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Are Spanish Companies Involved in Profit Shifting? Consequences in Terms of Tax Revenues

Ángela Castillo Murciego and Julio López Laborda

Abstract
In this paper the authors analyze the existence of profit shifting by companies located in Spain. Using a sample of 1,380 Spanish subsidiaries owned by foreign OECD and EU parent companies from the AMADEUS Database for the period 2005–2014 and a simple tax rate difference as a measure of the profit shifting tax incentive, the authors obtain a negative effect of corporate income taxes on reported profits, which is consistent with the profit shifting activity of corporations and matches the empirical results in the literature. Furthermore, they derive a negative effect from this profit shifting activity in terms of tax revenues for Spain.

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Keywords Profit shifting; multinational corporations; tax revenues; Spain

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1. Introduction

Among Multinational Enterprises (MNEs), Profit Shifting (PS) is a tax planning strategy within a group consisting of shifting taxable income from entities located in high tax paying countries (basically, countries with a high Corporate Income Tax, CIT) to entities located in countries with lower tax rates (TRs).

PS phenomena, as well as other tax avoidance and tax evasion methods, cause what is known as Double Non-Taxation, which refers to the minimisation and sometimes zero taxation of certain taxable income (or more generally, taxable object). This Double Non-Taxation, together with the traditional International Double Taxation, originated in the current international tax system, based on the Separate Accounting Method and created around a century ago, when economic conditions were very different from today's.

While the world is becoming increasingly globalised (the movement of capital has increased a great deal) and the digital economy is becoming more important, jurisdictions still have sovereignty for establishing their own tax policies (with no coordination between them in the case of direct taxes). This mismatch allows MNEs to develop strategies, most of which are legally acceptable, to take advantage of the different tax rules of the jurisdictions to reduce corporations' tax burden.

Two of the most popular PS strategies among MNEs are Transfer Pricing and Thin Capitalisation. Transfer prices are the prices that entities set when they exchange services and/or goods within the multinational group, which should be determined as if the transaction were between independent enterprises (according to the arm's length principle).

Both Transfer Pricing and Thin Capitalisation consist of declaring more revenues in the jurisdictions where TRs are most favourable, and more deductible expenses in the ones where they are least favourable. The Transfer Pricing strategy achieves this result by manipulating the transfer prices according to taxes, which is relatively easy in some cases when there are no comparable transactions in the market (this is usually the case when transactions include intangible assets), and the Thin Capitalisation strategy by group companies in low tax jurisdictions (where interest has to be reported and

taxed) making loans to their sister companies in high tax jurisdictions (where interest is deducted[1]).

PS also causes an equity problem between territories because the movement of profits between jurisdictions is not accompanied by a parallel movement of the real economic activity that generates such profits. As a result, companies create value in some jurisdictions and report profits in others. So, through the PS strategy MNEs can take advance of both the high yield provided by some jurisdictions by locating their investments in such jurisdictions, and at the same time, the low taxes of other jurisdictions by locating their taxable income there.

But according to Hines (2014:444-446), PS activity and the associated equity problem could be higher. There is evidence that MNEs do not accomplish this tax planning strategy entirely. In the first place, high tax countries go on collecting tax revenues from the CIT. In the second place, the real activity of corporations is still affected by taxes (there is a consensus on the subject in the empirical literature); and in the third place, not all MNEs have affiliates situated in countries with the most favourable tax treatment, the tax havens.

The reason is the cost of such activity for MNEs. According to Hines (2014:450), PS activity produces administrative and compliance costs and more importantly, costs deriving from the need to change real activity to enable income reallocation. Although PS activity disassociates reported profits from value creation, a certain level of real economic activity in the territories where profits are reported is necessary to justify such reported profits.

Nowadays, the main international institutions and governments are worried about PS and the reduced taxes paid by some MNEs. Since the financial crisis and the loss of economic resources, the taxation scandals of MNEs have become front page news. The key international taxation problem has changed from International Double Taxation to Double Non-Taxation, giving rise to a new paradigm of international taxation. One of the most important international initiatives tackling the situation is the OECD's Base Erosion and Profit Shifting (BEPS) project, launched in 2013, with the final reports published in September 2015 (OECD, 2015). This consists of a package of measures aimed at aligning taxation and value creation by driving needed changes and improvements in current international taxation standards. In addition to the OECD, the EU has been working on the international taxation problems from the beginning, and is

[1] Dividends (which constitute equity remuneration), as opposed to interests, cannot be deducted (Fatica et al., 2012).

now developing an Action Plan on Corporate Taxation (European Commission, 2015). Among other measures, the EU wants to relaunch the Common Consolidated Corporate Tax Base (CCCTB) proposal.

In this context, our paper sets out to prove the existence of PS by corporations located in Spain and to determine and assess the positive or negative consequences for tax collection in the country from a sample of Spanish subsidiary companies. Is Spain affected by PS? And if we obtain a positive answer, are its tax revenues too low for the level of economic activity carried out within its borders, or does Spain come out ahead? And how much money are we talking about?

