

# Headquarters versus Subsidiary Profitability: Evidence for a Parent Bias and Implications

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## Abstract

Using a large panel of European firms, this paper provides evidence that multinational headquarters are significantly more profitable than their foreign subsidiaries. The effect turns out to be robust and quantitatively relevant, indicating the profitability gap to be around 65%. We rationalize the parent bias with agency and information costs faced by the central management at the parent firm if value-driving assets and functions are managed by a geographically distant subsidiary. In line with falling communication and travel costs over the last decade, the profitability gap between parents and subsidiaries is shown to have closed by around 15% over our sample period (1999-2006). Our results may have important implications for public economic policy since e.g. corporate tax payments are thus found to be higher at the headquarters location and multinational parents in high-tax countries tend to be less prone to profit shifting behavior.

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# 1 Introduction

The globalization of economies over the last decades has led to a surge in the numbers and types of international transactions whereas few developments have been as pronounced as the rise in the activity of multinational enterprises (MNEs). Thus, it is well known that today more than one third of international trade is intra-firm trade and that foreign direct investment figures surge year by year, having sextupled since the early 1990ies (OECD World Economic Outlook 2008).

Many multinational firms moreover do not only operate sales offices abroad but organize their whole set of activities across national borders "slicing up the value chain, breaking a production process in many geographically separated steps" (Krugman, 1995). Thus, MNEs are increasingly perceived to undertake a wide array of functions in foreign countries, from research and development activities, over production to distribution and marketing operations.

The different stages of the production process do however not necessarily contribute in equal shares to the MNE's ability to earn profits and create value. In the contrary, the profit potential of corporations is perceived to be more and more tied to a small number of value-driving functions and assets. Specifically, since the enhanced mobility of capital across borders has reduced the scarcity of capital inputs in the production process, the profit potential of corporations is less driven by a cost-efficient use of capital inputs but increasingly depends on firm-specific capabilities, especially knowledge and marketing related functions (see e.g. Zingales, 2000; Hall, 2001; Nocke and Yeaple, 2007). Consequently, in many firms the return earned on patents and trademarks dwarfs the profits which are generated with the actual production of the goods.<sup>1</sup>

The purpose of this paper is to investigate at which affiliate within the multinational group these value-driving functions are located. Specifically, we will focus our analysis on the role of the multinational headquarters. While theories on the fragmentation of production across national borders suggest that value-driving functions may be located at any of the multinational affiliates, theories on *horizontal* and *vertical* FDI implicitly suggest that key value-driving (*headquarters*-) functions remain at the parent firm and only standard operating functions are run by foreign subsidiaries. An alternative view on the same theme is that after accounting for standard operating functions, the

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<sup>1</sup>Alternatively to the fragmentation of production functions across national borders, one may think about different product lines which require product-specific production plants that are mobile across countries and may differ in their expected profitability (see e.g. Nocke and Yeaple, 2007).

residual of profits earned in the group are assigned to the corporate unit that bears the project risk which anecdotal evidence suggests to be the corporate headquarters in many cases. The theoretical business economics literature rationalizes this home bias in the location of profitable and risk-taking functions by positive control costs faced by the central management if it had to monitor value-driving operations at a foreign subsidiary (see Chang and Taylor, 1999; Hamilton and Kashlak, 1999; O'Donnell, 2000) since intra-firm communication becomes more cumbersome with physical separation.<sup>2</sup>

Despite some anecdotal evidence, the economic literature has surprisingly to the best of our knowledge so far neglected to test and quantify this headquarter bias in a rigorous econometric framework. The purpose of this paper is to fill this gap and to empirically assess whether there is a tendency to keep or locate value-driving assets and functions at the multinational headquarters which would result in a higher profitability of parent firms compared to their foreign subsidiaries.

We test our *parent bias* hypothesis using a panel of about 25,400 multinational affiliates from 27 European countries for the years 1999 to 2006 from the AMADEUS database. The results indicate a robust and highly significant profitability gap. Precisely, multinational parent firms exhibit a higher unconsolidated *gross profit margin* (profit before tax per sales) and *EBIT margin* (earnings before interest and tax per sales) than their foreign subsidiaries. Our most preferred specification suggest parents to be by around 65% more profitable than their corporate subsidiaries. This result is robust against the inclusion of a large set of control variables, precisely the capital, labor and leverage intensity at the affiliate level, firm age, time-varying country control variables and a full set of fixed effects for the multinational groups, 2-digit industries, countries and sample years. Moreover, our result turn out to be quantitatively robust to the use of alternative profitability measures.

Furthermore, we provide evidence that the *parent bias* of profits diminishes over the sample period (1999-2006). We explain this by a reduction of communication and travel costs over the last decade which leads to lower agency costs of controlling affiliates abroad. Our estimations show that the higher parent profitability decreases every year by about 2 percentage points. Thus, the profitability gap between parents and subsidiaries is shown to have closed by around 15% over our sample period as the profitability of subsidiaries increases significantly faster over time than the profitability of their foreign parents. This observation can additionally be motivated by an increasing trend in the recent years to offshore white-collar services to foreign subsidiaries (see

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<sup>2</sup>Moreover, empire building and prestige effects may reinforce this effect.

e.g. Blinder, 2006) comprising both, standard operating functions like book-keeping or customer services as well as functions which contribute more strongly to the corporate value of the MNE like R&D or royalty departments. While the existing literature has mainly discussed the effects of enhanced offshoring tendencies on white-collar workers (e.g. Bhagwati et al., 2004; Mankiw and Swagel, 2006), we are, to the best of our knowledge, the first paper to address the interrelation between those tendencies and the profit distribution within MNEs.

Moreover, we investigate whether the *parent bias* is restricted to an international context only or if it equally affects the location of profits within domestic groups. To do so, we reestimate our baseline specifications in an AMADEUS sample of national groups, i.e. parent firms and their *domestic* subsidiaries. The agency cost reasoning for our observation of the *parent bias* should also be observed, to a smaller extent, for headquarters and their domestic subsidiaries. This is confirmed by our regressions. The estimated profitability gap of parents versus their *domestic* subsidiaries is around 25%. Hence, this gap is more than doubled for multinational firms indicating a significantly higher level of agency costs if value-driving assets or profits, respectively, are located at a subsidiary abroad.

Our results may have implications for several areas of research and policy making. One of the most straightforward implications is related to public economic policy since our findings suggest that governments at the headquarters location receive a higher tax base per unit of corporate activity. We test this by regressing an affiliate's tax payments on a parent dummy variable and a set of controls and find that parent firms - as expected - report about 60% higher tax payments per sales than their subsidiaries. Thus, countries tend to profit more from hosting the headquarters of a MNE than from hosting its subsidiaries. This predicts corporate tax competition to be fiercer in tax instruments that specifically attract parent firms (like e.g. double taxation relief granted) and may rationalize government policies to create national champions by intervening in international merger and acquisition (M&A) activities. Both points have not yet been raised in the literature. In a companion paper (Dischinger and Riedel, 2009b), we moreover show that parent firms in high-tax countries are less prone to profit shifting activities since they are reluctant to shift profit away from their corporate headquarters.

The paper is structured as follows. In Section 2, we provide a theoretical motivation for our analysis, Section 3 describes our data set. In Section 4, we present our estimation methodology. The estimation results with robustness checks are provided in Section 5, the results for corporate tax payments in Section 6. Section 7 concludes.

## 2 Theoretical Considerations

This section sketches the simple theoretical idea underlying our empirical analysis. We consider a MNE whose production process is divided into a value chain with several functions, comprising for example manufacturing, logistics, marketing and the distribution of the products as well as general business services like R&D, administration activities and management services. This notion of the production process as a value chain has been especially popular in the literature on business strategy following the influential work of Porter (1998).<sup>3</sup>

Key idea to our paper is that the different corporate functions may not equally add to the value of the output and henceforth to the value of the firm. The distribution of the final product to the consumer might, for example, contribute less to the overall profit of a corporation than the corporate marketing activities. Moreover, there may not only be heterogeneity in the profit contribution of different corporate functions but analogously in the profit contribution of different *product lines* with some earning more profits than others. This concept of project selection to different multinational locations has been discussed for example in Becker and Fuest (2007).

