Tax Avoidance with Hybrid Financial Instruments*

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Abstract

Tax avoidance with hybrid financial instruments (HFIs) is difficult to study since financial statements do not disclose the tax treatment of financial instruments. We provide empirical evidence on this tax avoidance channel by studying the effect of implementing a linking rule in Germany in 2014. This rule links the tax treatment of a financial instrument to the tax treatment in the counterparty country, thereby making tax avoidance with HFIs impossible. Using a large panel on investment relations among affiliated companies for the period 2006-2016, we find that the introduction of the linking rule is associated with a change in the capital structure among companies where tax avoidance with HFIs was possible before.

Keywords: tax avoidance, hybrid financial instruments, BEPS

JEL Classification: H25, F23

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1 Introduction

Base erosion and profit shifting (BEPS) activities make the taxation of multinational firms challenging. A large body of literature studies the magnitude of the "BEPS problem" (summarized by Dharmapala, 2014). It has identified three main channels that multinational firms use to lower their tax burden: transfer mispricing (see e.g. Bartelsman and Beetsma, 2003; Clausing, 2003; Beer and Loeprick, 2015; Cristea and Nguyen, 2016; Liu et al., 2019), debt shifting (see e.g. Huizinga et al., 2008; Buettner and Wamser, 2013; Egger et al., 2014), and the relocation of intangible assets (see e.g. Dischinger and Riedel, 2011; Karkinsky and Riedel, 2012; Griffith et al., 2014). In addition, multinational firms can profit from misalignments in international tax law, for example by using hybrid financial instruments (HFIs). The OECD has identified this form of tax avoidance as one of the key opportunities for BEPS (OECD, 2013).

HFIs offer possibilities for tax avoidance as some countries may treat a financial instrument as equity for tax purposes, while other countries treat the same financial instrument as debt. Consider the following example: A holding company in Country C finances an affiliate in Country D with a financial instrument that is—for tax purposes—considered equity in Country C, and debt in Country D. Then, any payments under this instrument are tax-deductible interest payments in Country D, while the corresponding receipts are tax-exempt dividends in Country C. These issues have largely been ignored in the empirical literature on corporate tax avoidance, as there is to our knowledge no suitable cross-country dataset on the use of HFIs, nor are HFIs disclosed on balance sheets.

To fill this gap, our paper tests whether firms use HFIs to avoid taxes by studying the effect of introducing a so-called linking rule. Linking rules prevent this type of tax avoidance by linking tax exemption or deductability to a tax payment taking place in the other country. In particular, we exploit the implementation of such a linking rule in Germany in 2014. Our data stems from a a rich micro-level dataset of German multinationals and their foreign affiliates, which includes information on intra-firm financial flows (the Microdatabase Direct Investment (MiDi) by the Deutsche Bundesbank). As the possibility to use HFIs for tax avoidance varied among partner countries before 2014 (depending on double taxation treaties and foreign tax law), we can employ a difference-in-differences research design to estimate the extent to which German multinationals used HFIs for tax avoidance

until 2013. We find a significant change in the capital structure of affected companies from internal equity to internal debt after introducing this linking rule.

In more detail, our main specification compares foreign affiliates of German controlling companies with a tax avoidance opportunity before the implementation of the linking rule in 2014 with foreign affiliates of German controlling companies without a tax avoidance opportunity before 2014. The MiDi dataset comprises individual foreign direct investment (FDI) relations where either the investor or the investment enterprise is resident in Germany. Our sample consists of 101,002 observations over the period 2006-2016. Since we do not ultimately know whether HFIs show up as debt or equity in the affiliate-level report, we rely on the overall internal capital as the best proxy for HFIs and additionally investigate internal debt and internal equity separately.

Our results show a statistically significant effect of the implementation of the defensive linking rule in Germany in 2014 on the internal capital structure of affected affiliates: We observe a shift from internal equity, i.e. equity which is directly attributable to the German controlling company, to internal debt. Since internal finance includes HFIs between affiliates, this result indicates that the majority of HFIs was classified as equity in our data. Our results also indicate that multinational corporations specifically use HFIs to avoid taxes since they reduce internal equity if this tax avoidance strategy is no longer possible. Our findings are robust to including indirect investment relations in the sample and to using a restricted time period.

Two previous papers study tax avoidance with HFIs. Johannesen (2014) sets up a theoretical model that shows under which conditions multinational corporations can successfully use HFIs for tax avoidance. He finds that this tax avoidance strategy is always possible if demarcation rules—i.e. the rules that determine the qualification of an HFI as either debt or equity for tax purposes—between two countries differ. Hardeck and Wittenstein (2018) use data from the Luxembourg Leaks and empirically investigate how multinational corporations use HFIs and other hybrid arrangements to avoid taxes. Their results indicate that using HFIs reduces the effective tax rate (ETR) of a corporation. While our paper aims at comprehensively detecting tax avoidance activities using HFIs, Hardeck and Wittenstein (2018) examine selected cases of existing mismatch arrangements and study the extent and durability of resulting ETR reductions.

Our paper contributes to two broader strands of literature. First, we add to the literature studying BEPS and anti-avoidance measures. Dharmapala (2014) provides a comprehensive overview of the empirical literature on profit shifting within multinational corporations. Buettner et al. (2018) and Blouin et al. (2014) study the effectiveness of thin-capitalization rules and find negative effects on foreign direct investments (FDI) and on an affiliate's debt-to-asset-ratio respectively. Lohse and Riedel (2013) investigate the effectiveness of transfer pricing regulations and find a reduction of shifting activities.[1] Weichenrieder and Ruf (2013) study controlled foreign company rules and the effect on allocating passive assets. Our paper is the first to study the implementation of a linking rule.

We also contribute to literature studying the use of HFIs. Mills and Newberry (2005) analyze whether companies use HFIs to enhance the financial statements and consequently to increase financing opportunities. They find that companies with poor financing opportunities tend to use more hybrid finance. De Mooij and Keen (2016) examine whether banks and other financial institutions use HFIs to fulfil regulatory requirements. We add to this literature by studying how HFIs are used for tax avoidance.

The following section provides some background on tax avoidance with HFIs and derives our hypotheses. Section 3 discusses the empirical strategy. Section 4 introduced the dataset and discusses descriptive statistics, and Section 5 presents the results. Section 6 concludes.