The remainder of this paper is divided into three sections. In the next section (section 2), we provide a review of the empirical literature. In section three we develop our empirical analysis. And finally in section four we present our conclusions and indicate some future additional analyses and robustness tests.

2. Review of the empirical literature on Profit Shifting

There is a consensus on the existence of PS activity in the empirical literature. However, such a consensus does not exist with regard to the magnitude of the activity and the main methods used.

2.1. Proving the existence of Profit Shifting activity

Two kinds of empirical approaches are used to identify the existence of PS activity: direct and indirect. The direct approach consists of identifying particular PS strategies (examples of this kind of empirical approach can be seen in Clausing, 2003; Dischinger and Riedel, 2011, Buettner et al., 2012 or Blouin et al., 2014). And the indirect one is based on the expected results of the PS activity.

Within the indirect approach the traditional model comes from Hines and Rice (1994) and rests on the assumption that corporations declare more profits in territories with relatively low CIT taxes (it then postulates a negative relationship between profits and taxes). Although this result is found if PS activity exists, the same is true when companies, instead of moving taxable income due to taxes, move their investments due to taxes (behaviour that has been widely proven by the empirical literature), because investments generate profits.

For this reason the basic premise of the Hines and Rice approach is that MNEs' reported profits are equal to the true profits derived from economic activity plus the

profits derived from PS activity (positive or negative). Therefore in analysing the relationship between reported profits and taxes it is necessary to control for other explanatory variables with an impact on the true profits of enterprises. They have usually been proxies of the inputs capital and labour and its productivity.

Since Hines and Rice (1994), a great deal of empirical work has used the same approach. We can, for example, point to Huizinga and Laeven (2008) or Lohse and Riedel (2013). A review of the indirect evidence can be found in Heckemeyer and Overesch (2013). Moreover, a summary of the papers that follow this indirect approach can be seen in the Appendix.

There are also other more recent economic and accounting indirect approaches to prove the existence of PS behaviour (we can mention the papers of Collins, Kemsley and Lang, 1998; Klassen and Laplante, 2012; Dyreng and Markle, 2016 or Dharmapala and Riedel, 2013), but the Hines and Rice approach has been most used to date.

2.2. Evaluating the magnitude of Profit Shifting activity and identifying the main strategies used to accomplish it

As we remarked above, there is no consensus on the magnitude of PS phenomena and therefore, on the consequences for tax collection. However, as Hines (2014:444) point out, the economic consequences of the PS behaviour motivated by CITs cannot be very significant, given that CIT amounts to a very small part of the total tax revenues of major economies (the same is not true in less developed countries). In any case, what is clear and really significant is the fact that there is a distributive justice problem between territories.

Heckemeyer and Overesch (2013) performed a meta-analysis considering all possible variables that could have affected the magnitude of the varied results from 25 studies based on indirect approaches, and derived a semi-elasticity of pre-tax profits with respect to the international tax differential of 0.8, in absolute terms. This means that "reported profits decrease by about 0.8% if the international tax differential that can be exploited for tax arbitrage increases by 1 percentage point" (Heckemeyer and Overesch, 2013:2). They also obtained that non-financial strategies (Transfer Pricing and licensing) dominate over financial ones (Thin Capitalisation).

On the other hand, Heckemeyer and Overesch (2013:10-16) detected a series of methodological choices made in the different empirical works that could have affected the range of quantitative results. These choices refer to the proxies of the model variables (the measure of the companies' profits used as a dependent variable, the tax

incentive proxy, and the labour and capital indicators), the disaggregation level of the data and the econometrics.

With regard to the proxies used for the dependent variable we can distinguish four kinds of measures: pre-tax profits, post-tax profits, pre-tax earnings and post-tax earnings. According to these authors, using earnings instead of profits is expected to lead to a lower magnitude of PS behaviour because of the exclusion of interest and thus, of the financial strategies (Thin Capitalisation) for PS. Also, the impact of CITs on profits is expected to be higher when the measure of the dependent variable includes taxes.

The treatment given to the measure of the CIT incentive for PS is another major methodological issue. Some papers have used as proxy for this measure only the TR of the country where profits are reported, while others (first Huizinga and Laeven, 2008 and later De Simone, 2016 and Markle, 2016) have calculated weighted average TR differences considering all TRs and profits shifting opportunities throughout the territories where the MNE operates.

Lastly, we would like to emphasize the introduction of industrial Fixed Effects in the econometric specification as a way to control for the use of intangible assets. There are some economic sectors that use a high level of intangible assets (such as pharmaceuticals), which according to Dischinger and Riedel (2011:693), could have important effects on both true profits and shifted profits. Intangible assets usually produce a relatively high level of profits, and at the same time, make the Transfer Pricing strategy of MNEs easier. The prices of these assets are difficult to set according to the arm's length principle because of the lack of similar transactions on the market (Grubert, 2003:226). Thus, companies in sectors which use a higher level of intangible assets have more opportunities to use the Transfer Pricing strategy to shift profits.