There is a common notion that the drivers of corporate value have changed over the last decades (see e.g. Zingales, 2000). While traditionally firm value has been created by employing scarce capital resources cost-efficiently within the manufacturing process, the surge in the mobility of capital across national borders has reduced its scarcity and the value of a firm is perceived to be increasingly tied to knowledge and marketing functions like R&D or advertisement (Hall, 2001; Nocke and Yeaple, 2007). An illustrative example for this type of corporation are pharmaceutical companies which create substantial corporate value through the development of new medicine patents and their successful placement of the drugs in different consumer markets whereas the return to the manufacturing process is tiny. Applying this notion of the production process to MNEs which operate in several countries and may organize their production process across national borders, raises the question at which of the multinational locations the value-driving corporate functions are located. The purpose of our paper is to shed some light on that issue.

In the theory on *horizontal* FDI, the notion is that production is undertaken in foreign markets to save on transport costs if the goods were manufactured in the

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<sup>3</sup>Moreover, our analysis implicitly follows the literature on the boundaries of the firm in assuming that business functions cannot be outsourced to third parties due to contracting problems.

home country and exported to the foreign markets. In contrast, the theory of *vertical* FDI suggests that the production function is undertaken in a foreign country to exploit factor price differences and reduce manufacturing costs. Both theories implicitly suggest that only *standard* operating functions are outsourced to foreign subsidiaries while the corporate value drivers, often for example the R&D, product design and marketing departments, remain with the parent firm location. The headquarters thus receives the residual profits of the multinational group while commonly only profits for standard operating functions are assigned to the subsidiaries. This mechanism is likewise reflected in accounting practice where the good-will is assigned to the parent firm. Accounting firms in practice often operate a profit-split method where the easily quantifiable return on standard operating functions is assigned to the specific operating departments while the residual profits are assigned to the *risk-bearing* corporate unit, and thus usually to the corporate headquarters.

In the business economics literature, the lack in the MNEs' willingness to offshore value-driving corporate assets or functions or product lines abroad is usually explained with agency and information costs faced by the central management at the headquarters location if these assets or functions were run abroad. The notion behind this is that physical distance hampers the communication within the multinational group and poses difficulties to monitoring activities (see e.g. Chang and Taylor, 1999; Hamilton and Kashlak, 1999; O'Donnell, 2000).<sup>4</sup> This would generate higher profitability ratios at the headquarters. We call this the *parent bias effect* which distorts intra-group profits in favor of the parent company. In addition, this *parent bias* of profits may likewise be reinforced by a prestige effect (cf. empire building) of the managers at the headquarters which prefer a better performance at their location compared to the independently managed foreign subsidiaries, e.g. to negotiate higher wages. As the headquarters are the superior authority, their managers can enforce such an allocation of profitable assets and functions.

However, in recent years, the technological development, especially the rising importance of the internet and the mobile phone network, have weakened this agency problem since communication and travel costs have been reduced substantially (see e.g. Freund and Weinhold, 2002). In line with this development, the recent years have seen a rising number of anecdotal evidence suggesting an increasing trend to offshore white-collar services to foreign subsidiaries (see e.g. Blinder, 2006) comprising both, standard operating functions like book-keeping or customer services as well as functions

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<sup>4</sup>Furthermore, La Porta et al. (1999), analyze the widespread organizational form of *corporate pyramids* which are strongly associated with agency problems.

which are perceived to contribute more strongly to the corporate value of the firm like R&D and trademark management departments.<sup>5</sup> Therefore, we expect an decrease in the intensity of the *parent bias* in the last decade.

Summing up, we can conclude that our analysis predicts parent firms to exhibit a higher profitability than their subsidiaries. Moreover, this profitability gap is predicted to decline over time, mainly due to a reduction in communication and travel costs. In the following, we will empirically assess these hypotheses.

### 3 Data

We use the commercial database AMADEUS which is compiled by Bureau van Dijk. The version of the database available to us contains detailed information on firm structure and accounting of national and multinational corporations in Europe. We focus on 27 European countries<sup>6</sup> and on the time period of 1999 to 2006 as these countries and years are sufficiently represented by the database. One major advantage of the AMADEUS data is that it allows to link the subsidiary accounting information to information on its parent firm and vice versa.

Our baseline sample includes *multinational affiliates* that observe *at least one wholly-owned ownership link to a foreign country* worldwide: i.e., upwards via an foreign immediate shareholder (with 100% of the ownership shares), or downwards via at least one wholly-owned foreign subsidiary. Thereby, we define a *multinational parent firm* to be the global ultimate owner, i.e. there exists no (further) shareholders of this firm, of at least one wholly-owned foreign subsidiary. On the contrary, a firm is labeled as a *multinational subsidiary* if it exhibits a foreign immediate shareholder with 100% of the ownership shares. Our so defined *multinational subsidiaries* are allowed to have (further) subsidiaries themselves, however this is not decisive for our qualitative results. As a sensitivity check, we rerun our regressions including only subsidiaries which do not own any subsidiaries themselves which just slightly increased the quantitative estimate of our parent effect, as expected. The country statistics of our sample are presented in Table 1 in the Appendix.<sup>7</sup>

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<sup>5</sup>Moreover, in Dischinger and Riedel (2008), we provide evidence of locating intangible assets at subsidiaries in countries with a relatively low corporate tax rate.

<sup>6</sup>Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland, Ukraine.

<sup>7</sup>The reason why we do not observe subsidiaries for Ireland and Switzerland is that for these

We restrict our analysis to firms with a positive pre-tax profit. This is partly justified by the strong skewness of the profit distribution which suggests to take the logarithm of the variable to mitigate the effect of outliers. Moreover, restricting the focus to firms with a positive profit avoids that we have to deal with different legislations for loss offsets like loss carry-forward and loss carry-backward legislations while explaining different levels of profits or profitability. However, as a robustness check, we reran our analysis including firms with negative profits and did not find qualitatively different results.

The observational unit in our analysis is the multinational affiliate, i.e. a parent or a subsidiary, per year. In total, our baseline sample comprises 107,930 observations from 25,393 affiliates for the years 1999 to 2006 belonging to 18,531 multinational groups. Hence, on average, we obtain 5.8 observations for each group. 49.1% of the observations in our sample are for parent firms. This number may seem surprisingly high but it simply reflects the fact that our data does not only comprise corporate groups for which we observe both, the parent firm as well as one or several subsidiaries. In contrast, our data equally includes multinational groups for which we observe either the parent firm or the subsidiary in our data set. Since many firms in our data are parents with subsidiaries outside of Europe (which then are not covered by AMADEUS), the fraction of parent firms in our sample is quite large. Obviously, multinational groups for which not both parent firms and at least one subsidiary are included in the data set do not contribute to the identification of our parent effect. However, they nevertheless improve the estimation of the remaining (time-varying) coefficients which is the reason why we left them in the sample. In the sub-sample of multinational groups for which both the parent firm and at least one subsidiary is available, the fraction of parent firms is estimated with a moderate 23.5%.

Finally, to control for country characteristics, we merge data on GDP, GDP per capita, a corruption index and the statutory corporate tax rate.<sup>8</sup> Table 2 in the Appendix displays basic descriptive sample statistics.

On average, the affiliates in our sample observe a pre-tax profit of 18.6 million US dollars, fixed asset investments of 154.3 million and sales of 191.9 million US dollars.

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countries the cost of employees variable from the AMADEUS database applied in the regressions is missing in most cases.

<sup>8</sup>The statutory tax rate data is taken from the European Commission. Country data for GDP and GDP per capita are obtained from the IMF World Economic Outlook Database October 2008. The Corruption Perceptions Index (CPI) is taken from Transparency International (TI) and ranks from 0 (extreme level of corruption) to 10 (free of corruption).