2 How Does Tax Avoidance with HFIs work?

HFIs are financial instruments with characteristics of both debt and equity. Each country has its own demarcation rules determining under which conditions an HFI qualifies as debt or equity for tax purposes. In a cross-border setting, differing demarcation rules among countries may result in a qualification conflict: the same financial instrument qualifies as equity in one country and as debt in another country. These qualification conflicts combined with the different tax treatment of debt and equity in most countries may result in substantial tax savings for multinational corporations.

Assume a controlling company C Co., which is resident in the residence country

[1] See also de Mooij and Liu (2018) and Mescall (2017).

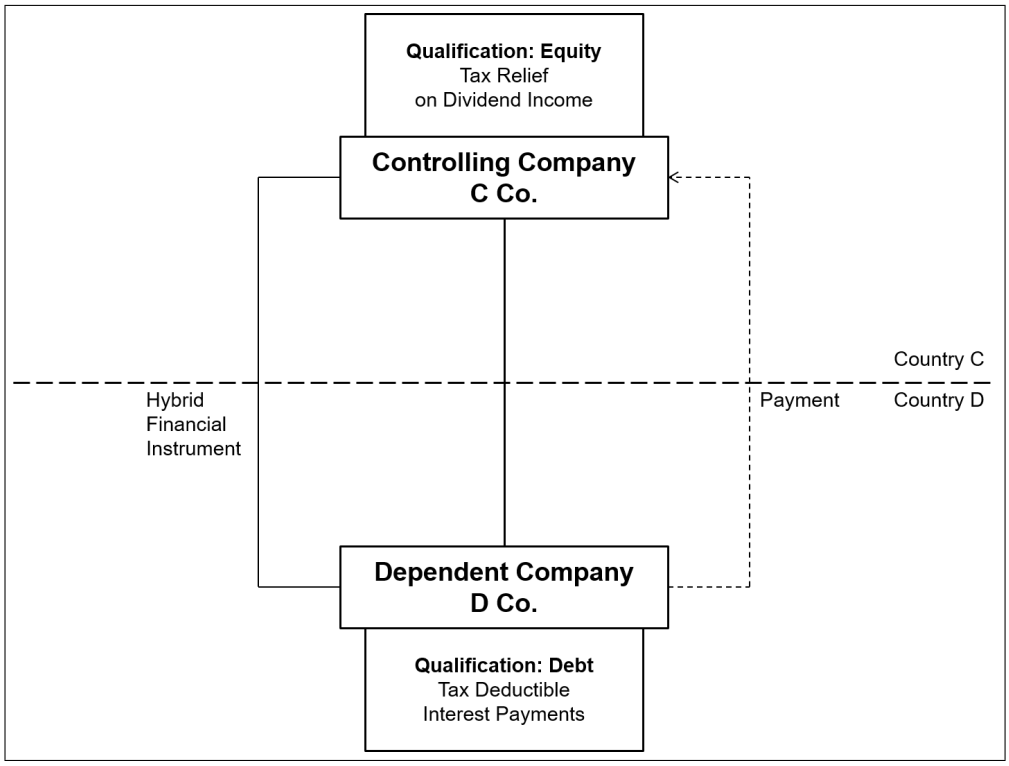


FIGURE 1: Basic Hybrid Financial Instrument, following OECD (2014).

C and provides its dependent company D Co., which is resident in the source country D, with an HFI (see figure 1). The national demarcation rules of both countries differ: residence country C qualifies the HFI as equity while source country D qualifies it as debt. In most countries, debt-related interest payments are tax-deductible at the level of the paying company whereas equity and resulting dividend payments get a tax relief at the level of the receiving company. The qualification as debt in the source country thus results in tax-deductible interest payments and reduces the tax base of D.[2] Company C Co. gets a tax relief on received dividend payments in country C. As a result, designing an HFI in a way that it qualifies as debt in the source country and as equity in the residence country can result in substantial tax savings for multinational corporations.

The tax treatment of an HFI in an international context depends on the national tax regulations of the involved countries, the existence and design of a double tax treaty (DTT), and on whether the involved countries are EU member states. Since the debt-equity demarcation rules are not harmonized internationally, it is primarily

[2]Country D may levy a source tax on the interest payments, which, however, the EU Interest-Royalty Directive prevents within Europe.

national tax rules that determine the tax treatment of an HFI.[3]

The existence of a qualification conflict between two countries leads only to a tax avoidance opportunity if it is not covered by anti-tax-avoidance legislation in one or both of the two countries. Initiatives by the OECD and the European Commission aim at combating tax avoidance with HFIs. The central OECD recommendation for national governments is to implement both a primary and a defensive linking rule into domestic tax law (OECD, 2015). These linking rules apply to financial instruments among related companies and link the tax treatment of a financial instrument in one country to the tax treatment of the same financial instrument in another country. The primary linking rule applies to downstream subsidiaries and prevents payments from being tax-deductible if the same payments are tax-exempt at the level of the investor. The defensive linking rule applies to investors and prevents payments from being tax-exempt if the same payments are tax-deductible at the level of the downstream subsidiary. A defensive linking rule is thus only necessary if there is no primary linking rule in the residence country of the capital acquirer. In 2019, 87 OECD-countries have signed the multilateral convention to implement tax-treaty related measures to prevent BEPS and therefore committed to apply these recommendations. Most OECD countries currently have a defensive linking rule in place and some also have a primary linking rule. A major country that has no linking rule is the United States.

The EU implemented the OECD recommendations in two ways. First, in 2014, the EU amended the Parent-Subsidiary-Directive (PSD) so that it prevents EU member states from granting a tax relief on payments that reduce the tax base in another country (i.e., a defensive linking rule). EU member states were obliged to effectuate the amendment into national tax law until the end of 2015. Second, in 2016, the European Council adopted the Anti-Tax-Avoidance-Directive (ATAD I) proposing actions to combat tax avoidance on an EU-level. Regarding HFIs, the directive implements a linking rule corresponding to the primary linking rule proposed by the OECD. It requires EU member states to prohibit the deduction of payments for tax purposes if the same payments are tax-exempt in another country. In 2017, the EC expanded anti-avoidance measures by implementing ATAD II, which includes a defensive linking rule and extends the territorial scope from the EU to third countries. EU member states have to implement ATAD I until the end

[3]Neither DTTs nor EU directives contain a distinct definition of debt and equity and therefore do not guarantee a uniform classification of an HFI (Eberhartinger and Six, 2009).

of 2018, ATAD II until the end of 2019.