3. Empirical analysis

3.1. Empirical methodology and data

3.1.1. Empirical methodology

We use the Hines and Rice indirect approach to verify the existence of PS activity by companies located in Spain. In addition to the basic premise of this approach (reported profits are equal to true profits plus shifted profits) Hines and Rice (1994:16) assume

that PS activity is costly. As we said in the introductory section, there is evidence that PS activity is not fully performed due to such costs. In particular, these authors assume that marginal costs from PS activity increase as the ratio of reported profits to true profits increases.

This equation shows the main idea of the Hines and Rice approach:

$$\pi_i = \rho_i + \phi_i - \frac{a}{2}\frac{(\Phi_i)^2}{\rho_i}; \quad (1)$$

Where π_i are the reported profits in country *i*, ρ_i are the true profits in country *i*, ϕ_i are the profits shifted from or to country *i*, and $\frac{a}{2}\frac{(\Phi_i)^2}{\rho_i}$ are total PS costs in any of the two-way directions, being a>0.

From this initial equation, the authors derive the expressions for shifted and true profits. On the one hand, they calculate the expression of a MNE's optimal profits shifted by maximising global profits net of taxes (t_i) and PS costs (taking as fixed true profits).

$$L = \sum_{i=1}^{n}(1 - t_i)\left(\rho_i + \phi_i - \frac{a}{2}\frac{(\Phi_i)^2}{\rho_i}\right) \quad (2)$$

$$\text{subject to } \sum_{i=1}^{n}\phi_i \leq 0$$

And on the other hand, they estimate true profits (which are not observable) from a Cobb-Douglas production function $Q = cA^{\varepsilon}L^{\alpha}K^{\phi}e^{u}$ (where A is the level of productivity in the local country, L is labour input, K is capital input and c is a constant term), supposing that true profits are equal to the production function less the labour costs wL (where w is the wage and is taken to be equal to the marginal product of labour).

$$Q - wL = c(1 - \alpha)cA^{\varepsilon}L^{\alpha}K^{\phi}e^{u} \quad (3)$$

Making some substitutions and calculations to define a particular measure of the tax incentive variable, the authors derive an expression in logarithms similar to this one for analysing the existence of the PS activity:

$$Ln(\pi_i) = \beta_1 + \beta_2 lnA_i + \beta_3 lnL_i + \beta_4 lnK_i - \gamma(Tax\ incentive_i) + u_i; \quad (4)$$

Where $\beta_1 + \beta_2 lnA_i + \beta_3 lnL_i + \beta_4 lnK_i$ accounts for reported profits derived from the real activity of MNEs, and $\gamma\ (tax\ incentive)$ accounts for reported profits derived from their PS activity.

It is essential to know the particular definition of the tax incentive variable to interpret the results of the estimation correctly, taking into account the negative relationship between taxes and reported profits in a particular territory derived from the PS activity. If the tax incentive measure is the TR of the local jurisdiction where profits are reported, it is clear that PS activity should lead to estimating a negative effect. However, if the measure is a TR difference between territories, the interpretation depends on how the subtraction has been calculated.

3.1.2. Data

3.1.2.1. Sample selection and procedure

The sample includes 2496 non-financial Spanish subsidiaries owned by OECD and/or EU parent industrial companies from 2005 to 2014. It has been taken from the AMADEUS database, from the Bureau Van Dijk. Parent companies are those denominated Global Ultimate Owners (GUOs) in AMADEUS. In particular, the definition we have taken for the GUOs considers a minimum percentage for the path from a subject company to its GUO of 25.01%. Then, we use panel data as opposed to the cross-section data used by Hines and Rice (1994) and the new model equation can be represented as follows:

$$Ln(\pi_{it}) = \beta_1 + \beta_2 lnA_{it} + \beta_3 lnL_{it} + \beta_4 lnK_{it} - \gamma(Tax\ incentive_{it}) + u_{it}; \quad (5)$$

Where t indicates the time period and the sample units i are now affiliates (the Spanish subsidiary companies) instead of countries (as opposed to the country level data used by Hines and Rice, 1994).

The AMADEUS database provides financial statements and ownership data for European companies. We have had access only to the data of big and very big companies. However, we consider this to have been an advantage. PS activity is usually carried out by this type of companies.

We downloaded the following financial data for the sample of Spanish subsidiaries: profit before income tax expense (as a measure of the dependent variable), tangible fixed assets (as a measure of the input capital) and cost of employees (as a measure

of the input labour), all of them in thousands of euros. Following the previous literature, after downloading the data we aggregated the observations of every financial variable of subsidiaries belonging to the same parent company. We only aggregated these observations when data on the variables were available for all the subsidiaries belonging to the same parent company.

From now on we will call each of these aggregated units a subsidiary, although this is not exactly the correct word. As a result of the aggregation, we obtained the same number of subsidiaries as parent companies in the sample, 1380.

Apart from the structure of the data, another difference from the Hines and Rice initial econometric specification is the variables we transform into logarithms. These are the variables with the highest value and the largest standard deviation in proportion to the average: the dependent variable and the tangible fixed assets. Moreover, we have not introduced in the model the level of productivity of the territory where profits are reported because in all cases it is Spain.