The average firm employs 565 workers. The median of the distributions is substantially smaller for all three variables. The average *gross profit margin* (i.e. profit before tax, per sales) and *EBIT margin* (i.e. earnings before interest and tax, per sales) is estimated with 2.32 and .1024 respectively, whereas again the median of the distributions is substantially smaller (.0585 and .0576 in both cases).

The sample characteristics substantially differ between parent firms and subsidiaries. First, parent firms tend to be larger than their subsidiaries with an average fixed assets of 285.4 million US dollars and a median of 8.61 million (versus an average fixed asset investment of 27.7 million and a median of 0.60 million US dollars at the subsidiary level). Moreover, the descriptive statistics already indicate parent firms to be more profitable than their subsidiaries since since the median of the gross profit margin and EBIT margin at the parent level is estimated with 6.39% and 6.05% respectively, while the median of these ratios at the subsidiary level are 5.43 and 5.49 respectively and thus significantly lower. The next section will investigate whether this descriptive pattern prevails in a more rigorous econometric framework.

## 4 Estimation Approach

We estimate an empirical model of the following form

$$\log \pi_{ijt} = \beta_0 + \beta_1 PARENT_{ijt} + \beta_2 X_{ijt} + \phi_j + \rho_t + \epsilon_{ijt} \quad (1)$$

whereas  $\pi_{ijt}$  represents the profitability measure of affiliate  $i$  belonging to multinational group  $j$  at time  $t$ . We employ two unconsolidated profit variables from a firms standard balance sheet: The profit before tax (PBT) and the earning before interest and tax (EBIT). The difference between PBT and EBIT are financial profits which are subtracted from EBIT but included in PBT. Therefore, PBT is the overall profit of a firm and EBIT is the operational profit. We present all regressions additionally with EBIT as the dependent variable to hedge against the possibility that our result may be driven by financial profits only. Since the profit variables exhibit a rather skewed distribution (cf. e.g. the divergence of mean and median estimates in Table 2), we employ a logarithmic transformation. In doing so, only firms with positive profits are included in our regressions which, furthermore, is more compatible with our theoretical considerations of locating highly profitable assets or profits.

The explanatory variable of central interest is  $PARENT_{ijt}$  which depicts a dummy that takes on the value 1 if the considered affiliate is an independent parent firm and

the value 0 if it is a dependent subsidiary.  $X_{ijt}$  comprises a vector with different affiliate and country control characteristics. As affiliate controls, we e.g. include the size of input factors, i.e. the logarithm of the affiliate’s fixed assets investment and the logarithm of the affiliate’s payroll costs.<sup>9</sup> The macro controls are GDP as a proxy for the market size, GDP per capita as a proxy for the degree of development of a country, an index of corruption as a proxy for the overall risk of a country and the statutory corporate tax rate as a proxy for the corporate tax burden.

Moreover, we include a full set of fixed effects for the multinational group to control for non-observable, MNE specific characteristics  $\phi_j$ . While the use of a fixed-effects model is generally suggestive, it is also preferred to a random effects model by a HausmanTest. Furthermore, year dummies  $\rho_t$  are included to capture shocks over time common to all affiliates.  $\epsilon_{ijt}$  describes the error term. As suggested by our theoretical considerations in Section 2, we expect  $\beta_1 > 0$ .

Obviously, when applying a fixed-effects approach with group fixed-effects, the calculation of the parent dummy coefficient is identified via groups only for which accounting information on the parent firm as well as on at least one subsidiary is available (as a variation in the relevant variable, the parent dummy, is a condition in a fixed-effects model). This is the case for a sufficient fraction of observations in our sample; precisely, 57,261 observations coming from 12,766 MNE-groups show a variation in the parent dummy.<sup>10</sup> The rationale for keeping the other observations in the sample is that the coefficient estimates of all other control variables are predicted to be more precise if we keep this information in our sample. As a robustness check, we reran our regressions on the sub-sample of firms for which parent and subsidiary information is available and found our results to be confirmed.

## 5 Estimation Results

This section discusses our empirical results displayed in Tables 3 to 7 in the Appendix. In Section 5.1, we present our baseline regression, an extension capturing the development of our effect over time is included in Section 5.2. Section 5.3 presents various robustness checks.

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<sup>9</sup>In capturing the labor input factor by the sum of the affiliate’s payroll costs rather than by its number of employees, we implicitly control for the skill level and worker productivity at the affiliate.

<sup>10</sup>Thus, in the calculation of the parent dummy coefficient, we on average observe each group for 4.5 times.

Throughout, the observational unit is the profit-making (multinational) affiliate per year. All regressions include a full set of group-fixed-effects and year fixed effects. Some specifications account for a full set of industry dummies (NACE code at the 2-digit level) and country dummies. The result tables display the coefficient estimates and, in parentheses, heteroscedasticity robust standard errors which are adjusted for clustering at the level of the MNE-group.

## 5.1 Baseline Estimations

Table 3 and 4 in the Appendix present our baseline estimations. In Table 3, we estimate a standard profit equation using the level of profits as dependent variable and condition on the level of the input factors (fixed assets and level of cost of employees). In Table 4, we rerun our regressions using the profit and EBIT margin (which are defined as pre-tax profit and EBIT per sales respectively) as dependent variables and regressing them on input factor measures which are equally normalized by sales.

In Specification (1) of Table 3, we estimate the profit function described by equation (1) employing the logarithm of PBT (profit before tax) as dependent variable and regressing it on the parent dummy and the logarithm of fixed asset investment and the cost of employees. As predicted by our theoretical considerations, the coefficient estimate for the parent dummy exhibits a positive sign and is statistically significant at the 1% level. Quantitatively, multinational parent firms are suggested to earn 88% larger pre-tax profits than their subsidiaries. This qualitative result is robust against the additional inclusion of time-varying country characteristics (GDP, GDP per capita, corruption index and statutory corporate tax rate) as well as fixed country effects in Specification (2), the affiliate's leverage ratio in Specification (3) and a set of industry dummy variables in Specification (4). Adding additional control variables slightly reduces the coefficient estimate for the parent dummy, Specification (4) suggests that parent firms observe a 65% larger profitability than their subsidiaries. Note moreover that the adjusted  $R^2$  in all specifications is high, between 79.3% and 80.4%, increasing with the additional controls.

The PBT variable employed as dependent variable in this first set of regressions subsumes an affiliate's operating profit *plus* its financial profit. Several studies on firm profitability rely on this measure since it captures the firm's overall profitability coming from operating and financial investments. As our theoretical considerations, however, not only suggest more profitable asset investments to be located at the parent firm, but equally more profitable operating investments, we re-estimate the regressions pre-

sented in Columns (1) to (4) using EBIT as the dependent variable which comprises an affiliate's operating earnings only. The results are presented in Columns (5) to (8) and qualitatively resemble the results of the PBT regressions although the point estimates of the parent effect are quantitatively slightly smaller with Column (8) suggesting the operating profitability at the parent firm to be on average 43% larger than at the subsidiaries.

The control variables for the input factors, fixed assets and cost of employees, exhibit significantly positive effects and suggests that overall the production display decreasing returns to scale as the coefficient estimates add up to less than 1. The leverage ratio shows a significant and strong negative effect. This negative effect can easily be rationalized as highly leveraged firms are more dependent from the creditor and therefore not allowed to engage in too risky businesses which results in a lower profitability or profit level, respectively. The GDP per capita of a country has obviously a positive impact on firm profits as well as the degree of absence of corruption (high corruption index stands for a low level of corruption). The statutory corporate tax rate exhibits a negative impact on profits indicating both, the weaker incentive to invest highly profitable assets in a country with a higher tax rate and the stronger incentive to shift profits out of high-tax locations. Financial profits seems to be independent from the market size of a country as GDP has no effect on PBT but a significantly negative impact on EBIT. Larger markets are usually characterized by a higher degree of competition which seems to depress operating profits.

