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## The Impact of Tax Treaties and Repatriation Taxes on FDI Revisited

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# The Impact of Tax Treaties and Repatriation Taxes on FDI Revisited\*

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**Abstract:** We revisit the effects of double tax treaties on foreign direct investment. Previous empirical studies provide somewhat counterintuitive results suggesting insignificant or even negative effects of tax treaties. Using a rich firm-level dataset provided by the German Central Bank we analyze the investment impact of double tax treaties and repatriation taxes between more than 3,000 country pairs. Whereas we do not find a significant effect of tax treaties on overall investment, we show that repatriation taxes have an adverse effect on fixed assets and a positive effect on financial assets. The latter supports the assumption that firms defer profit distribution to avoid taxes. Correspondingly, we also find that revenue reserves increase in repatriation taxes.

**Keywords:** Corporate Taxation, Double Tax Treaties, Repatriation Taxes, Empirical Analysis, Foreign Direct Investment, Multinational Firms

**JEL Classification:** F23, H25, H32

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## 1. Introduction

Multinational companies invest in their subsidiaries all over the world. There are several reasons for the increase of foreign direct investment (FDI) over the last decades. Most of them come down to the argument of lower transaction costs. In this paper, we work out how the improved coordination concerning taxation affects FDI. In particular, we revisit the impact of tax treaties and especially repatriation taxes on FDI. We model repatriation taxes as the sum of the nominal withholding tax effectively imposed on intercompany dividends by the country where the FDI takes place and the taxes imposed on those dividends in the home country of the receiving entity of the multinational firm.

Without an agreement, profits may be taxed twice, in the country where they originate and in the country to which they are repatriated. In order to avoid double taxation, states enter into bilateral double tax treaties. Besides other aspects, a double tax treaty allocates the claims to tax the same income, limits the tax rates imposed by source countries and defines a method to avoid double taxation. In particular, tax treaties define the percentage of distributed dividends the host country is allowed to keep as a withholding tax and how the dividends are taxed at home.

During the last decades, hundreds of double tax treaties have been concluded or amended and many of them lowered the permissible tax imposed on dividends between the respective countries. We combine this extensive institutional variation with a rich micro-level data set of German multinationals active in more than 50 host countries. Especially, we have detailed information on the chains of ownership. Moreover, we can use the fact that Germany has one of the most extensive tax treaty networks all over the world and always stipulates the exemption of foreign dividends from home country taxes. This data allows us to identify double tax treaties, withholding tax rates and the effective tax on repatriations between more than 3,000 country pairs over a period from 1996 till 2008.

We provide evidence suggesting that repatriation taxes indeed significantly affect investments of multinational subsidiaries. Our results are opposed to the finding of earlier studies stating a negative impact of tax treaties on investment. Whereas double tax treaties are expected to increase FDI, surprisingly, this general effect does not appear in several previous empirical studies. Blonigen and Davies (2004) find mostly insignificant and even some negative effects of the existence of a double tax treaty in aggregated data on US inward and outward FDI. Da-

vies (2003) considers US FDI data from 1960s and 1970s and also finds a negative response to tax treaties and mixed results for tax treaty amendments. Louie and Rousslang (2008) make another attempt to identify effects of US tax treaties but also fail to find statistically significant effects. Egger et al. (2006) consider outward FDI of OECD countries. Yet, their results again suggest a significant *negative* impact of newly implemented tax treaties on FDI. Egger and Wamser (2013) show that the extensive margin of bilateral FDI is negatively affected when a DTT is inaugurated together with other agreements fostering economic integration (bilateral investment treaties (BIT) or goods trade agreements (GTA)).

The insignificant or even negative effects are usually explained by a supposed treaty-induced reduction of tax evasion practices (see, e.g., Blonigen and Davies, 2004). Despite ongoing empirical analyses of tax evasion, this argument is not fully convincing in the tax treaty context. Regarding the rules to monitor transfer prices, national tax legislation of OECD countries and many other countries already refer to the arm's length principle to assess transfer prices irrespective of any double tax treaty. Concerning the effects of enhanced information exchange, it is also not entirely clear whether this fact really is to be associated with significant additional tax payments in the particular case of FDI. Whereas information exchanges clearly help to identify taxable transactions in the case of portfolio investment and capital investment by individuals, FDI is usually not completely invisible for tax authorities because investors have significant control in the investment projects and both the parent company and the subsidiary have to disclose financial accounts. Further, firms may switch to tax avoidance via debt financing if this information exchange hinders other types of tax avoidance (Huizinga et al., 2008). Another reason why debt financing may become more attractive after a DTT is that e.g. US bilateral tax treaties encourage reductions of the withholding tax rates on interests to 0% whereas they encourage tax rates on dividends of 5% (Daniels et al., 2015).

We, however, suppose that positive effects of tax treaties on FDI should outweigh any negative treaty effects. There already is evidence that withholding taxes and the method to avoid double taxation of foreign income significantly affect FDI. Hines (1996) finds that low tax US states are particularly attractive to investors from home countries which exempt foreign income compared to investors from credit countries. Similarly, a study by Egger et al. (2009) finds a significant effect of host country taxes on bilateral FDI among OECD countries if the home country applies an exemption system. In any case, both find a significant negative effect of withholding taxes on aggregated FDI stocks. Huizinga and Voget (2009) employ micro-

data of M&A cases and find striking effects of repatriation taxes on both the direction of acquisitions and the number of acquired firms per country. Furthermore, Overesch and Wamser (2009) find negative effects of withholding taxes on location decisions of German multinationals. Davies et al. (2009), Egger and Merlo (2011) as well as Marques and Pinho (2014) find that DTTs increase investment at the extensive margin. Barthel et al. (2010) find a positive effect of DTTs on investment. Egger and Wamser (2013) show that DTTs have a positive effect on the extensive margin in the short-run as well as on the intensive margin in the short-run and the long-run. Blonigen et al. (2014) find that the effects of DTTs are stronger for firms with differentiated inputs. Those firms benefit from increased support in determining transfer prices through the DTTs. Daniels et al. (2015) find a positive effect of DTTs on investment if it is financed by debt. This is in line with the above statement that firms have incentives to switch to debt finance after DTTs.

We test whether the puzzling results found in the literature correspond with theoretical predictions about the role of repatriation taxes on investment of subsidiaries. The early literature argues that investment is negatively affected by dividend taxes. Whereas proponents of what is called the “New View” on corporate taxation show that repatriation taxes do not affect FDI if a corporation uses a reduction of its profit distributions as their marginal source of finance (King, 1974a, 1974b; Sinn, 1984; Hartman, 1985). In accordance with these models, repatriation taxes exert a negative effect only if new equity injection is the marginal source of finance, e.g., when a new subsidiary is founded (Sinn, 1993). Interestingly, some studies finding positive treaty effects analyze the external margin of FDI (Di Giovanni, 2005; Davies et al., 2009). Di Giovanni (2005) considers aggregated data on mergers and acquisitions (M&A) and finds a significant positive effect of a tax treaty. For Swedish firms, Davies et al. (2009) find a positive effect of new tax treaties on the probability to have a subsidiary in a certain host country whereas, conditional on the location choice, they are unable to identify any statistically significant tax treaty effect on sales.

We, however, contribute to the discussion of tax treaty effects and repatriation taxes by analyzing the internal margin of FDI. Moreover, our paper contributes to the literature by combining both the big picture approach and an analysis of many individual effects tax treaties and repatriation taxes are supposed to exert.

First, we analyze whether renegotiations of tax treaties exert significant effects on total investment of subsidiaries, but the estimated results are not statistically significant. Further in-

spection, however, reveals that the tax treaty puzzle can be well explained by effects of repatriation taxes on different investment decisions of multinational subsidiaries. We disentangle different kinds of investment and financing and execute detailed tests of the predictions brought forward in the previous literature. In doing so, we find that repatriation taxes negatively affect investment in fixed assets leading to the conclusion that retained earnings are not the marginal sources of finance. Apart from the significant effects of repatriation taxes, a new or renegotiated tax treaty does not seem to exert an additional significant effect on real investment.