3.1.2.2. The tax incentive measure

We used a simple TR difference between territories (the residence and the source country jurisdictions) as a proxy for the international tax incentive to shift profits, in the same way as some authors did (Mills and Newberry, 2004; Clausing, 2009; Dischinger, 2010; Blouin et al., 2011; Dischinger and Riedel, 2011; Becker and Riedel, 2012; or Dischinger et al., 2014). In particular, we calculated the difference between the Spanish TR and the respective foreign TR of the country where the parent company is situated ($T_{ES} - T_{EX}$). The tax measure we considered is the top statutory CIT rate of the countries (including local taxes). Most of the information comes from KPMG (2006) and the KPMG website[2], and it has been completed with information from the OECD[3] and the EU[4] (2012).

This proxy of the tax incentive only measures the PS activity between parents and subsidiaries and the expected effect of it on the reported profits is negative. As the TR difference increases (decreases) the reported profits in Spain should decrease (increase). Moreover, since the dependent variable (reported profits) is in logarithms and the tax incentive variable is in levels, γ gives directly the semi-elasticity of taxes on profits.

[2] http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx
[3] http://www.oecd.org/tax/tax-policy/tax-database.htm#C_CorporateCaptial
[4] Spengel, Elschner and Endres (2012)

On the other hand, it may be important to take a look at the series of values of our tax incentive variable before estimating and interpreting the results. We can see that TR differences are high enough to encourage the PS activity. In the first place, the number of cases in which there is an absolute difference higher than 0.1 (which we consider high enough) is 2914 (out of 10849 observations).

In the second place, a study by Dischinger et al. (2014:257-268) showed that the PS semi-elasticity from parents to affiliates is lower than that from affiliates to parents. PS from subsidiaries to parents takes place when the TR of the subsidiaries is higher that the TR of the parents. Looking at the data, we can see that this happens more than half the time and therefore also in this case there is enough scope for PS activity to be important in the sample. The major TR difference between Spain and another country is 0.25 points and corresponds to the tax difference with Cyprus in 2005 and 2006 (when Cypriot TR was 10% and Spanish TR was 35%).

Lastly, Table 1 gives information about the number of parent companies (of our Spanish sample subsidiaries) by country, which gives an idea of the countries whose CIT have a higher weight in our results due to the higher profits reported in Spain. They are the United States, Luxembourg, and Germany (of which the United States and Germany have relatively high statutory TRs).

Table 1: Number of parent companies by country

Country	Number of parent corporations
Austria	7
Australia	5
Belgium	30
Canada	24
Switzerland	54
Chile	5
Cyprus	5
Czech Republic	1
Germany	126
Denmark	32
Estonia	1
Finland	12
France	108
United Kingdom	110
Greece	2
Ireland	17
Israel	8
Iceland	1
Italia	57
Japan	93
Korea	9

Luxembourg	174
Malta	8
Mexico	11
Netherlands	94
Norway	10
New Zealand	2
Poland	3
Portugal	18
Sweden	20
Slovenia	1
Slovakia	1
Turkey	2
United States	329

The correlation matrix and the descriptive statistics can be seen in Table 2 and Table 3.

Table 2: Correlation matrix

	lnK	L	$\mathrm{T_{ES}} - \mathrm{T_{EX}}$
lnK	1		
L	0.3684	1	
$\mathrm{T_{ES}} - \mathrm{T_{EX}}$	0.0455	-0.0053	1

Table 3: Descriptive statistics

Variable	Observ.	Mean	Std.Dev.	Min	Max
π	10,814	4,502.344	80,520	-2,116,210	5,430,267
$ln\pi$	7,554	7.408826	1.911522	-2.033016	15.5075
K	10,674	32,082.8	280,646.9	0	1.16e+07
lnK	10,263	7.773763	2.498201	-9.028019	16.26247
L	9,971	18,507.88	55,282.52	1.00e-05	939,479.1
lnL	9,971	8.477085	1.696536	-11.51293	13.75308
$\mathrm{T_{ES}} - \mathrm{T_{EX}}$	10,849	-0.0096493	0.0675002	-0.1069	0.25

3.2. Results: Tax revenue consequences

We have used static panel data techniques to derive the effects of the international tax incentive on Spanish reported profits. We have estimated both Random Effects and

Fixed Effects, and according to the Hausman test the preferred estimation is Fixed Effects. We have also estimated both one-way (including subsidiaries Fixed Effects) and two-way Fixed Effects models (including subsidiaries and year Fixed Effects), but the results are the same. We present our results in Table 4.

Table 4: Results

Variables	Subsidiaries Fixed Effects
L	1.90e-06 (2.29)**
$\ln K$	0.1495413 (7.76)***
$T_{ES} - T_{EX}$	-2.081585 (-3.54)***
Number of observations	7034
R^2	0.0148

Note: Robust t-statistics are in parentheses. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

As we can see in Table 4, our results are in line with the empirical literature (a summary can be seen in Heckemeyer and Overesch, 2013 and Dharmapala, 2014). We obtain a negative relation between our measure of the tax incentive to shift profits and reported profits, which indicates that taxes and profits are negatively correlated and corroborates that companies located in Spain are involved in PS activity. Spanish companies report profits lower (higher) than true profits when the Spanish TR is higher (lower) than the foreign TR of the country where the parent company is located.