As described above, in a second step we implicitly add another size control by calculating a profitability measure which comprises profits per sales and regressing it on the input factors which are equally calculated in terms of sales. Thus, as dependent variables we get two standard profitability measures: the *gross profit margin* (i.e. PBT per sales) and the *EBIT margin* (i.e. EBIT per sales). These *ratio regressions* which are depicted in Table 4 show qualitatively and quantitatively the same picture as the *level regressions* in Table 3. Note that as the balance sheet entry for sales is not available for all firms in our sample, the number of observations drops slightly. Our preferred specification in column (4) suggests that after controlling for input factors, the firm leverage, macro characteristics and fixed year, country, industry and MNE-group effects, parent firms are by 65% more profitable than their subsidiaries, with respect to the gross profit margin. In Column (5) to (8), reestimate the specifications using the EBIT margin as the dependent variable and find comparable, although somewhat smaller, coefficient estimates.

Note, that we additionally experimented with other profitability measures which

imply the normalization of pre-tax profits and EBIT on the total assets held by a subsidiary and its number of employees respectively. In all of these regressions, we find the qualitative findings presented in this section confirmed. The results are available from the authors upon request.

## 5.2 Extension: Development over Time

Our theoretical considerations predicted that the profitability gap between parents and their subsidiaries has declined over the past decade, mainly due to a rise of new technologies that have facilitated communication and information exchange and have consequently lowered agency costs faced by the central management to effectively control valuable assets owned by affiliates abroad. In general several authors have presented anecdotal evidence which suggests a rising trend in offshoring white-collar services to foreign affiliates and fragmentation in the production process which may equally contribute to a closure in the profitability gap.

To test this hypothesis empirically, we generate a linear time trend variable that takes on the value 0 for the year 1999, the value 1 for 2000 and so forth. This time trend is then interacted with the parent dummy (interaction term  $Parent \times Time$ ) and included in the regression model presented in the previous section. The specifications include the above described control variables results and are depicted in Table 5 of the Appendix whereas two columns are presented for each of our four profitability measures (PBT, EBIT, gross profit margin, EBIT margin).

In line with our presumption, the coefficient estimate for the parent dummy again exhibits a positive sign and is statistically significant in all regressions while the coefficient estimate for the interaction term between the parent dummy and the time trend exhibits a negative sign. Consequently, while the parent firms in general are found to observe a larger profitability than their subsidiaries, this profitability gap is shown to have closed in the course of our sample period.

Quantitatively, the specifications which employ the profit margin as the dependent variables in Column (4) and (5) for example suggest that the profit margin in the base year 1999 is by 70% larger at multinational parent firms than at their subsidiaries. However, the interaction with the time variable suggests that this *parent bias* has since then constantly diminished over time as the coefficient estimate for  $Parent \times Time$  exhibits a negative sign and is statistically significant at the 1% level. Precisely, the estimation suggests the profitability gap to have fallen by 15% or 10.5 percentage points within the time span of only 7 years, whereas the yearly decrease is 1.5 percentage points. Taken

together with the observation that the time variable enters with a significantly positive sign, i.e. the profitability of the average affiliate increases per year by around 3%, it can be followed that the reason for the decrease in this gap is that the profitability of parents increases significantly slower over time than the profitability of their foreign subsidiaries.<sup>11</sup>

In terms of the EBIT margin (Column (7) and (8)), the decline in the profitability gap is reported to be a quantitatively an even more pronounced since the profitability gap between the parent and the subsidiary closes by 37% or 13.3 percentage points from its initial level of 36.0%. Finally, as a sensitivity check, we also interacted the parent dummy variable with year fixed effects, i.e. we generated one interaction term for each year dummy. These exhibit significantly negative coefficient estimates which grow bigger over time and thus suggest a smooth and steady decline of the profitability gap over our sample period.

### 5.3 Robustness Checks

We ran a large number of sensitivity checks, out of which we will in the following report the results of the most important ones. For space reasons others are only verbally described but all results for robustness tests mentioned but not reported in this section are available from the authors upon request.

One potential reservation against our analysis might be that our parent dummy variable captures that subsidiary firms tend to be younger than their parents and younger corporations are often less profitable than more established firms since they e.g. still have to engage in upfront investments. To control for that, we rerun our baseline specifications and additionally include the firm age as an additional control variable. The results are presented in Table 6 and show that the inclusion of the firm age variable does not qualitatively change the parent effect.<sup>12</sup> The coefficient estimates for the parent dummy even slightly increase with the inclusion of the age control. In most

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<sup>11</sup>This is also confirmed by regressions with separate samples of only parent firms and only subsidiaries. The significantly positive coefficient estimates of the time variable turn out to be about three times larger for subsidiaries than for parents and are statistically different from each other on a 99% confidence level.

<sup>12</sup>The specifications presented in Table 6 use the logarithm of firm age as explanatory variable since the firm age distribution is considerably skewed. Alternatively, taking no logarithmic transformation of the age variable and additionally include the quadratic transformation yield to the same estimations results. Then, the coefficient estimate for the age variable turns out to be positive while the coefficient estimate for the age-squared variable turns out to be significantly negative.

specifications, the age variable moreover exhibits the expected significantly positive effect. Since the information on the date of incorporation is not available for all firms in the database, the number of observations drops by more than 20%, nevertheless, still leaving us with a large sample size.

Moreover, in a second step we investigate whether our results hold only for multinational corporations which operate their parent firm and their subsidiaries in different countries or whether analogous effects can be found for corporate activities at a domestic scale. This determines whether the identified effect should be interpreted as a unique home bias of profits within multinational firms or whether it captures a more general headquarters bias which qualitatively equally exists in a national context. Note thereby that if the agency cost reasoning for our observation is true, the *parent bias* should also be observed for headquarters and their domestic subsidiaries.

To investigate this question, we use a sample of domestic enterprises, i.e. parent firms and their *domestic* subsidiaries, likewise drawn from the AMADEUS database for the same countries as our baseline sample.<sup>13</sup> The parents in this new sample are ultimate domestic owners of their subsidiaries, i.e. some of the parent firms observe a foreign immediate shareholder. We, however, also reran our regressions restricting the sample to the groups that exhibit no foreign immediate shareholder and are consequently national in scope and find comparable results.

The results are presented in Table 7 and show qualitatively the same picture as for our baseline MNE-sample (also with the adjusted  $R^2$  being on a comparably high level). Quantitatively, however, the estimated *parent bias* is substantially smaller suggesting that the profitability of parent firms outweighs the profitability of *domestic* subsidiaries by only 23% (cf. Column (6) of Table 7). The profitability gap is almost three times larger in an international context, i.e. between multinational parents and their foreign subsidiaries as shown in the baseline MNE-sample (cf. Column (4) of Table 4). Note, that the coefficient estimates for the parent dummy variable are also statistically dif-

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<sup>13</sup>Since the number of domestic affiliates outweighs the number of multinational affiliates, the regressions with this domestic firm sample exhibit around 450,000 observations from about 80,000 affiliates. However, the domestic affiliates are much smaller in size. The median of the fixed assets variable is calculated with 659 thousand US dollars and the median of the number of employees with 18. The median of the fixed assets investment only of domestic parent firms is calculated with 1420 thousand, whereby the median of fixed assets for domestic subsidiaries is 285 thousand US dollars. The median of the gross profit margin (5.88%) and the EBIT margin (5.88%) are very comparable to the respective values of our baseline MNE-sample. Looking only at domestic parents, the median of the gross profit margin is 6.13% and the median of the EBIT margin is 5.91%. Looking only at domestic subsidiaries, the median of the gross profit margin is 5.66% and the median of the EBIT margin is 5.84%.

ferent at the 99% confidence level.<sup>14</sup> Consequently, our results suggest that while a headquarter bias prevails in a purely domestic context, it is nevertheless substantially larger within multinational firms. This seems intuitively plausible since geographic and cultural distance between affiliates is likely to be larger if they are located in different countries and so are communication and agency costs of locating value-driving assets or profits at a subsidiary abroad.

In the same spirit, we ran an additional sensitivity check to determine whether the geographic distance between the location of a parent and a foreign subsidiary determines the size of the reported profitability gap between the entities. Our regression results indeed report a coherent picture that suggest that subsidiaries which are geographically closer to the parent report a higher profitability which we interpret to reflect that they have a higher probability to host value-driving assets and functions of the corporate group. Assuming that communication and monitoring costs for the central management increase in physical distance between the entities as suggested by several authors, this evidence equally supports the notion of a bias in the location of value-driving assets or profits respectively close to the parent location.

