Form des Markteintritts von Tochtergesellschaften beobachtet werden kann. Wir stellen das Investitionsverhalten von Mutterkonzernen aus den U.S.A. und Europa gegenüber. Die Ergebnisse sagen aus, dass eher unprofitable U.S. Mutterkonzerne sich dafür entscheiden, Tochtergesellschaften zu akquirieren anstatt solche neu zu gründen. Dieses Ergebnis kann jedoch nicht als solches direkt auf westeuropäische Mutterkonzerne übertragen werden. Sowohl für U.S. als auch für westeuropäische Mutterkonzerne spielt die Güte der Institutionen im Gastgeberland eine entscheidende Rolle.

[2] 'Institutional Determinants of Domestic and Foreign Subsidiaries' Performance' Autoren: K.Gugler, E.Kalkbrenner, D.C.Müller and E.Peev.

[3] 'Acquired versus Non-Acquired Subsidiaries - Which Entry Mode do Parent Firms Prefer?' Autor: E.Kalkbrenner.

Esther **KALKBRENNER**

PROFESSIONAL EXPERIENCE

Department of Economics, University of Vienna, Vienna, Austria — March 2010 – present
NRN Labor Economics and the Welfare State, Research Assistant

Institute for Higher Studies, Vienna, Austria — Oct. 08 – Feb 2010
NRN Labor Economics and the Welfare State, Research Assistant

Department of Economics, University of Vienna, Vienna, Austria — Oct. 06 – Sept. 2008
Research Assistant Prof. Dennis C. Mueller

United Nations Office for Project Services (UNOPS), New York, USA — Oct. 03 – May 06
Project Manager

EDUCATION

University of Vienna, Vienna, Austria — Oct. 2006 – Oct. 2010
PhD Economics

University of Berkeley, Berkeley, CA, USA — Jan. – May 2010
Visiting Researcher

University Pompeu Fabra, Barcelona, Spain — Sept. 01 – Dec. 03
Master of Advanced Studies (MAS)

Leopold-Franzens University, Innsbruck, Austria — Oct. 95 – Dec. 00
Master International Business and Economics (Mag.rer.soc.oec.)

Murdoch University, Perth, Australia — Feb. 98 – March 99
Visiting Student

TEACHING

University of Vienna	Introduction to **Micro** Economics	SS 2007, 2008, 2009 WS 2009
	Introduction to **Macro** Economics	WS 2007/08, 2008/09
Diplomatic Academy of Vienna	**Econometrics** Quantitative Methods in Economics	WS 2008/09

CONFERENCES/WORKSHOPS

EALE, Praque, Czech Republic — September 2006

EARIE, Valencia, Spain — September 2007

EARIE, Toulouse, France — September 2008

NoeG, Vienna, Austria — May 2008

COST "Evaluation Methods", Paris, France — May 2008

DEMO, Barcelona, Spain — June 2009

IFS "New Developments in Econometrics", London, UK — June 2009

EARIE, Ljublinana, Slovenia — September 2009

AWARDS

Economics Award by Austrian Federal Economic Chamber — November 2001

Postgraduate Scholarship by Austrian Ministry of Education — Mai 2001

Berkley Program by Marshall Plan Foundation — September 2009