Particularly, we have estimated a semi-elasticity of 2, which indicates that if the simple TR difference (the Spanish TR minus the foreign TR) increases by 1%, reported profits decrease by 2%. That means that the change of the Spanish TR from 30% to 28% (which entails a reduction of almost 6.66%) in 2015 should lead to an increase of reported profits in Spain of 13.3% (assuming all else being equal).

Taking this semi-elasticity we can estimate in a very simple way the tax revenue consequences for Spain of the disappearance of PS activity. But we have to make some important assumptions. Firstly, we have to assume that the elimination of PS activity does not change the MNEs' investments decisions, all else being equal. And secondly, that the average semi-elasticity we estimated is the same for all years in the sample.

Holding these assumptions in mind, similarly to Clausing (2009) we quantified the difference in terms of tax revenues for Spain over the period 2005-2014. To that end it

was necessary to calculate the new reported profits in absence of the PS activity from the semi-elasticity of reported profits to taxes we estimated. The results can be seen in Table 5.

Table 5: Tax revenue consequences for Spain of removing Profit Shifting activity, 2005-2014 (thousands of €)

Year	Spanish CIT rate (%)	Reported Profits with PS	Reported Profits without PS	Reported Profits Difference	Difference in CIT Revenues
2005	35	4,804,348.14	4,912,107.972	107,759.832	37,715.94121
2006	35	6,640,392.94	6,865,053.839	224,660.8988	78,631.31458
2007	32.5	7,142,887.43	7,158,041.856	15,154.42561	4,925.188322
2008	30	3,716,292.98	3,495,041.816	-221,251.1643	-66,375.3493
2009	30	3,154,045.74	3,051,024.49	-103,021.2497	-30,906.37492
2010	30	4,058,585.15	3,965,522.723	-93,062.42683	-27,918.72805
2011	30	1,357,298.32	1,172,427.7	-184,870.6199	-55,461.18597
2012	30	3,817,288.69	4,148,218.693	330,930.0034	99,279.00103
2013	30	4,868,459.27	4,694,909.19	-173,550.08	-52,065.02401
2014	30	9,128,751.4	10,252,927.23	1,124,175.831	337,252.7492
TOTAL		48,688,350.1	49,715,275.51	1,026,925.45	325,077.532

As we can see in Table 5, it seems from our sample of Spanish subsidiaries that during the period 2005-2014, Spain has been a net loser of the PS activity. That is, reported profits in Spain could have been lower than real profits from the real economic activity carried out within its borders. Particularly, in the absence of the PS activity Spain could have earned up to 325,077.532 thousand euros more from the CIT, which accounts for more than 2% of total tax revenues from the sample companies.

But having a complete picture of the tax revenue consequences of the PS activity for Spain would also require estimating the consequences for a symmetric sample of foreign subsidiaries owned by Spanish companies.

Although we tried to demonstrate the PS behaviour of Spanish companies for this other sample, our results were not good and we need to examine them further. However, we have some arguments for justifying the results and they are: the relatively high Spanish CIT rate (as we mention above, shifted profits are usually higher from subsidiaries to parent companies than from parents to subsidiaries), the limited TR differences between Spain and the foreign countries included (the foreign CIT rates included for the calculation of the tax incentive change when considering the Spanish FDI outbound side), the fact that some Spanish corporations and their strategies have a greater weight in the sample (those whose investments are more spread out among different

countries), the fact that observations are concentrated in a few countries, and lastly the fact that many observations are lost when applying logarithms.

4. Conclusions and future additional analyses and robustness tests

This paper describes the topic of the PS activity of MNEs and reviews the empirical literature related to it to subsequently examine the existence of such activity from a sample of companies located in Spain.

We obtained a negative effect of taxes on Spanish reported profits and thus, indirect evidence of the presence of PS between Spain and foreign countries, which is consistent with the previous empirical literature. Particularly we estimated a semi-elasticity of 2, which means that if the Spanish TR increases by 1% to the foreign TR, then the reported profits in Spain decrease by 2%. Moreover, we derived that Spain is a net loser of this activity in terms of tax revenues because it could have earned additional income if it had not existed.

On the other hand, from this work it is possible to perform additional empirical analyses and robustness tests[5]. We are thinking about evaluating particular provisions of the tax system of the countries which may encourage CIT-motivated PS activity. For example, according to Markle (2016:39-40), PS could depend on the different systems of taxing foreign earnings of the countries where MNEs are domiciled.

PS activity could also depend on the MNEs characteristics such as their level of intangible assets. As we said before, this kind of assets increase the possibility of accomplish PS. Related to this issue, another improvement of the present work could consist of introducing industry Fixed Effects in the regression as a way to control for the heterogeneity in the use of intangible assets alongside the different industrial sectors.

We would also like to point to the analysis of PS between subsidiaries (we concentrated on PS activity vis-à-vis parents and subsidiaries up to now) by taking another measure of the tax incentive. Particularly, we want to implement the measure of Huizinga and Laeven (2008:1169).