Moreover, to alleviate potential endogeneity concerns in our econometric specification with respect to the input factors fixed assets (per sales) and cost of employees (per sales) as well as to the leverage ratio, on the one hand, we did regressions with lagged values of these variables (lags of one year and, alternatively, of two years). On the other hand, we ran instrumental variables panel estimations with lagged values of these variables as instruments. The regressions show neither a qualitative nor a quantitative change in our parent dummy effect and thus suggest no serious endogeneity problems with these firm variables (see also Huizinga and Laeven, 2008, and Dischinger, 2008, for a similar econometric specification).

Furthermore, as a proxy for the installed labor, we alternatively took the *number* of employees instead of the *cost* of employees.<sup>15</sup> We get the same results but larger coefficient estimates of the parent dummy which could be a hint of an overestimation of the effect. While employing the total cost of employees rather than the number, we implicitly control additionally for the skill level or the productivity, respectively, of the

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<sup>14</sup>Note, that the corruption index now enters significantly negative suggesting a required risk premium for *domestic* corporations doing business (that mostly have no international location opportunity like MNEs) if corruption is high and property rights are less protected (represented by a low index), resulting in a higher profitability.

<sup>15</sup>Moreover, we checked a non-linear impact of the input factors fixed assets and cost (or number, alternatively) of employees on firm profits and received no change in the parent dummy effect.

workers.

One general objection, one might have against this analysis, is that the observed profitability pattern may be generated by mergers and acquisitions (M&A). If in an average M&A the more profitable firm takes over the less profitable firm, our results may be driven by this M&A effect and may (at least not directly) reflect the location of valuable functions and assets across multinational affiliates. To account for this possibility, we ran a robustness check identifying corporate affiliates which were acquired by the corporate group through M&A using the ZEPHYR database which is equally provided by Bureau van Dijk. Excluding these subsidiaries from the data did neither qualitatively nor quantitatively change our results.

As an additional robustness test to our baseline MNE-sample, we reran our regressions including only these subsidiaries that do not own any further subsidiaries themselves. This did not alter our qualitative result and just slightly increased the quantitative estimates of the parent dummy.<sup>16</sup>

In addition, we analyzed if there is an effect of Eastern European affiliates by including a dummy and interaction terms. Our parent dummy effect was completely unaffected from these inclusions. However, we found slight evidence that firms in Eastern Europe exhibit less financial profits but more operating profits, which seems to be driven by parent firms located in Eastern Europe and not by East-European subsidiaries.

Furthermore, we reran our baseline estimations including affiliates with negative profits by doing no logarithmic transformation and thus excluding outliers at the 1% and 99% and alternatively at the 5% and 95% percentile. We did not find qualitatively different results.

Finally, we repeated all presented regressions for alternative profitability measures like the return on total assets (PBT per total assets), PBT per employees and EBIT per employees and found quantitatively similar results. Taken together, we find very consistent and robust evidence for a *parent bias* irrespective of the profitability measure used. In all regressions, the profitability at the headquarters location is found to substantially outweigh the profitability of the group's corporate subsidiaries.<sup>17</sup>

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<sup>16</sup>Over and above, we excluded holding companies from our baseline MNE-sample which likewise strengthens our result of the *parent bias*.

<sup>17</sup>Furthermore, we split our baseline MNE-sample into ten industry groups (NACE Rev.1 1-digit level) and found the *parent bias* to be quite homogeneous over these branches.

## 6 Implication: Higher Parent Tax Payments

Although the documented profitability gap between parents and subsidiaries has declined over recent years, we still find it to be sizable. Our result has implications for several areas of research and policy making. As headquarters are more profitable, they are likely to also exhibit higher tax payments than subsidiaries. Therefore, one of the most important and straightforward implications is that governments at the headquarters location should receive an over-proportional share of the multinational group's tax base.

To test this implication empirically, with the same sample of MNEs, we regress an affiliate's tax payments on the parent dummy and on our set of firm and country control variables from the baseline estimations, again including group-fixed-effects. Results are presented in Table 8. In Column (1) to (4), the dependent variable is the level of tax payments, while in Column (5) to (8), we again did a normalization in terms of sales, i.e. the regressand is tax payments per sales. We are including more and more controls, finally, likewise the firm age and 53 industry dummies in specification (4) and (8), respectively. We found our tax implication to be confirmed. The parent dummy has a consistently positive and strong impact on the amount of taxes paid by a multinational affiliate, significant at the 1% level. Quantitatively, parent firms exhibit 61% higher tax payments per sales than their subsidiaries (cf. Column (8)).

Thus, countries tend to benefit more from hosting the headquarters of a MNE than hosting its subsidiaries since they receive higher tax revenues. This could, for example, rationalize government policies to create national champions by intervening in international M&A activities, a point which has not yet been raised in the literature. This mechanism may also have implications for recently reported cases of headquarters relocations (see Strauss-Kahn and Vives, 2005 or Voget, 2008).

As a robustness check, we ran the same regressions of Table 8 instead with the MNE-sample now with the *domestic firm sample* from Table 7. With parent firms versus their *domestic* subsidiaries, we observe the same known pattern. The parent effect is again positive, highly significant and robust against the inclusion of our set of micro and macro controls, but is only half of the magnitude than with the MNE-sample.<sup>18</sup> Thus, with respect to corporate tax revenues, attracting *multinational* headquarters is much more beneficial to governments than attracting *domestic* parents.

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<sup>18</sup>Again, these estimations consist of a large number of around 400,000 observations from about 70,000 affiliates. The results are available from the authors upon request.

Two further implications of the *parent bias* can be observed. First, preliminary regressions show that multinational headquarters likewise exhibit significantly higher wages (i.e. cost of employees per employee) than their foreign subsidiaries. However, such a specification is likely to suffer from an omitted variables problem as our database does not include the worker's skill level and thus results might be biased. A proper analysis with a solution strategy to the endogeneity concern goes beyond the scope of our paper and is therefore subject for future research.

Second, the *parent bias* might well influence a MNE's profit shifting behavior. Preliminary estimations provide evidence that, depending on the corporate statutory tax rate differentials within the multinational group, MNEs are *reluctant* to shift profits *away from* their headquarters if headquarters are located in a *high-tax* country. On the contrary, MNEs with a *low-tax* parent firm are *eager* to shift profits from their foreign high-tax subsidiaries *to* the parent location. Again, such an analysis goes beyond the scope of this work and is subject to a companion paper.

## 7 Conclusions

This paper provides evidence for a *parent bias* of profits toward the multinational headquarters firm. Using a large panel of European MNEs and conditioning on input factors employed, we find that headquarters exhibit a 65% higher profitability than their corporate subsidiaries. We interpret this finding to support anecdotal evidence for MNEs to keep their value-driving functions at the headquarters and to offshore standard operating functions to foreign subsidiaries only. This pattern may for example be rationalized by enhanced monitoring and control costs faced by the central management if decisive corporate functions are located physically distant to the headquarters.

Our result of the *parent bias* is robust to various sensitivity checks, e.g. the use of alternative profitability measures, the inclusion of the firm age or the exclusion of firms emerging from a M&A. Moreover, we rerun our regressions with a new sample of only domestic enterprises, i.e. parent firms versus their *domestic* subsidiaries, and observe the same pattern but with a smaller magnitude. The estimated profitability gap of parents versus their *domestic* subsidiaries is estimated around 25%. Hence, this gap is more than doubled for multinational parents indicating a significantly higher level of agency costs if value-driving assets or profits, respectively, are located at a subsidiary abroad.

However, we also find evidence for some cracks in the notion and status of the parent

company as profit center of the multinational group. Thus, our results simultaneously suggest that the profitability gap between parent firms and subsidiaries has decreased over our sample period between 1999 and 2006. Quantitatively, the decrease is sizable, pointing to a closure of the gap by 15% in seven years. This result is in line with the widespread perception of an increased fragmentation of the production process across international borders which today does not only comprise standard operating functions like manufacturing and sales but equally includes value-driving units like R&D and licensing departments.

