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Avoiding Taxes: Banks' Use of Internal Debt

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Avoiding Taxes: Banks' Use of Internal Debt*

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- Preliminary Version -

Abstract

This paper investigates how banks use internal debt to shift profits to lower taxed affiliates. Using regulatory data on German multinational banks I find that banks employ the debt shifting channel for tax avoidance more aggressively than non-financial multinationals do. This becomes even clearer when I correct for conduit entities in internal debt financing: A ten percentage points higher corporate tax rate increases the internal net leverage by substantial 5.63 percentage points, corresponding to an 18% increase at the mean. Furthermore, in accounting for conduit debt I make a more general point on debt shifting literature. In my sample I find that mainly low-taxed bank affiliates hold conduit debt.

Keywords: Profit Shifting, Internal Debt, Multinational Banks, Taxation

JEL Classification: H25, G21, F21

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1 Introduction

The fight against profit shifting has been a major policy issue in recent years. The Organisation for Economic Co-operation and Development (OECD) estimates that profit shifting causes tax revenue losses amounting to 4% to 10% of global corporate income tax revenues (OECD, 2015). Facing this substantial impact on public treasuries, the member countries have progressively implemented countermeasures proposed in the OECD/G20 action plan on base erosion and profit shifting (OECD, 2013) into national legislation. Nevertheless various legal structures for multinational tax planning are still available.

There is a substantial empirical literature studying profit shifting and the different channels multinationals can use to transfer profits to lower taxed affiliates, but virtually all of this literature has left out banks or not considered the special role of the financial sector. This is particularly striking when it comes to profit shifting via internal credit relations, which is one of the main channels for profit shifting. It is usually labeled debt shifting in the literature and works straightforwardly: A multinational bank group can shift its capital as equity to affiliates residing in low tax countries or tax havens. The low taxed affiliate then lends money to other high taxed affiliates. Through the related interest payments profits are shifted to the low taxed affiliate, with a tax saving equal to the tax rate differential times the interest payment. While there is consistent evidence on debt shifting in non-financial sectors, to my knowledge there is no study that investigates the extent of debt shifting in the banking sector.

Banks are likely to use debt shifting more aggressively than other multinationals because of several reasons: first, banks hold much higher leverages than other companies. This additional debt capacity allows also for a more intensive use of internal debt. Second, several countries exempt banking income from their controlled-foreign-corporation (CFC) rules that should prevent profit shifting. Germany, for instance, does not use CFC rules towards banks under some conditions that are easily fulfilled. And third, as the profit maximizing optimization of financial transactions is a bank's core business, the expertise in tax planning is probably much larger in banks than in other multinationals. Whereas firms in other sectors often purchase tax advisory services from consultancy companies, banks already have a substantial tax planning expertise within the group.

In this paper I focus on debt shifting by banks. I show that banks indeed shift debt more aggressively than non-financial firms do. My analysis uses the External Positions

of Banks database, a comprehensive administrative dataset of the German central bank to which all German multinational banks and their foreign subsidiaries and branches are obliged to report. Internal leverages of bank affiliates in this sample are on average 42.2%. I find significant evidence for debt shifting with a ten percentage points higher corporate tax rate leading to an increase in the leverage of about 4.95 percentage points. This increase is both absolutely and also relatively to the mean larger than found in previous studies on non-financial sectors: Fuest et al. (2011), Møen et al. (2011), Buettner et al. (2012) and Buettner and Wamser (2013) use data on internal debt of German multinationals' affiliates. They find mean internal-debt-to-total-assets ratios between 19% and 28%, and a positive effect of an exemplary ten percentage points tax rate change of 0.7 to 2.1 percentage points on the internal leverage. Both absolutely and relatively to the mean this effect is smaller than the effect I find for German bank affiliates, indicating that the financial sector indeed uses debt shifting more aggressively.

Moreover this paper discusses the use of conduit entities in internal debt financing. In such conduit entities loans are simply passed through without shifting any profits out of the conduit affiliate. However, classical debt shifting regressions use internal gross liabilities as proxy for the volume of debt shifting and therefore inaccurately measure debt shifting if the location of these conduit entities correlates with tax rates. In the sample of German multinational banks I show that conduit entities are systematically located in low tax countries. To account for the potential bias I use a new dependent variable that captures internal liabilities net of internal claims relative to total assets (if positive, zero otherwise). I show that taking account of this bias increases the sensitivity of internal debt to the tax rate further: the estimated tax coefficient rises whereas the sample mean of the internal-net-debt ratio is substantially lower at 28.1%. More precisely, a ten percentage points higher corporate tax rate raises this internal-net-debt ratio by 5.63 percentage points, which corresponds to an increase by 20% at the mean.

In accounting for conduit entities and subtracting conduit debt in the dependent variable I furthermore make a more general methodological point on profit shifting literature: As also non-financial multinationals might use conduit affiliates in internal debt financing, previous regressions using the internal-gross-liabilities-to-total-assets ratio as dependent variable are potentially also affected by a biased estimation of debt shifting.