Since the data we use focuses on Germany, we now present the German rule in more detail. The Federal Ministry of Finance first mentioned a defensive linking rule in a ministerial draft bill in March 2012. In June 2013, the German government implemented the linking rule as part of the annual tax act 2013. The linking rule became effective in 2014. Before the implementation of the linking rule, multinational corporations with a controlling company in Germany and a dependent company in specific foreign countries were able to exploit qualification conflicts to avoid taxes: Germany granted a tax-relief for received dividend payments also when the same payments were tax-deductible in the foreign country. Since 2014, German controlling companies only get the tax-relief for received dividend payments if they prove that the same payments did not reduce the tax base at the level of the paying dependent company.[4] Apart from implementing the defensive linking rule, the annual tax act 2013 contained no other major changes affecting corporate taxation.

Table 1 shows tax avoidance opportunities for German controlling companies over time. We focus on the 15 countries with the highest volume of foreign direct investments (FDI) from a German perspective in the first year of our observation period. We analyze the tax qualification of the four most widely used HFIs (preference shares, profit-participating loans, perpetual and super maturity loans, and optional convertible debt) in Germany and the selected foreign countries, and compare them to reveal qualification conflicts that enable tax avoidance. Tax avoidance with HFIs has never been possible between a German controlling company and a dependent company resident in Italy, Malta, Poland, or Sweden. Until the implementation of the defensive linking rule in Germany in 2014, this tax avoidance channel was possible between German controlling companies and dependent companies resident in Austria, Belgium, the Czech Republic, France, Luxembourg, the Netherlands, Spain, Switzerland, and the United States (US). Between German controlling companies and dependent companies in the United Kingdom (UK) or in Hungary, tax avoidance with HFIs was possible until 2010/2011. The amended double tax treaties between Germany and both the UK and Hungary included a subject-to-tax-clause from 2011/2012 on. This subject-to-tax-clause has the same effect as a defensive linking rule and eliminates tax avoidance possibilities with HFIs.

Therefore, we assume that multinational corporations with a controlling com-

[4]The exact procedure and scope of this obligation to produce proof is currently at issue. Submitting the tax declaration of the foreign dependent company may be sufficient.

TABLE 1: Tax Avoidance Opportunities with a German Controlling Company

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Austria	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Belgium	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Czech Republic	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
France	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Hungary	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
Italy	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Luxembourg	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Malta	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Netherlands	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Poland	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Spain	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Sweden	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Switzerland	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
UK	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗
US	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗

This table shows tax avoidance opportunities when using HFIs for German controlling companies with dependent companies in the listed countries. ✓(✗) denotes (no) tax avoidance possibility based on own research.

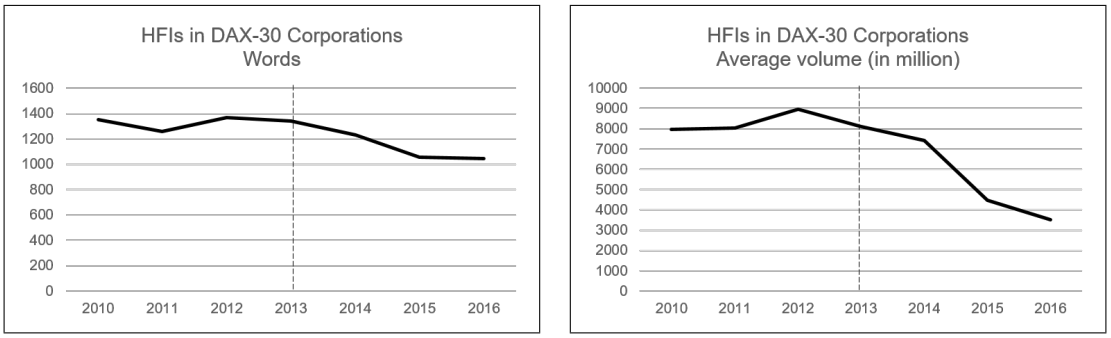
pany in Germany and a dependent company in one of these countries systematically used HFIs. Implementing the defensive linking rule in Germany eliminated these tax avoidance opportunities. We, thus, hypothesize that implementing the linking rule resulted in German controlling companies providing less HFIs to dependent companies resident in countries where tax avoidance with HFIs was possible before. We expect an immediate reaction since intra-group HFIs are flexible.

To find some first direct anecdotal evidence supporting this hypothesis, we analysed the annual reports of the DAX-listed companies between 2010 and 2016 regarding (1) the number of words referring to the most common HFIs[5] and (2) the reported volume of HFIs. We only analyze companies with annual reports for the whole observation period.[6] Figure 2 shows the amount of words referring to HFIs and–where this information was available[7]–the summarized volume of HFIs reported in DAX-listed companies between 2010 and 2016. The figure depicts a decline in both

[5]The counted words are the German translations for: convertible loan/bond, preference share, warrant (bond), option, silent partnership, participation right/certificate, and subordinated debt/loan.

[6]Therefore, we excluded Covestro, Deutsche Börse, Fresenius Medical Care, Merck, and Vonovia. We excluded thyssenkrupp because of a business year that deviates from the calendar year.

[7]Information on the volume of HFIs is scarce. We could only find information on this for three companies: Munich Re, Siemens, and Deutsche Bank.a



(A) Words (B) Volume

FIGURE 2: Anecdotal Evidence for HFIs

Data from annual reports of DAX-listed companies from 2010 to 2016. Graph (A) depicts the number of words referring to HFIs. Graph (B) depicts the average reported volume of HFIs.

the amount of words referring to HFIs and the volume of HFIs starting around. This data anecdotally supports our hypothesis that German controlling companies reduced the use of HFIs as a result of the linking rule.

3 Empirical Strategy

Our empirical design exploits a natural experiment resulting from the implementation of a defensive linking rule in Germany in 2014. We use a difference-in-difference design and compare the capital structure of German outbound affiliates with a tax avoidance opportunity until 2013 with the capital structure of German outbound affiliates without such opportunities.[8] Our treatment group, thus, are affiliates resident in Austria, Belgium, the Czech Republic, France, Hungary, Luxembourg, the Netherlands, Spain, Switzerland, the UK, or the US with a German controlling company. Our control group are affiliates in Italy, Malta, Poland, or Sweden with a German controlling company. Formally, we estimate the following regression model:

$$\text{Internal\_Capital}_{it} = \beta_0 + \beta_1(\text{tao\_bef13}_i * \text{post}_t) + \beta_2 \ln \text{assets}_{it} + \beta_3 X_{it} + \delta_i + \gamma_t + \epsilon_{it}, \quad (1)$$

[8]This is true for all countries except the UK and Hungary, where the implementation of a subject-to-tax-clause in the respective double tax treaties eliminated tax avoidance with HFIs already in 2011/2012. We account for these two special cases in our analysis. More specifically, the post dummy indicating observations after the implementation of the linking rule is already one for observations in 2011 in the UK and in 2012 in Hungary.

where i denotes affiliates and t the year. δ_i are affiliate fixed effects, γ_t are year fixed effects, and ϵ_{it} is the error term. Since HFIs and how they are classified for tax purposes cannot be observed in financial statements directly, we have to use an indirect measure for hybrid finance. We use different measure of internal capital i ($\text{Internal\_Capital}_{it}$) as dependent variables. Internal capital comprises both debt and equity provided by the German controlling company to the foreign dependent company (internal debt and internal equity). Since we do not ultimately know how HFIs show up in the affiliate-level report (debt or equity), we rely on the overall internal capital as the best proxy for HFIs. To observe changes in the internal capital structure, we also use internal debt and internal equity as separate dependent variables.