In addition, we provide evidence that parent firms pay more taxes than their subsidiaries. Thus, countries which host a high number of headquarters can collect substantially more tax revenues than their counterparts which host multinational subsidiaries foremost. Given the still small but growing number of headquarters relocations across countries, our finding may be relevant for researchers and policy makers alike since they suggest that the attraction of a multinational parent firm may be substantially more attractive from a revenue point of view than the attraction of a mere subsidiary. This may have important implications for tax competition between countries in different fiscal instruments, like e.g. the legislation of controlled foreign corporations (CFCs) and the withholding tax treaty network which affect a country's attractiveness as a headquarters location. Moreover, with respect to corporate tax revenues, attracting *multinational* headquarters is estimated to be about twofold as beneficial to governments than attracting *domestic* parents, relative to subsidiaries. However, it might not only be the fiscal administration which benefits from the location of a multinational parent but also could be the domestic workers since parent firms are likely to exhibit a higher wage level than subsidiaries.

Given the described benefits from hosting a multinational headquarter, our results may also have important implications for the literature on M&A and the observed interference of nation states in international mergers. Precisely, the profitability bias in favor of headquarters locations provides a new argument for the observed creation of national champions and government actions to avoid the take-over of national firms by foreign companies. In general, we think the paper opens up interesting areas for future research.

## 8 Appendix

<b>Table 1: Country Statistics</b>			
<i>Country</i>	<i>All Affiliates</i>	<i>Parent Firms</i>	<i>Subsidiaries</i>
Austria	271	135	136
Belgium	2,092	1,123	969
Bulgaria	78	5	73
Croatia	186	57	129
Czech Republic	519	77	442
Denmark	1,724	828	896
Estonia	240	24	216
Finland	537	14	523
France	2,838	1,283	1,555
Germany	1,395	731	664
Great Britain	3,175	960	2,215
Hungary	34	9	25
Ireland	30	30	0
Italy	2,339	1,418	921
Latvia	10	0	10
Luxembourg	23	14	9
Netherlands	2,068	1,404	664
Norway	1,112	365	747
Poland	738	44	694
Portugal	273	82	191
Romania	512	12	500
Serbia	69	2	67
Slovakia	82	5	77
Spain	2,644	1,231	1,413
Sweden	2,226	1,392	834
Switzerland	138	138	0
Ukraine	40	2	38
<i>Sum</i>	25,393	11,385	14,008

**Table 2: Descriptive Statistics**

<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>Median</i>	<i>Min.</i>	<i>Max.</i>
Dummy Parent Firm	107,930	.4912	0	0	1
Profit before Tax (PBT)★	107,930	18,623	884	1	1.67e+07
Earnings before Interest & Tax (EBIT)★	107,930	14,857	850	1	1.52e+07
Gross Profit Margin (PBT per Sales)	100,181	2.32	.0585	1.73e-05	26,393
EBIT Margin (EBIT per Sales)	100,181	.1024	.0576	1.73e-05	295
Sales★	100,181	191,893	16,151	1	1.46e+08
Fixed Assets★	107,930	154,263	2,486	1	1.04e+08
Cost of Employees	107,930	26,530	2,183	1	2.26e+07
Number of Employees	107,930	565	44	1	99,837
Financial Leverage Ratio♦	102,227	.5937	.6209	0	1
GDP▲	107,864	932.1	610.7	5.63	2,915
GDP per Capita◄	107,864	28,778	27,892	633	74,471
Corruption Index►	107,864	7.34	7.4	1.5	10
Statutory Corporate Tax Rate	107,864	.3251	.3399	.1	.523
<i>Parent firms only:</i>					
Profit before Tax (PBT)★	53,011	32,967	1,683	1	1.67e+07
Earnings before Interest & Tax (EBIT)★	53,011	26,711	1,538	1	1.52e+07
Gross Profit Margin (PBT per Sales)	48,650	3.53	.0639	1.73e-05	26,393
EBIT Margin (EBIT per Sales)	48,650	.1214	.0605	3.22e-05	295
Fixed Assets★	53,011	285,419	8,612	1	1.04e+08
Cost of Employees	53,011	46,423	3,921	1	2.26e+07
<i>Subsidiary firms only:</i>					
Profit before Tax (PBT)★	54,919	4,778	520	1	8.06e+06
Earnings before Interest & Tax (EBIT)★	54,919	3,878	528	1	2.64e+06
Gross Profit Margin (PBT per Sales)	51,531	1.18	.0543	2.71e-05	23,304
EBIT Margin (EBIT per Sales)	51,531	.0852	.0549	1.73e-05	64.7
Fixed Assets★	54,919	27,664	599	1	3.76e+07
Cost of Employees	54,919	7,328	1,391	1	6.33e+06

Notes:

★ Unconsolidated value, in thousand US dollars, current prices.

♦ = (total liabilities / total assets).

▲ In billion US dollars, current prices, data from IMF WEO Database October 2008.

◄ In US dollars, current prices, data from IMF WEO Database October 2008.

► Corruption Perceptions Index (CPI) from Transparency International (TI), ranks from 0 (extreme level of corruption) to 10 (free of corruption).

Table 3: Baseline Estimation I – Higher Parent Profits								
OLS Group–Fixed–Effects, Panel 1999–2006								
Dependent Variable	Log (Profit before Tax)				Log EBIT			
<i>Explanatory Variables:</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent Dummy	.877*** (.044)	.858*** (.046)	.697*** (.046)	.650*** (.046)	.547*** (.043)	.497*** (.044)	.398*** (.045)	.429*** (.045)
Log (Fixed Assets)	.231*** (.008)	.227*** (.008)	.216*** (.008)	.214*** (.008)	.148*** (.008)	.141*** (.008)	.136*** (.008)	.137*** (.007)
Log (Cost Employees)	.464*** (.011)	.454*** (.012)	.488*** (.012)	.505*** (.012)	.606*** (.011)	.167*** (.012)	.634*** (.012)	.633*** (.012)
Leverage Ratio			-1.26*** (.043)	-1.26*** (.043)			-.720*** (.040)	-.726*** (.039)
Log GDP		-.238 (.148)	-.222 (.143)	-.172 (.184)		-.209*** (.066)	-.199*** (.061)	-.189** (.079)
Log (GDP p.Capita)		.609*** (.169)	.414*** (.165)	.339* (.201)		.315*** (.101)	.212** (.098)	.203* (.110)
Log Corruption		.231*** (.079)	.303*** (.079)	.296*** (.079)		.138** (.068)	.177*** (.069)	.166** (.069)
Statutory Tax Rate		-.962*** (.239)	-.754*** (.235)	-.784*** (.236)		-.609*** (.215)	-.407* (.220)	-.418* (.220)
Year Dummies	✓	✓	✓	✓	✓	✓	✓	✓
Country Dummies		✓	✓	✓		✓	✓	✓
Industry Dummies				✓				✓
# Observations	107,930	107,864	102,227	101,828	107,106	107,046	100,973	100,567
# MNE–Groups	18,531	18,531	18,007	17,923	18,067	18,066	17,514	17,433
Adjusted $R^2$	.7928	.7940	.8033	.8041	.8117	.8140	.8192	.8204

Notes:

Heteroscedasticity robust standard errors adjusted for group clusters in parentheses.

\*, \*\*, \*\*\* indicates significance at the 10%, 5%, 1% level. The observational units are profit–making *multinational parent firms* and *multinational subsidiaries*. A group–fixed–effect is set for belonging to a MNE–group. *Parent Dummy* is a dummy variable set to 1 if an observational unit is a *parent firm* and set to 0 if it is a *subsidiary*. *Log (Cost Employees)* is the natural logarithm (Log) of the cost of employees. 56 industry dummies (NACE Rev.1 2–digit level) and 27 country dummies are included where indicated. Adjusted  $R^2$  values are calculated from a dummy variables regression equivalent to the fixedeffects model.