If repatriation taxes vary over time, additional effects of repatriation taxes have to be considered. Blouin and Krull (2009) provide a simple model and empirical evidence regarding the response to the 2004 US tax holiday on repatriated dividends. It is reasonable that multinationals expect falling repatriation taxes when taking into account the striking trend of cutting withholding tax rates if tax treaties are conducted or renegotiated. If subsidiaries expect a cut in repatriation tax rates, they should postpone repatriation. Desai et al. (2007) and Bellak and Leibrecht (2010) find a negative tax impact on repatriations of US or German multinationals, respectively. Moreover, Foley et al. (2007) show that US multinationals hold extensive amounts of cash in foreign subsidiaries because repatriation will be taxed. Weichenrieder (1996) shows that capital market investments can be used to defer profit distributions. Altshuler and Grubert (2003) note that buying shares of affiliates is an especially relevant means to avoid repatriation taxes. Whereas profitable local investment opportunities of the subsidiary are limited, investment in the capital market or in shares of other affiliated firms is independent from local investment opportunities. Consequently, the positive effect of repatriation taxes on retention should particularly appear in higher financial investments. Egger et al. (2014) show that after the change in the method to avoid double taxation in the UK (from a credit to an exemption system; see the Appendix for a description of those methods), which meant a reduction of the repatriation tax, the repatriation of dividends increased.

If FDI data does not allow differentiation between physical and financial investment, the effect of repatriation taxes on financial assets might dominate estimated effects, which in turn leads to the wrong conclusion that tax treaties generally exert a negative effect on FDI. One exception is the analysis by Millimet and Kumas (2007). They find some positive effects of tax treaties on FDI measures. In particular, the effect is more pronounced for observations

succeeding the conclusion of a new double tax treaty by many years leading to the conclusion that negative effects of a new tax treaty might reflect repatriation of retained earnings.

In fact, we find a positive effect of repatriation taxes on financial investments. Moreover, we find corresponding evidence regarding the structure of equity finance. Higher repatriation taxes are associated with a significantly higher share of revenue reserves. This finding again supports the view that firms postpone repatriation because they have the general expectation that - owed to new tax treaties - high repatriation taxes will decrease in the future.

The remainder of the paper is organized as follows. In the next section we discuss effects of the institutional details of the international tax system and derive empirically testable hypotheses. Thereafter, the investigation approach is presented in Section 3. The data is presented in Section 4 and Section 5 presents empirical results. Finally, Section 6 concludes.

## **2. Development of Hypotheses**

International business taxation significantly affects FDI. Several studies have come to the result that an increase of the host country's corporate tax negatively affects FDI (for an overview see DeMooij and Ederveen, 2003; Feld and Heckemeyer, 2011). Moreover, intercompany transactions are subject to withholding taxes in the host country and are considered as foreign income at the level of the parent company. Consequently, the taxation of these transactions is also expected to influence FDI.

### *2.1 Double Tax Treaties and FDI*

A double tax treaty is an agreement between two countries on the taxation of income (dividends) which, without such an agreement, may be taxed by both treaty partners. A double tax treaty limits the claims of those countries to tax the income. Moreover, double tax treaties coordinate the definition of terms and determine mutual agreement procedures.

Considering these functions, double tax treaties are expected to affect FDI of multinational firms. It is, however, unclear if the introduction of a double tax treaty increases or decreases FDI. On the one hand, double tax treaties are expected to be associated with additional FDI for the following reasons: elimination of double taxation, reduction of withholding taxes, standardization of terms and definitions, enhanced certainty about the tax environment, and elimination of double taxation of expatriates. On the other hand, the previous literature has argued that tax treaties might also negatively influence FDI because treaties refer to the arm's

length principle to assess transfer prices. This principle means that intrafirm transactions have to be priced at what third parties would agree upon. Therefore double tax treaties would reduce profit shifting opportunities via those so-called transfer prices. Further, double tax treaties eliminate loopholes by enhancing the information exchange between the treaty partners, provoke additional repatriations by reducing withholding taxes, and prevent firms from setting up holding structures which aggressively exploit the international treaty network (see, e.g., Blonigen and Davies, 2004).

We argue that the rationales suggesting an adverse effect of tax treaties on FDI are not very convincing.<sup>1</sup> First, OECD countries as well as other countries already apply the arm's length principle to assess transfer prices on the basis of national tax legislation. Consequently, a tax treaty usually does not change the assessment of transfer prices.<sup>2</sup> Nevertheless, some tax treaties include specific rules on mutual agreement procedures in transfer pricing disputes. These rules, however, tend to avoid double taxation risk and might therefore be associated with more rather than less FDI. Second, information exchange does only contribute to closing loopholes if transactions are invisible to tax authorities. Yet, FDI is associated with significant control of investors by the administration. Parent companies and subsidiaries have to disclose many details in their financial accounts. Therefore, the effects of enhanced information exchanges are expected to be rather limited in the particular case of FDI. Third, rules to prevent firms from what is called treaty shopping only eliminate incentives which just arise from the fact that a treaty has been concluded.<sup>3</sup>

In a nutshell, it seems to be a very reasonable conclusion that positive effects of tax treaties on FDI outweigh negative treaty effects. A total positive effect is also expected after a renegotiation of a tax treaty, because renegotiations are often associated with significant cuts in repatriation taxes. This leads to our first testable hypothesis:

*H-1: A new or a renegotiated tax treaty exerts a non-negative total effect on FDI.*

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<sup>1</sup>The explanation that tax treaties predominantly exert significant negative effects on FDI owing to transfer pricing rules and enhanced information exchange is also contradicted by evidence dealing with tax treaty effects on FDI in developing countries. Whereas national tax legislation of developing countries might often lack sophisticated transfer pricing rules and clear definitions of terms, a study by Neumayer (2007) finds significant positive treaty effects on FDI in developing countries.

<sup>2</sup>Details of arm's length transfer prices are defined by OECD transfer pricing guidelines (OECD, 2010). These guidelines came into force by national tax legislation and should not be mistaken as the OECD model convention.

<sup>3</sup>Anti-avoidance rules to prevent firms from treaty shopping might have an effect if these rules are introduced in the course of a renegotiation of an existing tax treaty. Then, FDI measures might be affected by some reorganizations of holding structures.



## 2.2 *Tax Treaties and the Effective Tax on Repatriation*

A multinational firm has different means to repatriate profits, either by paying interest on previously provided intercompany loans, by paying royalties or by paying intercompany dividends. The latter can be considered the most important one in terms of volume and also in the potential sensitivity to tax treaty regulations. That is why we focus on repatriation via dividends in this paper. Cross-border intercompany dividends can be subject to tax in the host country of the subsidiary paying the dividends (source country) as well as in the residence country of the firm receiving the dividends (home country). Without an effective treaty, double taxation is very likely. Either way, the taxes imposed on intercompany dividends reduce funds available for distribution to the shareholders.

We have argued that the consequences of tax treaties for the taxation of FDI boil down to changes in repatriation taxes. In the following, let us consider the standard case of FDI in an incorporated subsidiary. Profits generated by a subsidiary are taxed at the level of the parent firm as long as they are not distributed (deferral system). Sooner or later, however, a multinational firm will repatriate foreign profits and bring them to the sphere of disposability.

Among the various aspects associated with a tax treaty, two issues directly affect the effective tax on repatriation. First, tax treaties limit the withholding rate imposed on intercompany dividends (Article 10 OECD Model Tax Convention). However, the tax treaty only affects the treatment of intercompany dividends if national tax legislation already claims a fiscal position in intercompany dividends. In this case, withholding taxes are only changed by a tax treaty if the cap imposed by the treaty is below the withholding tax rate already effective in the source country. Suppose, for example, a tax treaty which limits the withholding tax at a rate of 10 percent - the tax treaty would change the effectively imposed tax rate if the ordinary withholding tax rate defined by the national tax code was 15 percent. In contrast, the withholding tax would remain completely unaffected by the tax treaty if the withholding tax rate determined by the national legislation was only 5 percent. Moreover, tax treaties between member states of the European Union (EU) are very likely to have no material effect on withholding tax rates because the EU Parent-Subsidiary-Directive has already eliminated any withholding taxes imposed on intercompany dividends.

Second, tax treaties include an agreement on either the credit method or the exemption method to avoid double taxation of intercompany dividends at the level of the parent company (Ar-

article 23 OECD Model Tax Convention). However, national tax legislations also take into account that the repatriated profits have already been subject to withholding taxes and also to corporate taxes at the level of the subsidiary. If the exemption method is applied, repatriated intercompany dividends are tax exempt at the level of the firm which receives the dividends. Germany is one of the countries exempting intercompany dividends from taxation. In the case of a credit system, intercompany dividends are subject to tax but taxes paid abroad reduce the tax liability. The US are a prominent country applying a credit system.<sup>4</sup> If the tax rate of the residence country exceeds the tax credit, a reduction of withholding tax, e.g., caused by a new tax treaty, has no material effect. The interplay of a declining withholding tax and the credit system may also help to explain why the previous literature has often failed to find positive treaty effects.<sup>5</sup>

Moreover, we have to consider the interplay between the tax treaty and the national tax legislation. A double tax treaty changing the method to avoid double taxation can significantly cut the effectively imposed repatriation tax. Yet, there are many cases where the method introduced by a tax treaty effectively leaves the repatriation taxes unchanged. The first case is an excess credit position. An excess credit arises if foreign taxes exceed the tax liability of the residence country on foreign income. If the excess credit cannot be used, e.g., in subsequent periods, a credit system effectively equals the exemption system. In this case, introducing the exemption method does not effectively change repatriation taxes. Secondly, if, for example, the tax code of the residence country already determines the exemption of intercompany dividends, the taxation of repatriated profits is effectively unchanged by a tax treaty referring to the indirect credit method. This is also true if the treaty refers to the same method which is already in force.