The explanatory variable of central interest is the interaction term $\text{tao\_bef13}_i * \text{post}_t$. The dummy variable tao_bef13_i equals one if there was a tax avoidance opportunity between dependent company i and the controlling company in Germany until 2013 and zero otherwise. post_t equals one for observations after 2013 and zero otherwise. We disregard observations from the year of announcement of the reform in 2013 to exclude anticipation. To control for variations in country characteristics over time, we include several source country characteristics (X_{it}) including the statutory tax rate, the short- and long-term lending rates, and GDP growth. To control for the size of the dependent company, we include the ln of tangible and intangible fixed assets. Additionally, dependent company fixed effects (δ_i) are included to control for unobserved corporate characteristics that are time-invariant. As affiliates do not change location in the dataset, these fixed effects subsume country fixed effects and also control for time-invariant country characteristics. We also include year fixed effects (γ_t) to control for unobserved shocks over time that are common to all dependent companies.[9]

To estimate the effect of implementing the German linking rule in Germany, it is important to be aware of other tax reforms in Germany and in the considered foreign countries during the observations period from 2006 to 2016 which affected corporate taxation. As stated above, the German government implemented the defensive linking rule as part of the annual tax act 2013. The tax act did not implement other major changes affecting corporate taxation. To our best knowledge, the only major tax reforms during our observation period were a tax reform in Germany in

[9]Our control variables are in line with e.g. Ruf and Weichenrieder (2012).

2008 and a tax reform in the UK in 2009/2010. Both reforms may bias the effect of implementing the German linking rule. In section 5.3, we therefore conduct a robustness test for the period 2009 to 2016 and exclude the UK in order to control for this bias.

The identifying assumption of our difference-in-difference research design is a common trend assumption. More specifically, we assume that the multinational firms in the control group would have similar trends in internal capital to the firms in the treatment group in the absence of implementing the linking rule. Since we cannot directly test this assumption, we analyze whether internal capital developed similarly among the firms in the treatment and in the control group prior to the implementation of the linking rule. Therefore, we extend equation 1 to an event-time specification by estimating the following regression model:

$$\text{Internal\_Capital}_{it} = \beta_0 + \sum_{\theta=-6}^{3} \delta_t \mathbb{1}[t=\theta] * \text{tao\_bef13}_i + \beta_2 \ln \text{assets}_{it} + \beta_3 X_{it} + \delta_i + \gamma_t + \epsilon_{it}, \tag{2}$$

where $\mathbb{1}[t=\theta]$ is a series of year dummies that equal one when the implementation of the linking rule is θ years away. Each coefficient δ_t measures the change in internal capital relative to total capital for firms in the treatment group relative to firms in the control group in the θ-th year before or after the implementation of the linking rule. The omitted time category is $\theta = -6$, the first year of our observation period. This specification allows us to check for common pre-reform trends.

4 Data and Descriptive Analysis

Our empirical analysis relies on the "Microdatabase Direct Investment" (MiDi) by Deutsche Bundesbank.[10] The dataset contains detailed information on individual investment relations between affiliated firms from 1999 to 2016, where either the investor or the investment enterprise is resident in Germany.[11] It is unbalanced in structure. We restrict our sample to the years 2006 until 2016 and exclude the year of announcement of the reform 2013. The observational units in our empirical study

[10] The "Microdatabase Direct Investment (MiDi) 1999-2016" used in this study is registered under the DOI: 10.12757/Bbk.MiDi.9917.05.06.

[11] An investment relation is in the sample if a company directly/indirectly holds at least 10%/50% of the shares or voting rights in a foreign company with a balance sheet total of more than 3 million Euro (Drees et al., 2018).

are dependent companies of multinational groups.

We restrict our baseline analysis to direct investment relations between a German controlling company and a dependent company in Austria, Belgium, the Czech Republic, France, Hungary, Italy, Luxembourg, Malta, the Netherlands, Poland, Spain, Sweden, Switzerland, the UK, and the US. We exclude observations with a balance sheet total or fixed assets of zero and observations with a negative turnover. We focus on direct investments since we expect multinational corporations with conduit entities to use hybrid finance rather between the controlling company and the conduit entity.[12] Our main sample consists of 101,002 observations over the years 2006-2016. For the baseline year 2006, table 2 shows for each country the number of dependent companies having a German controlling company. In 2006, we have 8,827 affiliates in the sample.

Table 2: Dependent Companies per Country

	2006
Austria	754
Belgium	414
Czech Republic	665
France	1,052
Hungary	436
Italy	716
Luxembourg	137
Malta	16
Netherlands	577
Poland	787
Spain	658
Sweden	240
Switzerland	609
UK	727
US	1,039
Total	8,827

Number of dependent companies with a German controlling company for each country in our sample (year: 2006). Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. Own calculation.

Table 3 reports descriptive statistics for our sample. The dependent companies have, on average, fixed and intangible assets of € 24 million. The fraction of internal debt to internal capital is on average 0.67, the fraction of internal equity to internal

[12]The results using an extended sample that also includes indirect investments are similar to the baseline results (see section 5.3).

capital 0.58, and the fraction of internal capital to total capital 0.40. We also use information on the country's corporate tax rate.[13]

TABLE 3: Descriptive Statistics

Variable	**Obs.**	**Mean**	**p5**	**p50**	**p95**
Internal debt / Internal capital	97,734	0.67	0.00	0.99	1.00
Internal equity / Internal capital	100,043	0.58	0.00	0.67	1.00
Internal capital / Total capital	101,002	0.4	0.00	0.36	0.95
Corporate tax rate	101,002	0.28	0.18	0.26	0.40
Fixed and intangible assets (thousand €)	101,002	23,560.29	29	2,101	62,362

Descriptive statistics of main dependent and explanatory variables. Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank from 2006 to 2016. Data on the corporate tax rates by KPMG. Own calculations.