**Table 4: Baseline Estimation II – Higher Parent Profitability**  
**OLS Group–Fixed–Effects, Panel 1999–2006**

Dependent Variable	Log (Profit b. Tax per Sales)				Log (EBIT per Sales)			
<i>Explanatory Variables:</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent Dummy	.930*** (.046)	.927*** (.048)	.746*** (.048)	.648*** (.047)	.471*** (.038)	.443*** (.039)	.299*** (.039)	.291*** (.039)
Log (Fixed Assets per Sales)	.444*** (.015)	.454*** (.015)	.407*** (.015)	.369*** (.014)	.193*** (.010)	.183*** (.010)	.145*** (.010)	.137*** (.010)
Log (Cost Employees per Sales)	.043*** (.017)	.032* (.018)	.014 (.018)	.016 (.018)	-.054*** (.018)	-.039** (.019)	-.061*** (.019)	-.068*** (.019)
Log (Fixed Assets)	-.243*** (.009)	-.255*** (.010)	-.222*** (.010)	-.200*** (.010)	-.120*** (.007)	-.112*** (.008)	-.087*** (.008)	-.089*** (.008)
Leverage Ratio			-1.57*** (.044)	-1.58*** (.043)			-1.14*** (.035)	-1.13*** (.035)
Log GDP		-.217 (.148)	-.193 (.143)	-.141 (.183)		-.182*** (.064)	-.165*** (.061)	-.148** (.071)
Log (GDP p.Capita)		.568*** (.167)	.322** (.162)	.231 (.198)		.169* (.093)	-.012 (.090)	-.025 (.097)
Log Corruption		.170** (.079)	.274*** (.077)	.275*** (.077)		.105* (.065)	.190*** (.064)	.186*** (.064)
Statutory Tax Rate		-.652*** (.231)	-.351 (.226)	-.362 (.227)		-.311 (.197)	.033 (.199)	.016 (.200)
Year Dummies	✓	✓	✓	✓	✓	✓	✓	✓
Country Dummies		✓	✓	✓		✓	✓	✓
Industry Dummies				✓				✓
# Observations	100,181	100,117	94,893	94,525	99,846	99,786	94,143	93,766
# MNE–Groups	17,191	17,191	16,702	16,624	16,846	16,845	16,337	16,261
Adjusted $R^2$	.5987	.6003	.6303	.6340	.4662	.4698	.4976	.5010

Notes:

Heteroscedasticity robust standard errors adjusted for group clusters in parentheses.

\*, \*\*, \*\*\* indicates significance at the 10%, 5%, 1% level. The observational units are profit–making *multinational parent firms* and *multinational subsidiaries*. A group–fixed–effect is set for belonging to a MNE–group. *Parent Dummy* is a dummy variable set to 1 if an observational unit is a *parent firm* and set to 0 if it is a *subsidiary*. *Log (Cost Employees per Sales)* is the natural logarithm (Log) of the cost of employees per sales. 56 industry dummies (NACE Rev.1 2–digit level) and 27 country dummies are included where indicated. Adjusted  $R^2$  values are calculated from a dummy variables regression equivalent to the fixedeffects model.

Table 5: Extension – Development over Time								
OLS Group-Fixed-Effects, Panel 1999–2006								
Dependent Variable	Log PBT		Log EBIT		Log(PBT p.Sales)		Log(EBIT p.Sales)	
<i>Explanatory Variables:</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent Dummy	.968*** (.047)	.714*** (.049)	.635*** (.045)	.503*** (.047)	1.02*** (.049)	.702*** (.049)	.560*** (.040)	.360*** (.041)
Parent×Time	-.024*** (.004)	-.017*** (.004)	-.024*** (.004)	-.020*** (.004)	-.025*** (.004)	-.015*** (.004)	-.024*** (.003)	-.019*** (.003)
Time	.062*** (.003)	.033*** (.007)	.036*** (.003)	.028*** (.006)	.059*** (.003)	.031*** (.007)	.026*** (.003)	.027*** (.006)
Log (Fixed Assets)	.233*** (.008)	.216*** (.008)	.151*** (.008)	.140*** (.008)	-.243*** (.009)	-.199*** (.010)	-.119*** (.007)	-.088*** (.008)
Log (Cost Employees)	.463*** (.011)	.504*** (.012)	.604*** (.011)	.632*** (.012)				
Log (Fixed Assets per Sales)					.446*** (.015)	.370*** (.014)	.196*** (.010)	.138*** (.010)
Log (Cost Employees per Sales)					.041** (.017)	.015 (.018)	-.056*** (.018)	-.069*** (.019)
Leverage Ratio		-1.26*** (.042)		-.722*** (.039)		-1.58*** (.043)		-1.12*** (.035)
Log GDP		-.163 (.181)		-.171** (.073)		-.134 (.181)		-.133** (.066)
Log (GDP p.Capita)		.263 (.199)		.106 (.107)		.167 (.198)		-.113 (.095)
Log Corruption		.296*** (.079)		.166** (.069)		.273*** (.077)		.183*** (.064)
Statutory Tax Rate		-.781*** (.236)		-.414* (.220)		-.350 (.227)		.033 (.200)
Year Dummies	✓	✓	✓	✓	✓	✓	✓	✓
Country Dummies		✓		✓		✓		✓
Industry Dummies		✓		✓		✓		✓
# Observations	107,930	101,828	107,106	100,567	100,181	94,525	99,846	93,766
# MNE-Groups	18,531	17,923	18,067	17,433	17,191	16,624	16,846	16,261
Adjusted $R^2$	.7930	.8042	.8119	.8205	.5990	.6341	.4668	.5013

Notes:

Heteroscedasticity robust standard errors adjusted for group clusters in parentheses.

\*, \*\*, \*\*\* indicates significance at the 10%, 5%, 1% level. The observational units are profit-making *multinational parent firms* and *multinational subsidiaries*. A group-fixed-effect is set for belonging to a MNE-group. The abbreviation *PBT* stands for *Profit before Tax*. *Parent Dummy* is a dummy variable set to 1 if an observational unit is a *parent firm* and set to 0 if it is a *subsidiary*. *Time* is set to 0 for the year 1999, 1 for 2000, 2 for 2001, ..., and 7 for 2006, with a mean of 3.5. *Parent×Time* is the interaction term between *Parent Dummy* and *Time*. *Log (Cost Employees per Sales)* is the natural logarithm (Log) of the cost of employees per sales. 56 industry dummies (NACE Rev.1 2-digit level) and 27 country dummies are included where indicated. Adjusted  $R^2$  values are calculated from a dummy variables regression equivalent to the fixedeffects model.

Table 6: Robustness Check I – Control for Firm Age								
OLS Group-Fixed-Effects, Panel 1999–2006								
Dependent Variable	Log PBT		Log EBIT		Log(PBT p.Sales)		Log(EBIT p.Sales)	
<i>Explanatory Variables:</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent Dummy	.923*** (.058)	.729*** (.061)	.560*** (.058)	.467*** (.060)	.963*** (.063)	.740*** (.062)	.446*** (.055)	.295*** (.054)
Log Age	.117*** (.020)	.067*** (.021)	.059*** (.019)	.046** (.020)	.097*** (.022)	.045** (.021)	.025 (.016)	.012 (.016)
Log (Fixed Assets)	.214*** (.011)	.196*** (.010)	.140*** (.010)	.130*** (.009)	-.286*** (.013)	-.235*** (.014)	-.119*** (.011)	-.087*** (.011)
Log (Cost Employees)	.427*** (.015)	.478*** (.017)	.577*** (.015)	.607*** (.016)				
Log (Fixed Assets per Sales)					.471*** (.019)	.392*** (.019)	.172*** (.013)	.121*** (.013)
Log (Cost Employees per Sales)					.017 (.020)	.008 (.021)	-.116*** (.019)	-.115*** (.020)
Leverage Ratio		-1.22*** (.053)		-.642*** (.048)		-1.51*** (.054)		-1.01*** (.042)
Log GDP		-.130 (.170)		-.135** (.060)		-.109 (.176)		-.116* (.062)
Log (GDP p.Capita)		.201 (.206)		.006 (.116)		.206 (.208)		-.079 (.106)
Log Corruption		.312*** (.093)		.199** (.082)		.272*** (.092)		.185** (.076)
Statutory Tax Rate		-.842*** (.281)		-.298 (.265)		-.487* (.275)		.037 (.243)
Year Dummies	✓	✓	✓	✓	✓	✓	✓	✓
Country Dummies		✓		✓		✓		✓
Industry Dummies		✓		✓		✓		✓
# Observations	78,012	74,272	76,706	72,696	72,121	68,707	71,242	67,564
# MNE-Groups	14,785	14,368	14,303	13,855	13,607	13,239	13,240	12,843
Adjusted $R^2$	.8161	.8248	.8359	.8422	.6596	.6858	.5182	.5442

Notes:

Heteroscedasticity robust standard errors adjusted for group clusters in parentheses.