The discussion has shown that in conceivable cases tax treaties do not effectively change repatriation taxes. Please refer to the Appendix for a detailed description how the effective repatriation tax is calculated. We set up the following hypothesis:

*H-2: A new or renegotiated tax treaty exerts a positive effect on FDI if it has effectively decreased the repatriation tax imposed on intercompany dividends.*

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<sup>4</sup> If a direct credit is applied, the foreign tax credit includes the withholding taxes imposed on intercompany dividends. An indirect credit also includes foreign corporate taxes paid by the subsidiary.

<sup>5</sup> In additional robustness checks, the study by Blonigen und Davies (2004), for example, comes up with several positive treaty effects on US inbound FDI, whereas no robust effects are found in the case of US outbound FDI. The latter results may hint at an offsetting effect of the US credit system and changes of withholding tax rates.

### 2.3 *Investment Effects of Repatriation Taxes*

Concerning the effect on FDI we consider a change in repatriation taxes the most important aspect of double tax treaties. Therefore, we derive testable hypotheses for additional empirical analyses about the impact of repatriation taxes on FDI.

The traditional view on dividend taxes is deduced from the fact that taxes on dividend payments are an excess burden on corporate investment. Since investors anticipate this additional tax, cost of equity capital rises with the dividend tax (Harberger, 1962). If marginal rates of return on capital are declining, the optimal investment size is negatively affected by dividend taxes. The repatriation taxes imposed on intercompany dividends are a particular type of dividend tax. Consequently, this “old” view on corporate taxation predicts negative effects of repatriation taxes on FDI.

Yet, another strand of literature, dealing with the so-called “new” view on corporate taxation, predicts insignificant effects of repatriation taxes and, therefore, of tax treaties. Starting with the seminal works by King (1974a, 1974b) and Auerbach, (1979, 1983), this literature suggests that dividend taxes do not affect investment if a corporation can use retained earnings as their marginal source of finance. Unlike the Old View, these models consider the fact that dividend taxes can be deferred by retaining and reinvesting earnings within the corporation. As repatriation taxes, like withholding taxes or home country taxes on foreign income, are usually imposed on distributed income rather than on accruals, Hartman (1985) and Sinn (1984) apply these arguments to repatriation taxes on international intercompany dividends. Proponents of the New View assume that dividend taxes only have a negative impact on investment if new equity injection is the marginal source of finance. We set up the following hypothesis:

*H-3: Repatriation taxes exert a significant negative effect on FDI if new equity is the marginal source of finance. If subsidiaries use retained earnings as their marginal source of finance, repatriation taxes do not significantly affect FDI.*

### 2.4 *Repatriation Taxes and Retentions*

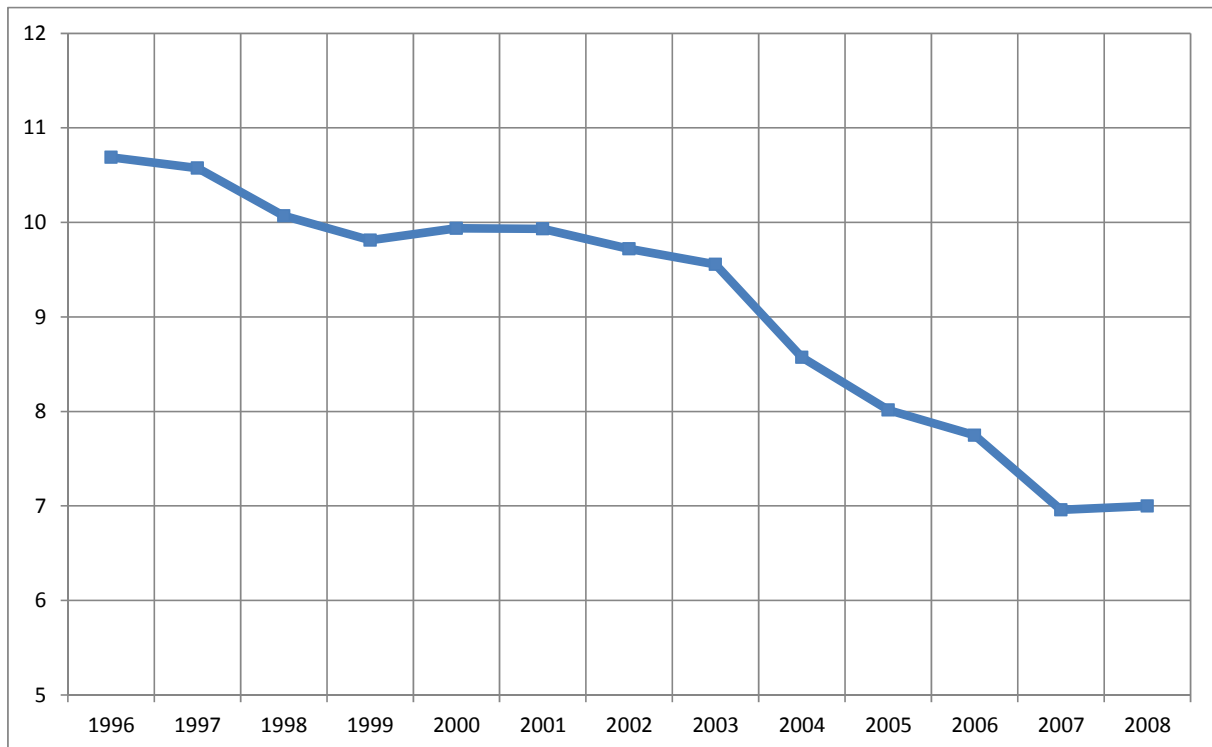
Applying the logic of the New View to repatriation strategies of the multinational firm suggests that repatriation taxes do not affect the timing of repatriations if current tax conditions are not expected to change over time. The rationale for this result is the following: Repatria-

tion taxes do not affect the marginal investment decision because the subsidiary has to pay these taxes irrespective of whether it reinvests the profits or distributes them right away.

Empirical studies show that firms smooth their repatriation payments over time (Desai, Foley and Hines, 2007; Bellak and Leibrecht, 2010). Desai et al. (2007) argue that intercompany dividends can be quite well explained by agency conflicts between local managers and the central management of the firm, financial constraints of the multinational group and last but not least by the incentive that, in turn, the multinational firm has to pay smooth dividends to its external shareholders.

Previous results also suggest that repatriation taxes affect repatriations (Desai et al. 2007; Bellak and Leibrecht, 2011). The most convincing explanation for an impact of repatriation taxes is the expectation that withholding taxes and home country taxes on foreign income vary over time. Then, repatriation taxes are, of course, no longer irrelevant for the decision whether to retain or to repatriate foreign income. The expectation of varying repatriation taxes was, for example, fulfilled for US multinationals in 2004 and 2005, when the US government offered a temporary reduction in US taxes on repatriated foreign income. Several empirical studies provide striking evidence that US firms jumped at the chance and repatriated billions of dollars (Albring, Mills and Newberry, 2010; Blouin and Krull, 2009; Clemons and Kinney, 2008; Dharmapala, Foley and Forbes, 2011; Redmiles, 2008).

It is however very likely that multinationals all over the world expect some variation in repatriation taxes. More precisely, it is very likely that they will expect falling repatriation taxes, since the extension of the EU parent-subsidiary directive, changes in national legislations, newly set up double tax treaties as well as treaty renegotiations show a clear overall trend of declining withholding taxes. Moreover, double tax treaties are often announced in advance. We collected data on dividend taxation of a 58x57 country and 13 year matrix. Based on this data, there are 1,701 cases of declining withholding taxes. In 689 of these cases, it even shrunk to zero. By contrast, there are only 350 cases where the withholding tax increased, e.g. due to the expiration or cancellation of double tax treaties or changes in the national legislation. Figure 1 shows a striking negative trend in the average taxes withhold from cross-border intercompany dividends.