5 Evidence on Tax Avoidance with Hybrid Financial Instruments

5.1 Baseline Results

Table 4 reports the basic estimation results for equation (1). We use internal capital as a proxy for HFIs since we know that they are either classified as internal equity or internal debt. All regressions include dependent company and year fixed effects. The brackets below the coefficient estimates show robust standard errors clustered at source country-year level. Following the difference-in-difference design presented in section 3, column (1) regresses the internal debt of a dependent company relative to its internal capital on the interaction term with a dummy variable indicating a tax avoidance opportunity until 2013 and with a dummy variable indicating observations after 2013 ($\text{tao\_bef13}_i * \text{post}_t$). By relating the internal liabilities to total internal capital, we focus on changes in the internal capital structure rather than on changes in the overall capital structure. We control for the size of the dependent company by including the ln of the sum of tangible and intangible fixed assets. We also include source country characteristics controlling for variations in country characteristics over time.[14] The coefficient estimate of the interaction term

[13]We take the data on corporate tax rates from KPMG.

[14]We take the data on GDP-growth from the International Financial Statistics (IFS) by the IMF. The data on short- and long-term lending rates are from the OECD.

is positive and statistically significant. The average of internal debt relative to internal capital in our sample is approximately 0.67. The results indicate an increase of internal debt by 0.01. Therefore, the implementation of the defensive linking rule in Germany in 2014 is associated with a 2% increase in internal debt among companies where tax avoidance with HFIs was possible before.

Column (2) presents the coefficient estimates for internal equity as a separate dependent variable. The dependent variable depicts the ratio of the nominal capital paid that is attributable to the controlling company relative to the total internal capital of the dependent company. The coefficient estimate of the interaction term is negative and statistically significant suggesting that the implementation of the defensive linking rule is associated with a decrease in internal equity of 2%. The estimates in columns (1) and (2) indicate a shift in the internal capital structure of affected companies from internal equity to internal debt. This result suggests that most of HFIs in our data are classified as equity. Since tax avoidance with HFIs in the context of this study is only possible when the financial instrument is qualified as equity in Germany and since our data source is German, this seems plausible. Therefore, we may conclude that the implementation of the defensive linking rule and thus the elimination of tax avoidance opportunities with HFIs decreased internal hybrid capital. Companies seems to have replaced this hybrid capital by internal debt.

Column (3) reports the estimates on total internal capital as a share of total capital. We find a positive and statistically significant coefficient estimator for the interaction term, indicating that the implementation of the linking rule is associated with an increase in the internal capital ratio. As a result, affected companies seem to overcompensate the eliminated hybrid capital with internal debt: before the implementation of the linking rule, using internal hybrid capital was the first best form of financing from a tax point of view. With the linking rule, internal debt may become more attractive because of the tax shield. Companies may, however, have to use more internal debt to reach a comparable tax advantage as with HFIs.[15]

Table 5 further observes changes in the overall capital structure of affected companies: so far, we studied changes in the internal capital structure. Columns (1) and (2) report regression estimates for the total debt share and the total equity share respectively. Both regression estimates of the interaction term do not show a sta-

[15]To make sure that our results are not driven by a reaction of one of the control countries, we excluded one control country at a time and got similar and statistically significant results.

TABLE 4: Main results

Dependent variable	$\frac{\text{Internal Debt}}{\text{Internal Capital}}$	$\frac{\text{Internal Equity}}{\text{Internal Capital}}$	$\frac{\text{Internal Capital}}{\text{Total Capital}}$
	(1)	(2)	(3)
Tao_bef13 · post	0.0122*	-0.0099**	0.0114*
	(0.0050)	(0.0036)	(0.0036)
Ln assets	0.0141***	-0.0155***	-0.0105***
	(0.0017)	(0.0013)	(0.0012)
Corporate tax rate	0.1970*	-0.0289	-0.0326
	(0.0803)	(0.0569)	(0.0540)
Lending rate short term	-0.0001	0.0000	-0.0002*
	(0.0001)	(0.0001)	(0.0001)
Lending rate long term	0.0000	0.0000	0.0001
	(0.0000)	(0.0000)	(0.0000)
GDP growth	0.0000	-0.0000	-0.0001**
	(0.0000)	(0.0000)	(0.0000)
Year & Affiliate FE	Yes	Yes	Yes
Observations	88,287	90,410	91,313
Adjusted R^2	0.640	0.703	0.733

Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. The observational units are dependent companies with German controlling companies. $\frac{\text{Internal Debt}}{\text{Internal Capital}}$ and $\frac{\text{Internal Equity}}{\text{Internal Capital}}$ separately represent internal debt relative to internal capital and internal equity relative to internal capital. $\frac{\text{Internal Capital}}{\text{Total Capital}}$ represents the internal debt and equity relative to the total capital of a dependent company. Tao_bef13 is a dummy variable that equals one if there was a tax avoidance opportunity with HFIs between a dependent company and its German controlling company before the implementation of the defensive linking rule in Germany in 2014. Post is a dummy variable that equals one for observations after 2013. Yearly data from 2006 to 2016. Robust standard errors clustered at source country-year level in parentheses. Own calculations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

tistically significant result suggesting that the linking rule did not affect the overall capital structure regarding the choice between debt and equity. The regression estimates in column (3) support that finding: the coefficient of the interaction term on the share of external capital, i.e. external debt, is negative and statistically significant. Consequently, multinational corporations seem to have shifted from external debt to internal debt.