Lastly, as robustness tests we propose other proxies for the dependent variable as well as the independent variables. We suggest, for example, using the number of

[5] Most of the ideas are based on the Heckemeyer and Overesch (2013) and Dharmapala (2014) reviews of the empirical literature.

employees and total assets as proxies for the inputs labour and capital, respectively. And using the pre-tax earnings as measure of the dependent variable to compare the magnitude of the PS activity depending on the scope of the PS channels considered.

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Appendix. ***Review of the empirical literature on the Profit Shifting activity of Multinational enterprises motivated by Corporate Income Taxes. Hines and Rice approach***[6].

Author/s and Year	Methodological Factors[7], Additional Control Variables and Analysis
Hines and Rice (1994)	-Sample[8]: BEA (aggregate data on nonbank majority-owned affiliates); 1982. -Profits[9]: Ln (Pre-tax earnings); Ln (Pre-tax profits). -Tax Incentive[10]: TR (average TR). -Real Economic Activity[11]: $\ln L_i$: Ln (Total employee compensation). $\ln K_i$: Ln (Plant, Property and Equipment). $\ln A_i$: Ln (GDP pc). -FE[12]: - -Additional Control Variables[13]: - -Additional Analyses[14]: -
Grubert (2003)	-Sample: Treasury Corporate Tax Files (manufacturing CFCs with positive earnings) and Compustat (R&D information); 1996. -Profits: Pre-tax profits/Sales. -Tax Incentive: TR (statutory TR). -Real Economic Activity: $\ln K_i$: Ln (Assets/Sales). -FE: - -Additional Control Variables: • CFC: CFC age<5 years; CFC age 5-15 years; Debt/Assets. • MNE: Parent R&D/Sales; Parent advertisement/Sales; Ln (Parent sales); Interaction terms with the tax incentive. • Country: GDP pc. -Additional Analyses: The links between intangible income, intercompany transactions, income shifting and the choice of location; Main PS strategies.
Mills and Newberry (2004)	-Sample: Treasury Corporate Tax Files (CFC not belonging to the financial sector); 1987-1996.

[6] We summarize the empirical literature based on the Hines and Rice approach, including other papers with a similar approach.

[7] We summarize the methodological factors that according to Heckemeyer and Overesch (2013) could have affected the magnitude of the results: the sample, the proxies for the model variables and the econometrics.

[8] We indicate the database (and some characteristics of the particular sample selection, in brackets) and the time period. The description of the different databases (countries included, information contained and level of data disaggregation) is at the end of this table.

[9] We indicate the proxy for the dependent variable. We distinguish between four possible proxies: pre-tax earnings (excludes taxes and interest), post-tax earnings (includes taxes but excludes interest), pre-tax profits (excludes taxes but includes interest) and post-tax profits (includes taxes and interest).

[10] We indicate the proxy for the tax incentive variable. We distinguish between three possible proxies: TR, simple TR difference and weighted TR difference.

[11] We indicate the proxies for the inputs labour and capital and the level of productivity of the territory where they are situated.

[12] We indicate the kind of Fixed Effects included in the regression.

[13] We indicate the additional control variables included in the regression.

[14] We indicate the additional analyses different from the examination of the existence of the PS activity but related to this PS activity; for example, the effect of the PS activity on the tax collection.

	-Profits: Pre-tax profits/Assets; Pre-tax profits/Sales. -Tax Incentive: Simple TR difference (from the US statutory TR and the average TR of the foreign parent company; and from statutory TRs). -Real Economic Activity: Through the denominator of the dependent variable. -FE: Year FE; Industrial FE; Parent country FE. -Additional Control Variables: • CFC: Altman's bankruptcy predictor score; Age; Sales/Total sales. • MNE: Intangible assets/Assets; Pre-tax profits/Assets. -Additional Analyses: Tax incentive effect on the debt levels.
Huizinga and Laeven (2008)	-Sample: AMADEUS (manufacturing subsidiaries); 1999. -Profits: Ln (Pre-tax earnings); Ln (Pre-tax profits). -Tax Incentive: Weighted TR difference (from statutory TR and taking sales as the weighting factor). -Real Economic Activity: $\ln L_i$: Labour compensation; Ln (Number of employees). $\ln K_i$: Ln (Fixed assets). $\ln A_i$: Ln (GDP pc). -FE: Industrial FE. -Additional Control Variables: • Affiliate: A dummy variable indicating Eastern European firms and an interaction term with the tax incentive; Financial leverage. • Country: Corruption. -Additional Analyses: -
McDonald (2008)	-Sample: Treasury Corporate Tax Files (CFC not belonging to the financial sector and without losses); 1996, 2000 y 2002. -Profits: Pre-tax earnings/Sales. -Tax Incentive: TR (statutory TR). -Real Economic Activity: Assets/Sales. -FE: - -Additional Control Variables: • CFC: CFC age<5 years; CFC age 5-15 years • MNE: Parent R&D/Sales; Parent advertising/Sales; Parent domestic profits/Sales; Ln (Parent sales). Cost sharing arrangements and an interaction term with the tax incentive. -Additional Analyses: -
Clausing (2009)	-Sample: BEA; 1982-2004. -Profits: Pre-tax profits/Sales; Pre-tax profits/Employment. -Tax Incentive: Simple TR difference (effective TR; statutory TR). -Real Economic Activity: Through the denominator of the dependent variable. -FE: - -Additional Control Variables: - -Additional Analyses: PS effect on the US revenue collection.
Schwarz (2009)	-Sample: BEA (foreign affiliates); 1999-2001. -Profits: Pre-tax profits/Sales; Pre-tax profits/Assets. -Tax Incentive: TR (statutory TR; effective TR). -Real Economic Activity: Through the denominator of the dependent variable. -FE: - -Additional Control Variables: • Country: GDP growth; Political risk. -Additional Analyses: Replacing the dependent variable by