**Figure 1: Average Withholding Tax on Intercompany Dividends**

Average withholding tax rate on dividends in all combinations in a sample of 57 countries, in percent. The values denoted above are the annual means of the added up 57 country-specific average withholding-taxes.

If the firm expects a cut in repatriation taxes in subsequent years and internal funds is the marginal source of finance, the expected change in repatriation taxes indeed affects investment decisions. The higher the repatriation tax rate, the higher is the probability and the benefit of a tax cut in the future. In this case, it becomes rational to defer distributions and reinvest profits until the expected tax cut will come into force. More precisely, the marginal cost of capital rises with the expected tax rate cut.

Moreover, tax treaties are often negotiated for years and often become effective one or two years after they were being finalized and published.<sup>6</sup> Thus, multinationals can be expected to see the legal amendments in advance. This anticipation causes higher investment by the subsidiary right before the change. If repatriation taxes are significantly reduced or abolished, the incentive to retain profits and to invest in assets declines. Therefore, the growth path or even the stock of assets is expected to significantly decline just after a cut in repatriation taxes.

<sup>6</sup> For example, the revision of the treaty between Germany and Switzerland has been signed on March 12, 2002, has come into force at March 24, 2003 and is effective from January 1, 2004. For the treaty between Italy and Russia, the corresponding dates are April 9, 1996, November 30, 1998 and January 1, 1999. The treaty between the United States and Luxembourg was signed on April 3, 1996, came into force on December 20, 2000 and was effective January 1, 2001.

Consequently, high repatriation taxes can be associated with additional investment due to retention. If marginal returns are decreasing, local investment opportunities, for example in fixed assets, are however limited. At some day repatriation of free cash flow becomes rational. However, Weichenrieder (1996) points at investment in the capital market as another opportunity to reduce the excess burden repatriation taxes exerted on equity endowment. Investment in the capital market or in shares of other affiliated firms is independent from investment opportunities within the subsidiary. Consequently, the available interest rate in the world capital market is the lower boundary for the investment of retained earnings. Moreover, Altshuler and Grubert (2003) note that, in particular, buying shares is a means to funnel funds to other affiliates but at the same time, to avoid repatriation taxes. Put it differently, investing in shares of affiliated firms is an alternative means to funnel equity to other investment opportunities of the multinational group without paying repatriation taxes. Therefore, excessive retention owed to high repatriation taxes are expected to affect financial investment, but not in additional (local) investment in fixed assets.

In a nutshell, the effects of repatriation taxes on financial assets and on real investments (cf. H-3) are expected to have opposing signs. If FDI data does not allow disentangling physical investment from financial investment, the positive effect of high repatriation taxes on financial assets might dominate the opposing effect on real capital. Based on these considerations, we set up the following hypothesis:

*H-4: An increase of repatriation taxes positively affects financial investment in the capital market whereas repatriation taxes exert negative or even insignificant effects on real investments.*

## 2.5 *Repatriation Taxes and Financial Structures*

In addition to the investment effects of repatriation taxes corresponding effects on capital structures has to be expected. Combining the arguments of the Old and New View on corporate taxation leads to the conclusion that a negative investment effect is expected if the source of finance is new equity. Sinn (1993) shows in a dynamic framework that repatriation taxes therefore initially lead to a nucleus of investment abroad. Then, however, the firm grows to maturity through retained earnings only. According to his model, the size of a mature subsidiary is unaffected by repatriation taxes. Nevertheless, the proportions of endowed equity capi-

tal (subscribed capital) and retained earnings (revenue reserves) are indeed affected by repatriation taxes because initial equity injection is negatively affected by repatriation taxes.

Moreover, the discussion in subsection 2.4 suggests additional retention if repatriation taxes are still high and are expected to decline someday. Then, the share of retained earnings but also the total share of equity capital should be positively affected by high repatriation taxes. Thus, we formulate the following hypothesis regarding the structure of equity finance:

*H-5: Repatriation taxes negatively affect the share of subscribed capital whereas they positively affect the share of revenue reserves in total capital.*

Hines (1994) uses a similar framework like Sinn (1993) but adds the possibility of debt financing. He also finds that the maturity size of the subsidiary is unaffected by repatriation taxes. Yet, the initially established nucleus is bigger. The affiliate just uses debt financing and subsequently, substitutes debt by retained profits during its growth to maturity. According to Hines' modeling, repatriation taxes positively affect the share of debt in an immature subsidiary because initial equity injections are negatively affected. Regarding a mature firm whose marginal source of finance is cutting distribution, repatriation taxes do not matter for the share of debt financing.

If, however, a firm expect falling repatriation taxes in the future, transitory retention is very reasonable. Corresponding to a positive effect of repatriation taxes on equity, an adverse effect on debt financing is expected. Therefore, the expectation regarding debt financing is rather case sensitive. We set up the following hypothesis:

*H-6: Repatriation taxes positively affect the share of debt financing if the subsidiary is still immature. Yet, repatriation taxes exert no significant effect on the debt share if the subsidiary's marginal source of finance is reducing distributions. If firms postpone repatriation, a negative effect of repatriation taxes is expected.*

### **3. Investigation Approach**

In order to analyze how tax treaties and dividend taxes affect investments and financial structures of multinational subsidiaries, we use firm-level data taken from the Deutsche Bundesbank's Microdatabase Direct investment (MiDi), which comprises administrative data on FDI of German multinational enterprises. We start by taking total assets  $y_{i,t}$  as the dependent variable of our analysis which is in accordance with the previous literature dealing with effects of

tax treaties. The subscript  $i$  denotes the subsidiary where the investment takes place and  $t$  the respective year. The vector  $X$  includes tax variables but also a set of firm-level information and host-country characteristics. Concerning tax variables, we basically consider the host-country statutory tax rate. Moreover, we consider the aforementioned variables indicating either if a new tax treaty is enforced or has effectively changed the repatriation taxes on inter-company dividends. Furthermore, we consider measures of withholding and repatriation taxes.

We run our estimations with the Arellano-Bond estimator, a panel GMM estimator (Cameron & Trivedi, 2005), which considers a first-differences model:

$$\Delta y_{i,t} = \gamma \Delta y_{i,t-1} + \Delta X'_{i,t} \beta + \Delta \varepsilon_{i,t} \quad (6)$$

By estimating in first differences, we remove unobserved subsidiary-specific effects. Since the lagged dependent variable  $y_{i,t-1} - y_{i,t-2}$  is correlated with the error's first difference,  $y_{i,t-2}$  is usually included as an instrument for this estimator. However, for several dependent variables our data indicates first and sometimes also second order autocorrelation. Therefore, we include the third respectively fourth lag as an instrument instead.

Total assets include all types of investment. In order to test our hypotheses, we distinguish between different investment types in additional sets of regressions. Moreover, we also test our hypotheses on the impact of repatriation taxes on the financial structures.

#### 4. Data

As mentioned before, the empirical analysis uses firm-level data taken from the MiDi database. The comprehensive micro database covers information on both direct investment positions held in Germany by foreign companies and direct investment positions of German enterprises held abroad. In this study, we only analyze subsidiaries which are located outside Germany and are owned by a multinational enterprise having its headquarters in Germany.<sup>7</sup> We exclude subsidiaries from the financial industry. The data allows us to trace groups and their affiliates as well as the detailed ownership chains over time from 1996 to 2008. The data collection is imposed by German law, which requires reporting for certain international trans-

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<sup>7</sup> We exclude observations from mining, agriculture, non-profit and membership organizations because special tax regimes may be available there. Furthermore, we exclude observations whose German parent is not an incorporated and legally independent entity, as well as subsidiaries which are not legally independent.



actions and positions.<sup>8</sup> This aspect of MiDi is worth emphasizing as we are thus able to observe virtually all major German outbound investments.

We consider a sample of subsidiaries located in 57 countries with Germany serving as the home country of the parent company. Our sample consists of the four BRIC countries, 29 countries which were members of the OECD in 2008, and the eight EU member states which were not OECD countries in 2008.<sup>9</sup> In order to complete the picture of major investment flows, we also include tax havens and those larger economies showing substantial investment stocks of German multinationals.<sup>10</sup> Whereas the headquarters of the multinational groups covered in our dataset are always located in Germany, we consider the investments in directly and indirectly held subsidiaries which are wholly-owned by a German firm. The total sample applied here consists of 85,030 observations of 18,266 subsidiaries.