Our identification strategy relies on the assumption that there were no differential trends in internal finance among firms in the treatment and in the control group prior to the implementation of the defensive linking rule. To verify this assumption, we conduct an event study by estimating equation 2. We replace the post-dummy from equation (1) with a series of year dummies for a period of six years before and three years after the implementation of the linking rule. Figure 3 plots the estimated coefficients on the modified interaction terms. The bars depict 90 percent confidence intervals. We can interpret the estimated coefficients as the differential changes in

TABLE 5: Capital Structure Changes

Dependent variable	$\frac{\text{Equity}}{\text{Total Capital}}$	$\frac{\text{Debt}}{\text{Total Capital}}$	$\frac{\text{External Capital}}{\text{Total Capital}}$
	(1)	(2)	(3)
Tao_bef13 · post	0.0009	-0.0009	-0.0209*
	(0.0029)	(0.0029)	(0.0099)
Ln assets	-0.0168***	0.0168***	0.0089***
	(0.0009)	(0.0009)	(0.0024)
Corporate tax rate	0.0074	-0.0074	-0.2487
	(0.0425)	(0.0425)	(0.1771)
Lending rate short term	-0.0001	0.0001	0.0003
	(0.0000)	(0.0000)	(0.0002)
Lending rate long term	0.0000	-0.0000	-0.0001
	(0.0000)	(0.0000)	(0.0001)
GDP growth	-0.0000**	0.0000**	0.0002**
	(0.0000)	(0.0000)	(0.0001)
Year & Affiliate FE	Yes	Yes	Yes
Observations	91,313	91,313	91,313
Adjusted R^2	0.837	0.837	0.672

Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. The observational units are dependent companies with German controlling companies. $\frac{\text{Equity}}{\text{Total Capital}}$ represents total equity relative to the total capital of a dependent company. $\frac{\text{Debt}}{\text{Total Capital}}$ represents total debt relative to the total capital. $\frac{\text{External Capital}}{\text{Total Capital}}$ represents total external capital relative to the total capital. Tao_bef13 is a dummy variable that equals one if there was a tax avoidance opportunity with HFIs between a dependent company and its German controlling company before the implementation of the defensive linking rule in Germany in 2014. Post is a dummy variable that equals one for observations after 2013. Yearly data from 2006 to 2016. Robust standard errors clustered at source country-year level in parentheses. Own calculations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

internal finance of firms in the treatment group, relative to firms in the control group. The baseline year is t-6, the first year of our observation period. Figure 3 shows that the firms in the treatment and control groups show similar trends prior to the implementation of the linking rule. The coefficient estimates are close to zero prior to the change in tax law. The positive and statistically significant coefficient estimates in and after the year of the implementation indicate an increase in internal finance among affected companies.

5.2 Real Effects

If a multinational corporation does not use another tax avoidance channel after the elimination of tax avoidance with HFIs, the company faces an increased tax burden that may result in economic real effects. Table 6 shows the regression estimates for three different indicators of economic real effects. Columns (1) and

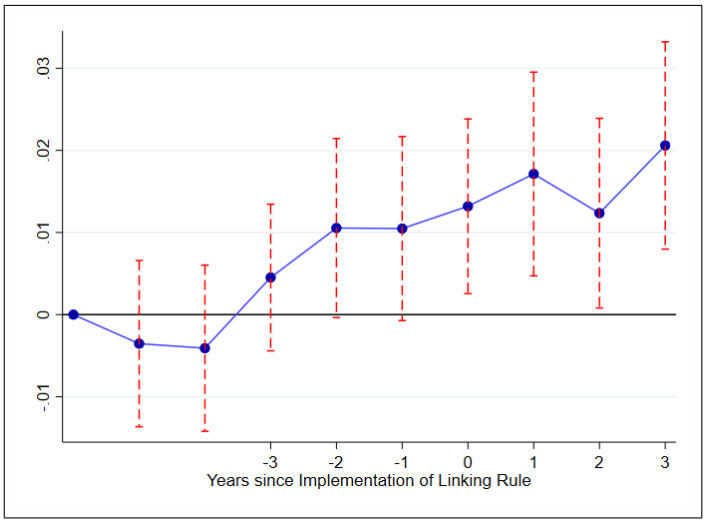


FIGURE 3: Event Study Results

Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. Regression coefficients from estimating equation 2. The bars depict 90 percent confidence intervals. Own calculation.

(2) show estimated regression coefficients on the ln of the turnover of a dependent company and on the ln of FDI. Column (3) shows estimated regression coefficients on the change in fixed assets relative to the fixed assets in the previous year. We interpret this variable as an indicator for investment activities. A decrease in one of these variables that is associated with the implementation of the linking rule may indicate a reduction in economic and/or investment activity in affected countries. We do not find statistically significant regression estimators for the interaction term suggesting that the implementation of the linking rule is not associated with a reduced economic activity. These results may suggest that the implementation of linking rules is not associated with negative economic real effects. However, these results may also indicate that the affected multinationals successfully use other tax avoidance channels to prevent a significant increase in the tax burden. Our baseline results point to an increased use of internal debt which may also be used for tax avoidance reasons.

5.3 Robustness

We conduct several tests to verify the robustness of our baseline results. First, we extend the baseline sample and include indirect investment relations. In the baseline sample, we exclude indirect investments since we expect multinational cor-

TABLE 6: Real Effects

Dependent variable	ln(Turnover)	ln(FDI)	$\frac{\Delta \text{Fixed Assets}}{\text{Fixed assets}_{t-1}}$
	(1)	(2)	(3)
Tao_bef13 · post	-0.0164	-0.0181	-0.5148
	(0.0127)	(0.0103)	(1.4765)
Ln assets	0.0539***	-0.0031	18.3624*
	(0.0052)	(0.0030)	(8.5790)
Ln balance sheet total	0.5805***	0.8816***	
	(0.0139)	(0.0108)	
Corporate tax rate	0.1589	-0.5151***	-47.5099
	(0.1585)	(0.1172)	(65.4647)
Lending rate short term	0.0008**	-0.0004*	0.0193
	(0.0003)	(0.0002)	(0.0307)
Lending rate long term	-0.0004***	0.0002*	-0.0114
	(0.0001)	(0.0001)	(0.0165)
GDP growth	0.0004***	-0.0000	0.0012
	(0.0001)	(0.0001)	(0.0199)
Year & Affiliate FE	Yes	Yes	Yes
Observations	85,165	88,989	65,940
Adjusted R^2	0.934	0.921	0.242

Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. The observational units are dependent companies with German controlling companies. ln(Turnover) and ln(FDI) represent the ln of turnover of the dependent company and the ln of foreign direct investments. $\frac{\Delta \text{Fixed Assets}}{\text{Fixed assets}_{t-1}}$ depicts the change in fixed assets to the prior year relative to total assets in the prior year. Tao_bef13 is a dummy variable that equals one if there was a tax avoidance opportunity with HFIs between a dependent company and its German controlling company before the implementation of the defensive linking rule in Germany in 2014. Post is a dummy variable that equals one for observations after 2014. Yearly data from 2006 to 2016. Robust standard errors clustered at source country-year level in parentheses. Own calculations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

porations with conduit entities to use hybrid finance rather between the controlling company and the conduit entity than between the controlling and dependent company to avoid taxes. Second, we restrict our sample to the period 2009 to 2016 and omit observations with the UK as a host country to exclude effects of the tax reforms in Germany and the UK. Third, we investigate whether firms that belong to the control group respond more vigorously to the corporate tax rate in the host country since they cannot use HFIs as the first best form of financing from a tax perspective. All regressions include dependent company and year fixed effects. The brackets below the coefficient estimates show robust standard errors clustered at source country-year level.