	Equity capital/(Equity capital +debt) and Retained earnings/Stocks.
Weichenrieder (2009)	-Sample: MiDi (Incorporated affiliates, excluding those operating in not-for profit sectors and those in the banking and insurance industries and holding companies); 1996-2003. -Profits: Post-tax profits/Total assets. -Tax Incentive: TR. -Real Economic Activity: $\ln L_i$: Ln (Employment). $\ln K_i$: Ln (Fixed Assets). -FE: Firm effects; Time effects. -Additional Control Variables: • Affiliate: Ln (Sales); Debt/Total assets; Dummy variable depending on the ownership relationship. • Country: GDP growth; Domestic private credit/GDP. -Additional Analyses: -
Azemar (2010)	-Sample: Treasury Corporate Tax Files; 1992-94-96-98-2000. -Profits: Ln (Pre-tax profits). -Tax Incentive: TR (average TR). -Real Economic Activity: $\ln K_i$: Ln (Total assets). -FE: Year FE. -Additional Control Variables: • Country: Ln (GDP); Ln (Trade openness); Ln (Inflation); Ln (Exchange rate); Ln (Physical infrastructures); GDP pc (or host country legislative maturity) and an interaction term with the tax incentive. -Additional Analyses: Taxes effect on repatriated dividends and Subpart F income.
Dischinger (2010)	-Sample: AMADEUS (foreign affiliates of industrial MNEs, excluding state-owned enterprises and firms that exhibit negative profits); 1995-2005. -Profits: Ln (Pre-tax profits/Number of employees); Ln (Pre-tax profits/Sales); Ln (Pre-tax profits/total Assets). -Tax Incentive: Ln (Simple TR difference): statutory TR; TR. -Real Economic Activity: $\ln L_i$: Ln (Cost of employees/Number of employees). $\ln K_i$: Ln (Fixed assets/Number of employees). $\ln A_i$: Ln (GDP pc). -FE: Affiliates FE; Year FE. -Additional Control Variables: • Affiliate: Debt ratio. • MNE: Ownership share and an interaction term with the tax incentive. • Country: Ln (GDP); Ln (Unemployment rate); Ln (Corruption index). -Additional Analyses: -
Blouin et al. (2011)	-Sample: BEA (foreign affiliates, excluding bank and insurance companies, holding companies and unprofitable companies); 1982-2005. -Profits: Ln (Pre-tax profits). -Tax Incentive: Simple TR difference (from foreign marginal TR and US statutory TR). -Real Economic Activity: $\ln L_i$: Ln (Cost of employees).

	$\ln K_i$: Ln (Total assets). $\ln A_i$: Ln (GDP pc). -FE: Industrial FE; Year FE. -Additional Control Variables: Conflicting situation (trade-off between minimising CITs and customs duties) dummy; Interaction term with the tax incentive. -Additional Analyses: -
Dischinger and Riedel (2011)	-Sample: AMADEUS (industrial affiliates of industrial parent companies which own intangible assets, excluding MNEs which a negative profit at all group affiliates); 1995-2005. -Profits: Ln (Pre-tax profits). -Tax Incentive: Simple TR difference. -Real Economic Activity: $\ln L_i$: Ln (Cost of employees). $\ln K_i$: Ln (Fixed assets). $\ln A_i$: Ln (GDP pc). -FE: Subsidiary FE; Year FE. -Additional Control Variables: • Affiliate: PS depending on the average intangible intensity. • MNE: PS depending on the distribution of intangible assets of a corporate group between high and low tax subsidiaries. • Country: Country R&D expenses; Population; Corruption index; GDP pc growth; Unemployment rate; -Additional Analyses: Taxes effect on the intangible assets location.
Becker and Riedel (2012)	-Sample: AMADEUS (subsidiaries directly owned by a foreign parent company with an ownership percentage of at least 90%); 1995-2006. -Profits: Ln (Pre-tax profits). -Tax Incentive: Simple TR difference (statutory TR). -Real Economic Activity: $\ln K_i$: Fixed asset investment. -FE: Industry-year dummies. -Additional Control Variables: • Country: GDP pc subsidiaries; GDP pc parents; Population subsidiaries; Unemployment rate subsidiaries; Unemployment rate parents. -Additional Analyses: -
Grubert (2012)	-Sample: Treasury Corporate Tax Files (most of the analysis are based on nonfinancial corporations, some of the analyses exclude companies with worldwide losses); 1996 and 2004. -Profits: Change in profits/Sales. -Tax Incentive: TR (Change in Average Effective Foreign TR). -Real Economic Activity: Through the denominator of the dependent variable. -FE: - -Additional Control Variables: • CFC: A dummy for companies incorporated after 1980; Ln (Sales), 1996; Change in worldwide profit margin. • MNE: Parent R&D/Sales, 2004; Parent advertising/Sales, 2004; Interaction term with the tax incentive. • Country: Average effective foreign TR 1996 (effects of tax differences over time). -Additional Analyses: Explanation on the growing share of U.S. MNE income abroad (linkage between the firm level results and the change in the foreign share of aggregate MNE income).