Most of these multinational subsidiaries from our dataset are located in the United States, representing 12% of the total observations. The US is followed by larger European economies with France and the UK representing about 9% and the Netherlands, Spain, Austria, Switzerland and Italy representing about 5% each. Still, our sample includes several further observations from subsidiaries located in countries all over the world accounting for 45% of our sample. About two thirds of the subsidiaries are directly held. One third is held indirectly by a holding company abroad. Subsidiaries in countries like Russia, Korea or Poland are mainly held directly whereas subsidiaries in New Zealand, the United States or the United Kingdom are often held by at least one intermediary holding. European and US subsidiaries are most often held by holding companies in the Netherlands or in Switzerland whereas Asian subsidiaries tend to be held via Singapore or Hong Kong.

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<sup>8</sup> Sec. 26 of the Foreign Trade and Payments Act (*Aussenwirtschaftsgesetz*) in connection with the Foreign Trade and Payments Regulation (*Aussenwirtschaftsverordnung*). Since 2002, FDI has to be reported if the participation is 10% or more and the balance-sheet total of the respective foreign investment in Germany exceeds 3 million Euros. For details see Lipponer (2008). Though previous years showed lower threshold levels, we apply this one uniformly for all years in the panel. For general interpretations of the dataset from a tax and finance perspective see Mintz and Weichenrieder (2010).

<sup>9</sup> The BRIC countries are Brazil, Russia, India and China. The covered OECD countries are Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom and the US. Moreover, we consider subsidiaries located in the EU countries Bulgaria, Cyprus, Estonia, Latvia, Lithuania, Malta, Slovenia and Romania.

<sup>10</sup> Included tax havens are the Bermuda Islands, the Cayman Islands, the Dominican Republic, Hong Kong, Liechtenstein and Singapore. Moreover, we consider subsidiaries in Chile, Colombia, Croatia, Indonesia, Malaysia, Peru, Taiwan, Thailand, the United Arab Emirates and Uruguay.

In large economies, the majority of observable holding companies are domestic holdings (as opposed to foreign holdings owning subsidiaries in multiple countries). In this paper, however, we focus on cross border structures in order to analyze the influence of repatriation taxes and double tax treaties. Domestic holdings are not a problem for our estimation strategy for we keep the withholding tax constant at zero for the domestic case of a country holding (i.e. for the case where the considered subsidiary and holding are in the same country). Given the size of our sample, we still have thousands of cross border connections which can be used for identification purposes.

As our dependent variable, we particularly consider the investment level in total assets of each subsidiary. Moreover, in the further estimations we focus on different investment types and consider fixed assets, financial assets and current assets as dependent variables. Concerning the financial structures, we also run additional regressions using the share of either revenue reserves or subscribed capital or liabilities in total capital as dependent variables. Furthermore, we refer to the subsidiary-level profitability as a control variable.

As regards tax variables, we consider the statutory tax rate of the host-country corporate income tax. Concerning double tax treaty reforms, we consider two binary variables indicating whether an observation is from a year after a tax treaty reform is enforced. The dummy variable *Treaty Reform 1* turns to one if a new double tax treaty for the respective home and host country pair has been introduced or if there has been a reform of the existing treaty. The dummy variable is zero for years before a reform has taken place. The variable *Treaty Reform 2* indicates only tax treaty amendments which have effectively changed withholding taxes. Since companies cannot rely on a treaty before it is in force, we have used the latter point in time between the treaty's becoming effective and its enforcement as our year of change.<sup>11</sup> Of course, we have also considered such amendments which change only particular aspects, such as the withholding tax, instead of the whole text of a treaty. Table 6 in the Appendix provides an overview of the tax treaty changes between 1996 and 2008 which have been used to set up the two binary variables.

Our basic dataset covers the period from 1996 till 2008 and recognizes both directly and indirectly held subsidiaries. We only regard cases where holdings have full ownership of the subsidiaries. As indirectly held subsidiaries of German multinationals are included, we can moni-

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<sup>11</sup> For example, a treaty becoming in force in 2007 with regulations effective retroactively to 2005 will still be considered as a change in 2007.

tor effects of changes in the withholding tax rates between each single pair of the 58 countries. We combine our firm-level data with detailed data on taxation of cross-border intercompany dividends. Altogether, our matrix of withholding tax relationships shows 58 x 57 combinations each for 13 years resulting in 42,978 cells. Concerning the methods of how incoming dividends are treated by the parent company or the holding location, we gathered information for the same number of combinations. We browsed all tax treaties of the relevant country pairs and considered when they came into force or were terminated. We also considered that the tax treaty information may be overridden by a more favorable national rule or by multilateral legislation like the parent-subsidiary directive. Please refer to Tables 7 and 8 in the Appendix for excerpts of these two matrices.

From all the 42,978 conceivable withholding tax combinations, we see 1,701 cases (4.0%) where the withholding tax is lower as compared to the previous year and 350 cases (0.8%) where it is higher as compared to the previous year. The rare cases where the withholding tax is higher than in the past mainly stems from situations where there is no double tax treaty between two countries and then, the subsidiary country starts levying a withholding tax for the first time. Some country combinations do not appear at all in the sample used for the regressions, whereas others are frequently observable. The comprehensive information on bilateral withholding taxes and methods to avoid double taxation is used to construct two additional variables. First, we consider the nominal withholding tax effectively imposed on intercompany dividends (*Withholding Tax*). Second, the variable *Repatriation Tax* also takes into account the treatment of intercompany dividends in the home country of the receiving entity of the multinational firm.

As additional control variables we consider host country *GDP*, *GDP per Capita* and the *Inflation Rate* taken from the World Bank's World Development Indicators. Moreover, a variable *Country Risk* scaling from 0 to 7 with higher values corresponding to higher risk is derived from the OECD. Table 1 provides an overview of the definition, mean values and standard deviations of the variables employed in this study.

**Table 1: Descriptive Statistics**

<b>Variable</b>	<b>Description</b>	<b>Mean</b>	<b>Standard Deviation</b>
Total Assets	Total assets reported in the financial statements; measured in EUR '000.	222,728	2,844,082
Fixed Assets	Fixed and intangible assets reported in the financial statements; measured in EUR '000.	20,045	282,546
Financial Assets	Long-term financial assets reported in the financial statements; measured in EUR '000.	83,187	2,128,662
Shares of Affiliates	Financial assets in the form of shares of affiliated enterprises reported in the financial statements; measured in EUR '000.	25,569	564,777
Current Assets	Current assets reported in the financial statements; measured in EUR '000.	113,993	1,533,017
Nominal Capital	Subscribed or called-up capital, endowment capital and contributions by partners reported in the financial statements divided by total assets.	.300	.341
Liabilities	Liabilities reported in the financial statements divided by total assets.	.538	.290
Revenue Reserves	Revenue reserves plus profit/loss carried forward as reported in the financial statements divided by total assets.	.161	.336
Tax Rate	Statutory profit tax rate.	.317	.076
Treaty Reform 1	A tax treaty has been newly introduced or changed.	.185	.389
Treaty Reform 2	A tax treaty has effectively lowered withholding taxes.	.043	.204
Withholding Tax	Withholding tax on dividends for the respective country/country pair. It is the smaller of the domestic rate and the rate of an effective tax treaty.	.0158	.041
Repatriation Tax	The additional tax that needs to be paid effectively on repatriation. Differs from <i>Withholding Tax</i> due to recognition of the credit system and the company tax. (cf. the first page of the Appendix for further details)	.0305	.0478
Profitability	Profit or loss for the previous financial year as reported by the balance sheet divided by total assets.	.0632	.139
GDP	Gross Domestic Product measured in billion USD.	2.218	3.615
GDP per Capita	Gross Domestic Product per home country national; measured in current USD '000.	29.363	15.372
Inflation Rate	Inflation rate.	.0297	.038
Country Risk	OECD Country Risk Classification Method measures the country credit risk. Risk categories span from a low credit risk (0) to a high credit risk (7).	.556	1.212

Firm-specific variables stem from the Microdatabase Direct investment (MiDi) 1999-2012 of the Deutsche Bundesbank's Research Data and Service Centre (RDSC). Tax variables are derived from IBFD Tax Handbooks and the Worldwide Corporate Tax Guides by Ernst & Young. *GDP*, *GDP per Capita* and *Inflation Rate* stem from the World Development Indicators, edition 2009. *Country Risk* is based on information from the OECD.