\*, \*\*, \*\*\* indicates significance at the 10%, 5%, 1% level. The observational units are profit-making *multinational parent firms* and *multinational subsidiaries*. A group-fixed-effect is set for belonging to a MNE-group. The abbreviation *PBT* stands for *Profit before Tax*. *Parent Dummy* is a dummy variable set to 1 if an observational unit is a *parent firm* and set to 0 if it is a *subsidiary*. *Log Age* is the natural logarithm (Log) of the firm age in years. *Log (Cost Employees per Sales)* is the natural logarithm of the cost of employees per sales. 56 industry dummies (NACE Rev.1 2-digit level) and 27 country dummies are included where indicated. Adjusted  $R^2$  values are calculated from a dummy variables regression equivalent to the fixedeffects model.

Table 7: Robustness Check II – Parents vs. Domestic Subsidiaries								
OLS Group–Fixed–Effects, Panel 1999–2006								
Dependent Variable	Log PBT		Log EBIT		Log(PBT p.Sales)		Log(EBIT p.Sales)	
<i>Explanatory Variables:</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent Dummy	.360*** (.011)	.303*** (.023)	.084*** (.012)	.252*** (.022)	.463*** (.011)	.229*** (.022)	.189*** (.010)	.128*** (.019)
Log (Fixed Assets)	.253*** (.004)	.250*** (.004)	.222*** (.004)	.220*** (.004)	-.290*** (.005)	-.229*** (.005)	-.172*** (.004)	-.136*** (.004)
Log (Cost Employees)	.362*** (.004)	.376*** (.005)	.460*** (.005)	.443*** (.005)				
Log (Fixed Assets per Sales)					.488*** (.005)	.408*** (.006)	.295*** (.004)	.242*** (.005)
Log (Cost Employees per Sales)					-.042*** (.006)	-.055*** (.007)	-.161*** (.006)	-.168*** (.006)
Leverage Ratio		-1.19*** (.022)		-.499*** (.021)		-1.60*** (.021)		-.961*** (.019)
Log Age		.074*** (.006)		.064*** (.006)		.015** (.006)		-.019*** (.005)
Log GDP		-.075*** (.025)		-.065*** (.024)		-.058** (.025)		-.040* (.023)
Log (GDP p.Capita)		-.026 (.065)		-.095 (.059)		.004 (.061)		-.061 (.052)
Log Corruption		-.196*** (.052)		-.192*** (.047)		-.265*** (.051)		-.253*** (.043)
Statutory Tax Rate		-.607*** (.159)		-.439*** (.145)		-.281* (.156)		-.265** (.131)
Year Dummies	✓	✓	✓	✓	✓	✓	✓	✓
Industry Dummies		✓		✓		✓		✓
# Observations	519,915	466,129	508,344	453,835	454,167	405,509	453,271	403,135
# Firm–Groups	89,241	84,105	85,856	80,617	74,266	69,995	72,938	68,526
Adjusted $R^2$	.7729	.7838	.7931	.8012	.6013	.6357	.5136	.5405

Notes:

Heteroscedasticity robust standard errors adjusted for group clusters in parentheses.

\*, \*\*, \*\*\* indicates significance at the 10%, 5%, 1% level. The observational units are profit–making *domestic parent firms* and *domestic subsidiaries*. A group–fixed–effect is set for belonging to a firm–group. The abbreviation *PBT* stands for *Profit before Tax*. *Parent Dummy* is a dummy variable set to 1 if an observational unit is a *parent firm* and set to 0 if it is a *subsidiary*. *Log Age* is the natural logarithm (Log) of the firm age in years. *Log (Cost Employees per Sales)* is the natural logarithm of the cost of employees per sales. 88 industry dummies (NACE Rev.1 2–digit level) are included where indicated. Country dummies are not included due to no variation in the country of a parent and their subsidiary(ies) which is a condition in a fixed–effects model. Adjusted  $R^2$  values are calculated from a dummy variables regression equivalent to the fixedeffects model.

Table 8: Implication – Higher Parent Tax Payments								
OLS Group–Fixed–Effects, Panel 1999–2006								
Dependent Variable	Log (Tax Payments)				Log (Tax Payments per Sales)			
<i>Explanatory Variables:</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent Dummy	.874*** (.081)	.802*** (.081)	.656*** (.082)	.648*** (.083)	.875*** (.087)	.812*** (.088)	.637*** (.088)	.614*** (.085)
Log (Fixed Assets)	.119*** (.013)	.120*** (.012)	.107*** (.012)	.109*** (.013)	-.242*** (.016)	-.253*** (.017)	-.230*** (.017)	-.228*** (.018)
Log (Cost Employees)	.562*** (.019)	.553*** (.020)	.581*** (.021)	.577*** (.022)				
Log (Fixed Assets per Sales)					.325** (.022)	.341*** (.023)	.301*** (.024)	.291*** (.023)
Log (Cost Employees per Sales)					.061*** (.025)	.070*** (.027)	.055** (.027)	.048* (.029)
Leverage Ratio			-1.08*** (.067)	-1.07*** (.068)			-1.41*** (.064)	-1.39*** (.065)
Log Age				.119*** (.026)				.096*** (.026)
Log GDP		-2.30*** (.822)	-2.13*** (.823)	-1.89** (.833)		-2.16*** (.799)	-1.99*** (.790)	-1.79** (.800)
Log (GDP p.Capita)		2.52*** (.844)	2.19*** (.841)	1.81** (.857)		2.45*** (.817)	2.07*** (.804)	1.78** (.819)
Log Corruption		.079 (.128)	.122 (.127)	.122 (.127)		.034 (.129)	.090 (.126)	.107 (.127)
Statutory Tax Rate		2.14*** (.431)	2.40*** (.430)	2.40*** (.432)		2.33*** (.433)	2.72*** (.429)	2.64*** (.433)
Year Dummies	✓	✓	✓	✓	✓	✓	✓	✓
Country Dummies		✓	✓	✓		✓	✓	✓
Industry Dummies				✓				✓
# Observations	51,878	51,851	48,949	47,640	48,262	48,235	45,516	44,291
# MNE–Groups	9,406	9,405	9,118	8,923	8,698	8,697	8,439	8,269
Adjusted $R^2$	.7692	.7758	.7831	.7839	.5392	.5500	.5676	.5749

Notes:

Heteroscedasticity robust standard errors adjusted for group clusters in parentheses.

\*, \*\*, \*\*\* indicates significance at the 10%, 5%, 1% level. The observational units are profit-making *multinational parent firms* and *multinational subsidiaries*. A group–fixed–effect is set for belonging to a MNE–group. *Parent Dummy* is a dummy variable set to 1 if an observational unit is a *parent firm* and set to 0 if it is a *subsidiary*. *Log Age* is the natural logarithm (Log) of the firm age in years. *Log (Cost Employees per Sales)* is the natural logarithm of the cost of employees per sales. 53 industry dummies (NACE Rev.1 2–digit level) and 27 country dummies are included where indicated. Adjusted  $R^2$  values are calculated from a dummy variables regression equivalent to the fixedeffects model.

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