Table 7 presents coefficient estimates for the extended sample with indirect investment relations. Comparable to the coefficient estimate in table 4, the coefficient

estimate for the interaction term ($\text{tao\_bef13}_i * \text{post}_t$) on the share of internal debt is positive and statistically significant (column (1)), while it is negative and statistically significant for the share of internal equity (column (2)). Therefore, the results support the shift of internal equity to internal debt. The estimator in column (3) indicates that affected companies overcompensate eliminated hybrid capital with internal debt since the total share of internal capital increases. As expected, the effects are slightly smaller than in the restricted sample with direct investment relations only.

Table 8, columns (1) to (3), present coefficient estimates for the restricted time period 2009 to 2016 without UK observations. There were two major corporate tax reforms in the observed countries in our observed baseline period: in 2008 in Germany and in 2009 and 2010 in the UK. To control for arising bias, we focus on a time period without major tax reforms. Using the restricted sample, we find highly comparable results to our baseline results indicating a shift from internal equity to internal debt after the implementation of the linking rule.

Column (4) in table 8 present coefficient estimates for the baseline sample with an additional regressor, an interaction term with a dummy variable for being in the control group and the statutory tax rate of the host country. The first best form of financing from a tax perspective are HFIs if there is a qualification conflict between two countries that enables a tax avoidance opportunity. Firms in the control group never had this tax avoidance opportunity. Therefore, we expect affiliates in the control group to react more vigorously to the statutory tax rate. The regression estimate of this interaction term is positive and statistically significant. This result indicates that a higher tax rate increases the use of internal finance among firms in the control group and therefore shows that companies in the control group show a stronger reaction to the tax rate.

TABLE 7: Robustness Test - Indirect Investment Relations

Dependent variable	$\frac{\text{Internal Debt}}{\text{Internal Capital}}$	$\frac{\text{Internal Equity}}{\text{Internal Capital}}$	$\frac{\text{Internal Capital}}{\text{Total Capital}}$
	(1)	(2)	(3)
Tao_bef13 · post	0.0122*	-0.0095**	0.0110**
	(0.0050)	(0.0036)	(0.0036)
Ln assets	0.0141***	-0.0155***	-0.0106***
	(0.0017)	(0.0013)	(0.0012)
Corporate tax rate	0.1972*	-0.0301	-0.0300
	(0.0802)	(0.0567)	(0.0533)
Lending rate short term	-0.0001	0.0000	-0.0002*
	(0.0001)	(0.0001)	(0.0001)
Lending rate long term	0.0000	-0.0000	0.0001
	(0.0000)	(0.0000)	(0.0000)
GDP growth	0.0000	-0.0000	-0.0001**
	(0.0000)	(0.0000)	(0.0000)
Year & Affiliate FE	Yes	Yes	Yes
Observations	88,988	91,121	92,027
Adjusted R^2	0.640	0.703	0.734

Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. The observational units are dependent companies with German controlling companies. $\frac{\text{Internal Liabilities}}{\text{Total Liabilities}}$ and $\frac{\text{Internal Equity}}{\text{Total Equity}}$ separately represent internal debt relative to internal capital and internal equity relative to internal capital. $\frac{\text{Internal Capital}}{\text{Total Capital}}$ represents the internal debt and equity relative to the total capital of a dependent company. Tao_bef13 is a dummy variable that equals one if there was a tax avoidance opportunity with HFIs between a dependent company and its German controlling company before the implementation of the defensive linking rule in Germany in 2014. Post is a dummy variable that equals one for observations after 2013. Yearly data from 2006 to 2016. This sample also includes indirect investment relations. Robust standard errors clustered at source country-year level in parentheses. Own calculations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Table 8: Robustness Test - Restricted Sample & Reaction to Tax Rate

	Restricted Sample			Reaction to Tax Rate
Dependent variable	$\frac{\text{Internal Debt}}{\text{Internal Capital}}$	$\frac{\text{Internal Equity}}{\text{Internal Capital}}$	$\frac{\text{Internal Capital}}{\text{Total Capital}}$	$\frac{\text{Internal Capital}}{\text{Total Capital}}$
	(1)	(2)	(3)	(4)
Tao_bef13 · post	0.0183***	-0.0141***	0.0100*	0.0081*
	(0.0053)	(0.0037)	(0.0040)	(0.0037)
Ln assets	0.0170***	-0.0167***	-0.0087***	-0.0106***
	(0.0023)	(0.0019)	(0.0016)	(0.0012)
Corporate tax rate (CTR)	0.0647	-0.0423	-0.0295	-0.0789
	(0.1815)	(0.0924)	(0.1164)	(0.0562)
CTR · control				0.2373**
				(0.0807)
Lending rate short term	-0.0001	0.0002**	-0.0003**	-0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Lending rate long term	-0.0000	-0.0000	0.0001*	0.0001*
	(0.0001)	(0.0000)	(0.0000)	(0.0000)
GDP growth	0.0000	0.0000	-0.0001*	-0.0001**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Year & Affiliate FE	Yes	Yes	Yes	Yes
Observations	59,049	60,343	60,914	92,027
Adjusted R^2	0.676	0.737	0.765	0.734

Data from "Microdatabase Direct Investment (MiDi) 1999-2016" by Research Data and Service Centre of Deutsche Bundesbank. The observational units are dependent companies with German controlling companies. $\frac{\text{Internal Debt}}{\text{Internal Capital}}$ and $\frac{\text{Internal Equity}}{\text{Internal Capital}}$ separately represent internal debt relative to internal capital and internal equity relative to internal capital. $\frac{\text{Internal Capital}}{\text{Total Capital}}$ represents the internal debt and equity relative to the total capital of a dependent company. Tao_bef13 is a dummy variable that equals one if there was a tax avoidance opportunity with HFIs between a dependent company and its German controlling company before the implementation of the defensive linking rule in Germany in 2014. Post is a dummy variable that equals one for observations after 2013. Control is a dummy variable indicating observations that belong to the control group. Yearly data from 2009 to 2016 in columns (1) to (3) and from 2006 to 2016 in column (4). This sample also includes indirect investment relations. Robust standard errors clustered at source country-year level in parentheses. Own calculations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

6 Conclusion

Using HFIs among affiliated companies is an important channel for tax avoidance. However, there is little, especially empirical, research on this tax avoidance strategy. This paper empirically investigates the effect of implementing a linking rule in Germany in 2014 on the use of hybrid finance among affected companies. We analyze demarcation rules of selected industry countries and reveal country combinations with a tax avoidance opportunity before the implementation of the linking rule in 2014. Applying a difference-in-difference approach, we compare the capital structure of German outbound affliates with a tax avoidance opportunity until 2013 with the capital structure of German outbound affiliates without such opportunities and examine the effect on internal finance including HFIs.