## 5. Regression Results

### 5.1 Total Investment

In this section, we present our empirical results. We start by testing our hypotheses regarding the effects of tax treaty reforms and repatriation taxes on total investment. The respective results are presented in Table 2. We start our analysis by considering simple binary variables which indicate that a new tax treaty is enforced. In column (1) we consider if a new double tax treaty has been introduced or if there has been a reform of the formerly existing double tax treaty between 1997 and 2008 (*Treaty Reform 1*). In column (2), we focus only on those treaty reforms that have effectively lowered withholding taxes on intercompany dividends (*Treaty Reform 2*).

We also control for the lagged dependent variable. As can be seen from the coefficient of the lagged dependent variable, the assets stocks are quite sticky over time, i.e. they are strongly influenced by the situation of the previous period. We use the third (fourth) lag of the dependent variable as an instrumental variable for the lagged dependent variable in first differences since we observe first (second) order autocorrelation.

As can be seen from our results in Table 2, we hardly find significant effects exerted by the introduction or modification of a double tax treaty. In line with the existing literature, the effect on total assets is either insignificant or negative with a weak significance. Therefore, the results on the binary variable do not confirm hypothesis H-1 of a general non-negative tax treaty effect on FDI. Furthermore, even the results presented in column (2) do not confirm our hypothesis H-2, which assumed a positive investment impact of tax treaties effectively lowering the withholding tax. Our results are therefore in accordance with findings of the tax treaty literature.

**Table 2: Effects of Tax Treaty Changes and Repatriation Taxes on Total Assets**

	(1)	(2)	(3)	(4)	(5)
Dependent Variable <sub>t-1</sub>	.550*** (.047)	.551*** (.047)	.550*** (.047)	.550*** (.047)	.550*** (.047)
Treaty Reform <sub>1</sub>	-.011 (.007)		-.011 (.008)	-.014* (.008)	
Treaty Reform <sub>2</sub>		-.007 (.016)			
Withholding Tax			.003 (.145)		
Repatriation Tax				-.157 (.114)	-.129 (.112)
Profitability	-.014 (.018)	-.014 (.018)	-.014 (.018)	-.014 (.018)	-.014 (.018)
(ln)GDP	.026 (.034)	.026 (.034)	.025 (.034)	.024 (.036)	.024 (.035)
(ln)GDP per Capita	.304*** (.051)	.302*** (.051)	.303*** (.051)	.310*** (.052)	.309*** (.052)
Inflation	.021 (.032)	.021 (.032)	.021 (.032)	.020 (.032)	.020 (.032)
Country Risk	.000 (.007)	.000 (.007)	.000 (.007)	.001 (.007)	.001 (.007)
Observations	56,702	56,702	56,702	56,702	56,702
Wald test statistic	4359.51	4362.00	4385.96	4401.68	4395.88

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Microdatabase Direct investment (MiDi) 1999-2012, own calculations.

The dependent variables are in logs. The standard errors shown in parentheses are robust and clustered on the subsidiary level. Year dummies for 1997-2008 are included but not reported. All results are from 2SLS. The instrument variable is the second lag of the dependent variable. \*, \*\* and \*\*\* show significance at the level of 10%, 5% and 1%.

Still, we suppose that repatriation taxes exert a significant impact on investments and their financing. Therefore, in columns (3), (4) and (5), we enrich our regressions by variables covering the aspect of withholding taxes on dividends. In specifications (4) and (5), we consider the variable *Repatriation Tax*. This variable stems from the withholding tax rates on dividends, but takes further aspects into consideration, such as if there is a credit or exemption method in the country of the parent company. We expect that the more refined consideration of the variation in the effective repatriation taxes may improve identification. Nevertheless, in columns (3) to (5), Table 2 shows that withholding taxes or repatriation taxes also yield insignificant effects on total assets. Consequently, we are unable to find any significant effects of either tax treaty reforms or more detailed measures of repatriation taxes if total asset stocks are considered.

Concerning the control variables, only GDP per capita is significant. Its positive impact on assets can be explained by the tradeoff between labor intensive and capital intensive production since GDP per capita can be seen as a proxy for labor costs.

### 5.2 Real Investments

Taking into account the discussion in Section 2.4, opposing effects of repatriation taxes are expected if different investment types are considered. The insignificant effects of repatriation taxes on total assets might be a consequence of opposing responses to repatriation effects of different investment types. If these elements are differently affected, they might net out leading to a total effect which is insignificant. Therefore, we decompose the overall effect of the repatriation tax on investment by separately considering different asset categories. In Table 3 we regress fixed assets on repatriation taxes and the variables indicating whether a tax treaty amendment took place.

In our hypothesis H-3 we suppose a negative impact of repatriation taxes on FDI if new equity is the source of finance of investment. The results shown in Table 3 suggest that fixed assets are negatively affected by repatriation taxes. Withholding taxes do not have an effect. In our further estimations we stick to *Repatriation Tax*, because, as described in Section 2, it is the more exact, sophisticated and relevant variable. The coefficient of -0.535 in column (5) of Table 3 indicates that a ten percentage point increase in the repatriation tax results in a stock of fixed assets which is 5.35 percent smaller.

**Table 3: Effects of Repatriation Taxes on Fixed Assets**

	(1)	(2)	(3)	(4)	(5)	(6)
	Fixed Assets	Fixed Assets	Fixed Assets	Fixed Assets	Fixed Assets	Fixed Assets
Dependent Variable <sub>t-1</sub>	.509*** (.058)	.509*** (.058)	.510*** (.058)	.509*** (.058)	.509*** (.058)	.510*** (.058)
Treaty Reform <sub>1</sub>			-.013 (.025)			-.015 (.025)
Treaty Reform <sub>2</sub>		-.014 (.053)				
Withholding Tax			-.395 .330	-.355 (.331)		
Repatriation Tax					-.535* (.317)	-.564* (.318)
Profitability	.161*** (.058)	.161*** (.058)	.161*** (.058)	.161*** (.058)	.161*** (.058)	.161*** (.058)
(ln)GDP	.023 (.090)	.023 (.090)	.030 (.090)	.030 (.090)	.018 (.090)	.018 (.091)
(ln)GDP per Capita	.313*** (.121)	.310** (.123)	.316*** (.121)	.316*** (.121)	.334*** (.122)	.334*** (.123)
Inflation	.201 (.157)	.201 (.157)	.201 (.158)	.201 (.157)	.200 (.158)	.200 (.158)
Country Risk	.000 (.019)	-.000 (.019)	.002 (.019)	.002 (.019)	.003 (.019)	.003 (.019)
Observations	56,702	56,702	56,702	56,702	56,702	56,702
Wald test statistic	462.96	464.07	473.03	472.76	472.73	472.82

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Microdatabase Direct investment (MiDi) 1999-2012, own calculations.

The dependent variables are in logs. The standard errors shown in parentheses are robust and clustered on the subsidiary level. Year dummies for 1997-2008 are included but not reported. All results are from 2SLS. The instrument variable is the second lag of the dependent variable. \*, \*\* and \*\*\* show significance at the level of 10%, 5% and 1%.

The significant effect of repatriation taxes supports our assumption that a closer look at this variable is advisable. Whereas both domestic and multilateral regulations play a role concerning withholding taxes, they are still strongly driven by double tax treaties. Moreover, in column (6) we also consider the variable indicating if a tax treaty amendment took place. The effect of a tax treaty reform proves to be insignificant. This finding supports the view that the effective changes of repatriation taxes affect FDI whereas the various issues also concluded in a tax treaty do not really matter. At least, they do not exert a negative impact on FDI.

As regards control variables, now also the profitability is significant with an expected positive effect on investment.



### 5.3. *Financial Investments*

We suppose that higher repatriation taxes cause firms to *increase* their financial asset stock in the host country if firms expect falling repatriation taxes in the future. Then, in the presence of high repatriation taxes, companies act rationally when they reinvest their profits instead of repatriating them. Investing in financial assets grants access to investment opportunities not limited to the host country of the respective subsidiary. The results in columns (1) and (2) of Table 4 do not confirm a positive impact of repatriation taxes on financial assets.

Financial assets also include portfolio investments. Portfolio investments are however not very attractive if the firm has investment opportunities within the multinational firm. In columns (3) and (4) of Table 4 we therefore focus on shares of affiliated firms because investing in shares of other affiliated firms is an alternative means to funnel equity to investment opportunities of the multinational firm – without paying repatriation taxes. In fact, the results in column (4) show a positive and significant effect of repatriation taxes on shares in affiliated firms. The coefficient of 0.997 means that a one percentage point increase in the repatriation tax results in a 0.997 percent increase in the subsidiary's financial asset stock. Further, in contrast to our previous results the coefficient for the binary variable indicating a new tax treaty is now significant with the expected sign. In column (3) it is combined with the repatriation tax and might capture its effect.