Lohse and Riedel (2013)	-Sample: AMADEUS (subsidiaries with positive profits); 1999-2009. -Profits: Ln (Pre-tax earnings); Ln (Pre-tax earnings/Total Assets); Ln (Pre-tax profits); Ln (Pre-tax profits/ Total Assets). -Tax Incentive: TR (statutory TR). -Real Economic Activity: $\ln L_i$: Cost of employees. $\ln K_i$: Fixed Assets. -FE: Subsidiary FE; industrial FE. -Additional Control Variables: • Country: PS depending on the Transfer Pricing rules; GDP; GDP pc; GDP growth; Unemployment rate; Corruption index. -Additional Analyses: -
Dischinger et al. (2014)	-Sample: AMADEUS (subsidiaries and parent countries, excluding holding companies and non-profitable companies); 1995-2007. -Profits: Ln (Pre-tax profits). -Tax Incentive: Simple TR difference (from statutory TR). -Real Economic Activity: $\ln L_i$: Cost of employees. $\ln K_i$: Fixed Assets. $\ln A_i$: GDP pc. -FE: Affiliates FE; Year FE; Industrial FE. -Additional Control Variables: • Affiliate: Ln (Subsidiary total assets / Parent company total assets) and an interaction term with the tax incentive. • MNE: Ln (Number of entities in the corporate group) and an interaction term with the tax incentive. • Country: High tax subsidiary dummy; Interaction term with the tax incentive. -Additional Analyses: -
Loretz and Mokkas (2015)	-Sample: AMADEUS (large and very large companies, excluding parent companies); 2002-2009. -Profits: Post-tax earnings/Assets; Post-tax profits/Assets; Pre-tax earnings/Assets; Pre-tax profits/Assets[15]. -Tax Incentive: TR (statutory TR). -Real Economic Activity: $\ln L_i$: Ln (Number of employees). $\ln K_i$: Ln (Total assets). -FE: Affiliate FE; year FE. -Additional Control Variables: • Affiliate: Leverage. • Country: GDP growth; Inflation rate; Interest rate. -Additional Analyses: -
De Simone (2016)	-Sample: AMADEUS (parent and subsidiary companies, excluding banks, insurance companies and non-profitable companies); 2003-2012. -Profits: Ln (Pre-tax profits). -Tax Incentive: Weighted TR difference (from statutory TR and taking operating revenues as the weighting factor). -Real Economic Activity: $\ln L_i$: Ln (Compensation expense). $\ln K_i$: Ln (Fixed Tangible Assets).

[15] In this case, the denominator of the dependent variable is introduced to control for the sensitivity of capital to taxes, as far as proxies for the companies' real operations are included on the right hand side of the equation in absolute terms.

	$\ln A_i$: Ln (GDP pc). -FE: Country FE; Year FE; Industrial FE. -Additional Control Variables: • Affiliate: Observations that are listed dummy; Observations that are listed as the GUO dummy. • Country: Interaction term between the adoption of a common set of accounting standards dummy and the tax incentive. -Additional Analyses: -
Markle (2016)	-Sample: ORBIS (foreign affiliates situated in 34 countries, excluding companies in a service, financial or insurance industry); 2004-2008. -Profits: Ln (Pre-tax profits). -Tax Incentive: Weighted average TR (from statutory TR and taking operating revenues as the weighting factor). -Real Economic Activity: $\ln L_i$: Ln (Compensation expense). $\ln K_i$: Ln (Tangible Fixed Assets). $\ln A_i$: Ln (GDP pc). -FE: Firm FE; Year FE. -Additional Control Variables: • Country: Interaction term between the taxation of foreign income dummy and the tax incentive. -Additional Analyses: -

Note. Databases information:

- AMADEUS. Accounting consolidated and unconsolidated data on private and publicly owned European firms as well as on their ownership relationships.
- ORBIS. Accounting consolidated and unconsolidated data on private and publicly owned worldwide firms as well as on their ownership relationships.
- MiDi. Inward and outward German multinationals data on a set of balance sheet items (including yearly profit after taxes but before dividend distributions as a separate part of the equity of the firm), plus data on sales and employees and microdata on FDI.
- BEA. Financial and operating data on U.S. multinational corporations.
- Treasury Corporate Tax Files. Financial data on the 7,500 largest foreign corporations controlled by U.S. multinationals.
- Compustat. Financial data on US MNEs.