We implement this approach by using a large dataset on investment relations among affiliated companies. Our results indicate that the elimination of tax avoidance opportunities with HFIs is associated with a change in the internal capital structure of affected companies: internal equity is replaced by internal debt. Since we do not find negative real effects, implementing linking rules seems to be an efficient unilateral policy against this form of double non-taxation without side effects.

References

Bartelsman, Eric J., and Roel M. W. J. Beetsma. 2003. "Why Pay More? Corporate Tax Avoidance through Transfer Pricing in OECD Countries." *Journal of Public Economics*, 87: 2225–2252.

Beer, Sebastian, and Jan Loeprick. 2015. "Profit Shifting: Drivers of Transfer (Mis)pricing and the Potential of Countermeasures." *International Tax and Public Finance*, 22(3): 426–451.

Blouin, Jennifer, Harry Huizinga, Luc Laeven, and Gaetan Nicodeme. 2014. "Thin Capitalization Rules and Multinational Firm Capital Structure." CESifo Working Paper Series 4695, CESifo Group Munich.

Buettner, Thiess, Michael Overesch, and Georg Wamser. 2018. "Anti Profit-Shifting Rules and Foreign Direct Investment." *International Tax and Public Finance*, 25(3): 553–580.

Buettner, Thiess, and Georg Wamser. 2013. "Internal Debt and Multinationals' Profit Shifting - Empirical Evidence from Firm-Level Panel Data." *National Tax Journal*, 66(1): 63–96.

Clausing, Kimberly. 2003. "Tax-Motivated Transfer Pricing and US Intrafirm Trade Prices." *Journal of Public Economics*, 87(9): 2207–2223.

Cristea, Anca D., and Daniel X. Nguyen. 2016. "Transfer Pricing by Multinational Firms: New Evidence from Foreign Firm Ownerships." *American Economic Journal: Economic Policy*, 8(3): 170–202.

Dharmapala, Dhammika. 2014. "What Do We Know about Base Erosion and Profit Shifting? A Rreview of the Empirical Literature." *Fiscal Studies*, 35(4): 421–448.

Dischinger, Matthias, and Nadine Riedel. 2011. "Corporate Taxes and the Location of Intangible Assets within Multinational Firms." *Journal of Public Economics*, 95(1): 691–707.

Drees, Dorothea, Christopher-Johannes Schild, and Frank Walter. 2018. "Microdatabase Direct Investment 1999-2016, Data Report 2018-06 - Metadata Version 5."Technical report, Deutsche Bundesbank Research Data and Service Centre.

Eberhartinger, Eva, and Martin Six. 2009. "Taxation of Cross–Border Hybrid Finance: A Legal Analysis." *Intertax*, 37(1): 4–18.

Egger, Peter, Christian Keuschnigg, Valeria Merlo, and Georg Wamser. 2014. "Corporate Taxes and Internal Borrowing within Multinational Firms." *American Economic Journal: Economic Policy*, 6(2): 54–93.

Griffith, Rachel, Helen Miller, and Martin O'Connell. 2014. "Ownership of Intellectual Property and Corporate Taxation." *Journal of Public Economics*, 112: 12–23.

Hardeck, Inga, and Patrick Uwe Wittenstein. 2018. "Assessing the Tax Benefits of Hybrid Arrangements - Evidence from the Luxembourg Leaks." *National Tax Journal*, 71(2): 295–334.

Huizinga, Harry, Luc Laeven, and Gaetan Nicodeme. 2008. "Capital Structure and International Debt Shifting." *Journal of Financial Economics*, 88: 80–118.

Johannesen, Niels. 2014. "Tax Avoidance with Cross-Border Hybrid Instruments." *Journal of Public Economics*, 112: 40–52.

Karkinsky, Tom, and Nadine Riedel. 2012. "Corporate Taxation and the Choice of Patent Location within Multinational Firms." *Journal of International Economics*, 88(1): 176–185.

Liu, Li, Tim Schmidt-Eisenlohr, and Dongxian Guo. 2019. "International Transfer Pricing and Tax Avoidance: Evidence from the linked Tax-Trade Statistics in the UK." *Review of Economics and Statistics*, forthcoming.

Lohse, Theresa, and Nadine Riedel. 2013. "Do transfer pricing laws limit international income shifting? Evidence from European multinationals." Working Paper 1307, Oxford University Centre for Business Taxation.

Mescall, Kenneth J. Klassen Petro Lisowsky Devan. 2017. "Transfer Pricing: Strategies, Practices, and Tax Minimization." *Contemporary Accounting Research*, 34(1): 455–493.

Mills, Lillian F., and Kaye J. Newberry. 2005. "Firms' Off-Balance Sheet and Hybrid Debt Financing: Evidence from Their Book-Tax Reporting Differences." *Journal of Accounting Research*, 43(2): 251–282.

de Mooij, Rud, and Michael Keen. 2016. "Debt, Taxes, and Banks." *Journal of Money, Credit and Banking*, 48(1): 5–33.

de Mooij, Ruud, and Li Liu. 2018. "At a cost: The real effect of transfer pricing regulations on multinationalinvestments." *IMF Working Papers*, No. 18/69.

OECD. 2013. *Addressing Base Erosion and Profit Shifting.*: OECD Publishing.

OECD. 2014. "Public discussion draft BEPS Action 2: Neutralise the effects of hybrid mismatch arrangements (recommendations for domestic laws)."Technical report.

OECD. 2015. *Neutralising the Effects of Hybrid Mismatch Arrangements, Action 2 - 2015 Final Report, OECD/G20 Base Erosion and Profit Shifting Project.*: OECD Publishing.

Ruf, Martin, and Alfons J. Weichenrieder. 2012. "The Taxation of Passive Foreign Investment: Lessons from German Experience." *Canadian Journal of Economics*, 45(4): 1504–1528.

Weichenrieder, Alfons J., and Martin Ruf. 2013. "CFC Legislation, Passive Assets and the Impact of the ECJ's Cadbury-Schweppes Decision." CESifo Working Paper Series No. 4461, CESifo Group Munich.