Columns (5) and (6) of Table 4 show the effect of a treaty reform and of repatriation taxes on current assets. Whereas the coefficient of the binary variable is again negative and significant, the repatriation taxes themselves seem to exert no significant influence. In any case, these results are not robust. Since the dependent variable includes several sub-items like inventories, short-term financial assets and cash holding, the previously identified opposing effects may once again both play a role here. Whereas inventories might respond in accordance with investment in fixed assets, short-term financial assets and cash holding might be adversely affected by repatriation taxes. Foley et al. (2007), for example, show that repatriation taxes can explain extensive cash holding by foreign subsidiaries of US multinationals. Unfortunately, our data does not allow demerging the current assets and identifying effects on its sub-items.

**Table 4: Effects of Repatriation Taxes on Financial Assets and on Current Assets**

	(1)	(2)	(3)	(4)	(5)	(6)
	Financial Assets	Financial Assets	Internal Financial Assets	Internal Financial Assets	Current Assets	Current Assets
Dependent Variable <sub>t-1</sub>	.944*** (.071)	.944*** (.071)	.895*** (.066)	.901*** (.066)	.643*** (.061)	.644*** (.063)
Treaty Reform <sub>1</sub>	.002 (.057)		-.087* (.048)		-.058** (.024)	
Repatriation Tax	1.001 (.868)	1.002 (.853)	.819 (.617)	.997* (.600)	-.237 (.216)	-.120 (.218)
Profitability	.310*** (.103)	.310*** (.103)	.181* (.095)	.181* (.095)	-.272*** (.074)	-.273*** (.074)
(ln)GDP	-.047 (.104)	-.047 (.650)	-.072 (.090)	-.071 (.092)	.044 (.104)	.046 (.103)
(ln)GDP per Capita	.151 (.184)	.152 (.184)	.045 (.144)	.043 (.145)	.256** (.126)	.254** (.126)
Inflation	-.226* (.129)	-.226* (.129)	-.212** (.101)	-.212** (.101)	.210*** (.057)	.211*** (.057)
Country Risk	-.068 (.051)	-.068 (.051)	.010 (.034)	.009 (.035)	-.010 (.017)	-.011 (.017)
Observations	56,702	56,702	56,702	56,702	56,702	56,702
Wald test statistic	242.36	242.13	244.98	242.68	827.31	814.45

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Microdatabase Direct investment (MiDi) 1999-2012, own calculations.

The dependent variables are in logs. The standard errors shown in parentheses are robust and clustered on the subsidiary level. Year dummies for 1997-2008 are included but not reported. All results are from 2SLS. The instrument variable is the second lag of the dependent variable. \*, \*\* and \*\*\* show significance at the level of 10%, 5% and 1%.

Concerning the control variables, inflation has gained importance (compared to tables 2 and 3) whereas GDP per capita is only relevant in the regressions on current assets. The negative coefficients of profitability in those regressions suggest a reduction of finished goods on stock and an incentive to reinvest profits into fixed assets instead of holding cash when a company's products are strongly demanded.

#### 5.4 Capital Structures

In a final step we also analyze whether the structure of liabilities and shareholder's equity is affected by tax treaty reforms and, in particular, repatriation taxes. Since the impact of repatriation taxes on total capital, which corresponds to total assets, is insignificant, we decompose the effect into the effects on its elements nominal capital, revenue reserves and liabilities. For each of these elements we run separate estimations. Table 5 shows the effect of repatriation taxes on the financial structures of multinational subsidiaries.

In columns (2) and (3) we focus on the effect of the repatriation taxes on the nominal capital of a subsidiary. The sign for the coefficient of higher repatriation tax on subscribed or called-up capital is negative as expected and significant when the reform dummy is included. The coefficient of -0.076 in column (2) means that a ten percentage point higher repatriation tax leads to a 0.76 percent smaller share of new equity injection.

Columns (4) and (5) of Table 5 show, by contrast, that revenue reserves are significantly positively affected by repatriation taxes on dividends. This result was also expected (cf. H-5) and corresponds well to our findings regarding investment in financial assets. If firms expect a decline of withholding taxes in the future, they act rationally when retaining profits and, in doing so, increasing their revenue reserves. The coefficient of 0.144 in column (4) can be interpreted as follows: A ten percentage point higher repatriation tax results in 1.44% higher revenue reserves.

Repatriation taxes have opposing effects on the different elements of equity. Higher repatriation taxes lead to a significantly higher share of revenue reserves and at the same time to significantly smaller new equity injections. The results are also in accordance with the equity nucleus proposition (Sinn, 1993). The opposing effects of repatriation taxes on new equity capital and revenue reserves confirm our hypothesis H-5.

**Table 5: Effects of Repatriation Taxes on Shareholder Equity and Liabilities**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total Capital	Share of Nominal Capital	Share of Nominal Capital	Share of Revenue Reserves	Share of Revenue Reserves	Share of Liabilities	Share of Liabilities
Dependent Variable $t-1$	.550*** (.047)	.768*** (.067)	.769*** (.067)	.841*** (.051)	.841*** (.051)	.821*** (.061)	.823*** (.061)
Treaty Reform <sub>1</sub>		-.003 (.004)		.001 (.004)		.008* (.004)	
Repatriation Tax	-.129 (.112)	-.076* (.044)	-.071 (.044)	.144** (.063)	.142** (.061)	-.010 (.065)	-.025 (.0642)
Profitability	-.014 (.018)	-.319*** (.020)	-.319*** (.020)	.574*** (.023)	.574*** (.023)	-.146*** (.013)	-.146*** (.013)
(ln)GDP	.024 (.035)	-.027 (.027)	-.027 (.027)	.014 (.019)	.014 (.019)	.022 (.039)	.022 (.039)
(ln)GDP per Capita	.309*** (.052)	.016 (.028)	.016 (.028)	.005 (.021)	.005 (.021)	-.036 (.039)	-.036 (.039)
Inflation	.020 (.032)	.024 (.039)	.024 (.039)	.036 (.025)	.036 (.024)	-.063** (.019)	-.063** (.019)
Country Risk	.001 (.007)	-.002 (.003)	-.002 (.003)	.001 (.003)	.001 (.003)	.002 (.004)	.002 (.004)
Observations	56,702	56,702	56,702	56,702	56,702	56,702	56,702
Wald test statistic	4395.88	321.03	320.11	1094.38	1094.27	1136.16	1133.94

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Microdatabase Direct investment (MiDi) 1999-2012, own calculations.

The dependent variables are in logs. The standard errors shown in parentheses are robust and clustered on the subsidiary level. Year dummies for 1997-2008 are included but not reported. All results are from 2SLS. The instrument variable is the second lag of the dependent variable. \*, \*\* and \*\*\* show significance at the level of 10%, 5% and 1%.

As to control variables, profitability is the most interesting. Its positive impact on revenue reserves does not come as a surprise. Then, the negative impact of profitability on the other financial shares can be explained by the simple fact that they represent the remaining parts of total capital. As the revenue reserves increase, the relative share of nominal capital and liabilities should automatically decline even though their absolute values might remain constant. However, we only find a significant effect for the share of nominal capital.

## 6. Concluding Remarks

We have analyzed how tax treaties and repatriation taxes affect investment and capital structures of multinational subsidiaries. If we follow the approach taken by previous studies and consider simple binary variables indicating the enforcement of a new tax treaty, we find insignificant effects on total assets. Then, we have particularly tested whether changes of

repatriation taxes affect total investment of multinational subsidiaries. Yet, we do not find any statistically significant effects of repatriation taxes on total investment.

In additional analyses, however, we have taken into account that different types of investment might be adversely affected by changes of repatriation taxes. Our findings are in accordance with expectations on the effect of repatriation taxes. Investment in fixed assets is negatively affected by repatriation taxes leading to the conclusion that new equity is the marginal source of finance. Moreover, our results suggest that firms postpone repatriation because they have the general expectation that - due to new tax treaties - high repatriation taxes will decrease in the future. In a lack of local investment opportunities, the respective funds are then invested in the capital market and especially in shares of affiliated firms. Accordingly, we find a positive effect of repatriation taxes on financial investments.

The behavioral response to repatriation taxes is also confirmed by corresponding effects of repatriation taxes on financial structures of the subsidiaries. Our results suggest significant effects on the structure of equity finance. Higher repatriation taxes are associated with a significantly higher share of revenue reserves and at the same time with almost significantly smaller new equity injections.

The results suggest that the aspect of repatriation taxes on dividends is worth analyzing. They seem to exert a significant impact on specific kinds of investments. The opposing effects, e.g., on investment in fixed and financial assets lead to an overall insignificant effect on total investment. These opposing effects might explain previous findings of an insignificant effect of tax treaties on aggregated FDI. Our results suggest that changes of the repatriation taxes exert statistically significant effects on both investment and the structure of equity financing. Therefore, tax treaties seem to be strongly considered by multinational companies if the treaty effectively affects repatriation taxes. By contrast, the general observation if a tax treaty exists or was rephrased does not exert a significant effect on investment.

## Appendix

### Methods to Avoid Double Taxation and Repatriation Taxes

If the exemption method is applied, repatriated intercompany dividends are tax exempt at the level of the firm receiving the dividends. Yet, in a few countries like France, Germany or Belgium a share  $\alpha$  is still subject to tax, whereas in most countries applying the exemption method,  $\alpha = 0$ . Then, the tax  $m$  imposed on one dollar of intercompany dividends amounts to:

$$(1) \quad m = \alpha \tau^R + \omega^S$$

Where  $\tau^R$  is the corporate tax rate of the residence country and  $\omega^S$  is the withholding tax rate imposed on intercompany dividends by the source country.

In the case of a system applying the credit method, intercompany dividends are subject to tax but taxes paid abroad reduce the tax liability. If a direct credit is applied, the foreign tax credit includes the withholding taxes imposed on intercompany dividends. Then, the additional tax imposed on one dollar of intercompany dividend amounts to:

$$(2) \quad m = \tau^R - \min\{\tau^R; \omega^S\} + \omega^S$$

An indirect credit also includes foreign corporate taxes  $\tau^S$  paid by the subsidiary. The additional tax imposed on intercompany dividends is computed in accordance with the following expression:

$$(3) \quad m = \frac{\tau^R}{(1-\tau^S)} - \min\left\{\frac{\tau^R}{(1-\tau^S)}; \frac{\tau^S}{(1-\tau^S)} + \omega^S\right\} + \omega^S$$

Expressions (2) and (3) show that the repatriation tax is determined by the tax rate of the residence country. It can be deducted from the formulas that there is a conceivable situation where a decrease in the withholding tax  $\omega^S$  is just subsidized by a proportional increase in  $\tau^R$ . This is the case if the tax rate of the residence country exceeds the tax credit. Then, a reduction of withholding tax, e.g., caused by a new tax treaty, has no material effect.

Table 6: Selected Tax Treaty Changes Between 1996 and 2008

Parent	Subsidiary	1st Tax Treaty	Treaty Revision	WHT before	WHT after	Parent	Subsidiary	1st Tax Treaty	Treaty Revision	WHT before	WHT after
Australia	Austria		2002	.15	.15	Brazil	Portugal	2002		.25	.1
Australia	Canada	1998		.2	.1	Bulgaria	Canada	2002		.1	.1
Australia	Czech Republic	2001		.1	.1	Bulgaria	Croatia	1999		.15	.05
Australia	Finland		2002	0	0	Bulgaria	Cyprus	2000		.25	.1
Australia	Malaysia		2006	0	0	Bulgaria	Czech Republic		2000	.15	.1
Australia	Mexico	2008		0	0	Bulgaria	Greece	2006		0	0
Australia	Norway		1997	.25	.05	Bulgaria	Ireland		2002	0	0
Australia	Romania		2007	.15	0	Bulgaria	Latvia	2007		0	0
Australia	Russia	1998		0	0	Bulgaria	Lithuania	2000		.2	.05
Australia	Slovak Republic	2001		.05	0	Bulgaria	Portugal	2001		0	0
Australia	Taiwan	2001		.25	.1	Bulgaria	Singapore		2003	.05	.05
Australia	United Kingdom		1998	0	0	Bulgaria	Slovak Republic	2002		.2	.1
Australia	United States		1997	.05	.05	Bulgaria	Slovenia		2008	0	0
Austria	Australia		2002	.15	.15	Bulgaria	Thailand		2008	.15	.1
Austria	Canada		2003	.15	.15	Bulgaria	Turkey	2001		.2	.1
Austria	Croatia	2002		.25	0	Canada	Australia		2003	.15	.05
Austria	Czech Republic		2008	0	0	Canada	Belgium		2008	0	0
Austria	Estonia		2004	.25	0	Canada	Bulgaria		2000	.15	.1
Austria	Finland		1998	0	0	Canada	Chile	2003		0	0
Austria	Germany		1997	.15	.1	Canada	Croatia	2000		.25	.05
Austria	India		2001	.25	.1	Canada	Czech Republic		2003	.1	.05
Austria	Korea		1996	.07	.05	Canada	Denmark	2005		.35	.05
Austria	Latvia	1996		.2	.05	Canada	Finland		1999	0	0
Austria	Lithuania	2006		0	0	Canada	France	2001		0	0
Austria	Mexico	2004		.3	0	Canada	Germany	1998		.1	.05
Austria	Netherlands		2003	0	0	Canada	Hungary	2005		0	0
Austria	New Zealand		1997	.15	.15	Canada	Iceland	2002		.25	.05
Austria	Norway		2003	.15	.05	Canada	India		1999	.15	.1
Austria	Poland	2004		.35	.05	Canada	Indonesia		1997	.1	.1
Austria	Romania		1999	.1	.05	Canada	Ireland	1996		0	0
Austria	Russia	2000		0	0	Canada	Japan		2007	0	0
Austria	Singapore	2001		0	0	Canada	Korea		2003	.15	.05
Austria	Slovenia	2007		0	0	Canada	Latvia	2001		0	0
Austria	Sweden		1998	0	0	Canada	Lithuania	1999		0	0
Austria	Switzerland		2006	0	0	Canada	Luxembourg	2005		0	0
Austria	United Arab Emirates	1996		.25	0	Canada	Mexico	2007		0	0
Austria	United States		2000	0	0	Canada	Netherlands	2002		.15	0
Belgium	Brazil		2008	.15	.1	Canada	Norway		2006	.05	0
Belgium	Canada		2005	.15	.05	Canada	Peru		2006	0	0
Belgium	China	2005		0	0	Canada	Portugal		1998	.25	.1
Belgium	Croatia	2005		.1	.05	Canada	Romania	1997		0	0
Belgium	Cyprus	2001		.17	.1	Canada	Russia		1998	.25	.15
Belgium	Czech Republic		2001	.15	.05	Canada	Slovak Republic	2000		0	0
Belgium	Denmark		1999	.15	.05	Canada	Slovenia	2007		0	0
Belgium	Estonia		1996	.25	.05	Canada	Spain	2003		0	0
Belgium	Germany		2003	.1	.05	Canada	Sweden		2006	0	0
Belgium	Greece	1999		.25	.05	Canada	Switzerland		1998	0	0
Belgium	Hong Kong		2005	0	0	Canada	United Arab Emirates	2008		0	0
Belgium	Iceland	2000		0	0	Canada	United Kingdom		1998	0	0
Belgium	Indonesia	1997		0	0	Chile	Brazil		2004	.35	.1
Belgium	Latvia	1999		0	0	Chile	Canada	2000		.35	.1
Belgium	Lithuania	2005		0	0	Chile	Croatia	2005		.35	.05
Belgium	Luxembourg	2007		0	0	Chile	Denmark		1996	0	0
Belgium	Mexico	2006		.25	.05	Chile	France	2002		0	0
Belgium	Netherlands		1998	.05	.05	Chile	Ireland	2007		0	0
Belgium	Poland	1997		0	0	Chile	Korea	2007		.15	.05
Belgium	Portugal	1997		.15	.1	Chile	Malaysia	2004		0	0
Belgium	Romania	2005		.15	.05	Chile	Mexico	2008		.1	.05
Belgium	Russia		1997	.25	.1	Chile	New Zealand	1996		0	0
Belgium	Singapore	2008		0	0	Chile	Norway	2002		0	0
Belgium	Slovak Republic	2004		.15	.05	Chile	Peru	2004		.1	.05
Belgium	Slovenia	2005		0	0	Chile	Singapore	2007		.1	.05
Belgium	Spain		1997	0	0	Chile	Sweden	1997		0	0
Belgium	Taiwan	1998		.3	.15	Chile	United Kingdom		1999	0	0
Belgium	United States	2000		0	0						
Brazil	Belgium		1997	.05	.05						
Brazil	Chile		2004	0	0						
Brazil	Finland		2007	.1	.05						
Brazil	Germany		2006	.15	.211						
Brazil	Mexico	1998		.25	.05						
Brazil	Norway	2004		.35	.05						







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