The literature on profit shifting has been so far almost exclusively confined to the non-financial sector. There are several studies that find debt shifting evidence for non-

banks. Similar to the above mentioned studies on German multinationals Blouin et al. (2014) finds debt shifting evidence for US multinationals. Overesch and Wamser (2014) is the only study so far that uses bilateral internal debt data and finds significantly positive effects of the precise bilateral tax rate differential (which is probably the most precise measure for debt shifting incentives). The dataset used in this paper similarly allows a bilateral analysis, and I find much higher elasticities of internal leverages for German bank affiliates also at the bilateral level.

Moreover, some papers infer evidence for debt shifting from regressing overall-liabilities-to-total-assets ratios on the difference between the tax rate an affiliate faces and the groups' average tax rate (e.g. Gu et al. (2015) for the banking sector and Huizinga et al. (2008) for multinationals in general). As they cannot distinguish between internal and external debt they also cannot break down this effect to debt shifting and the classical debt financing incentive generated by high tax rates due to the deductibility of interest expenses.

Most closely related to this paper is the work of Merz and Overesch (2016). They show in a worldwide sample of bank affiliates that corporate tax rates negatively affect reported pretax profits, indicating that banks indeed engage in profit shifting. However they cannot identify precise profit shifting channels but find some suggestive evidence that debt shifting might play a role.

The next section discusses relevant institutional issues and the role of conduit entities. Section 3 presents the empirical specification that is used for identification. In section 4 I describe the dataset and provide descriptive evidence for debt shifting. Then section 5 presents the regression results. Finally section 6 concludes.

2 Debt Shifting in the Banking Sector

While there is consistent evidence in the literature on debt shifting by non-financial multinationals, the financial sector can use this tax avoidance channel even stronger: The immaterial nature of the banking business and the institutional environment in many countries facilitate the use of large amounts of internal debt tailored to shift profits to lower taxed affiliates. This environment is outlined in the next section. Moreover, previous studies on debt shifting have not considered the role of conduit entities. As they might be particularly important in the banking sector I discuss them in section 2.2.

2.1 Institutional background

Leverages in the financial sector are very high. The Bank for International Settlements reports an equity-to-total-assets-ratio of only 6.9% for banks worldwide in 2015 (Bank for International Settlements, 2016). German banks, that constitute the sample in this paper, had on average an equity-to-total-assets-ratio of only 7.0% in 2015, compared to 28.2% in the non-financial sector (Deutsche Bundesbank, 2016). Berg and Gider (2016) find that mainly asset risks can explain the gap in leverages between banks and non-banks. However, the seemingly higher debt capacity in the banking sector also provides additional scope for internal debt financing. Moreover, bank regulation does not require an upper limit on the use of debt financing so far. In course of Basel III a compulsory leverage ratio that requires a minimum equity-to-total-assets-ratio of 3% (with variable mark-ups for globally systematically relevant banks) is expected to be implemented. Since January 1, 2015 banks have to disclose this ratio, but the adoption as a mandatory requirement is only planned to be introduced by January 1, 2018. Hence so far there is no regulatory limitation to the use of internal debt.¹

Apart from this, several countries implemented controlled-foreign-corporation (CFC) rules that add passive income (e.g. interest income) in low taxed affiliates to the tax base of the parent company (see e.g. Ruf and Weichenrieder (2012)), allowing for a tax credit for the taxes already paid abroad. If binding, these rules would prevent debt shifting. However, some countries as e.g. Japan, the United States and Germany completely or in large part exclude income from banking from being affected by CFC rules. For instance Germany, the home country of all multinational banks in the sample used in this paper, completely excludes income from banking under the relatively loose condition of having a ‘commercially organized business operation’ in the low-tax country.² Also this exclusion of banks from CFC legislation in some major countries provides additional scope for debt shifting compared to multinationals in other sectors.

Another regulatory issue that might affect debt shifting in the banking sector is the implementation of bank levies in several countries in the aftermath of the financial crisis. In most countries also internal liabilities are subject to the levy, increasing the

¹For a discussion of the Basel III leverage ratio requirement see Dermine (2015).

²The German Federal Fiscal Court decided in 2010 that it is not even necessary that the foreign affiliate has employees or offices to fulfill the condition of a ‘commercially organized business operation’ (BFH 13 Oct 2010, I R 61/09); having a service contract with another affiliate is already sufficient.

costs of debt shifting. In Germany a bank levy was introduced in 2011 with rates depending on the tax base. However, there is a levy exempt amount of 300 million euros and Buch et al. (2016) show that 77% of all German banks are therefore fully exempt from levy payments. Regarding the relatively low bank levy rates (also in other countries, see Devereux et al. (2015) for an overview) and the exemption of the majority of banks I expect that the German levy does not affect debt shifting substantially. Furthermore, since the adoption of European bank levy standards in 2015 there is even a special treatment that reduces bank levy rates on intragroup liabilities by half.

Taken together the regulatory environment, the immaterial nature of the banking business and the common high leverages in the financial sector suggest that banks use debt shifting more intensively than multinationals from other sectors.³

2.2 The role of conduit entities

So far only Mintz (2004) considers how multinationals might use conduit entities to avoid corporate taxes. In his model equity is given to a low-taxed conduit entity which then passes the capital as a loan to another higher-taxed affiliate. While the first transaction in most countries is not related with profit shifting (as dividends are usually not taxed), the loan shifts profits from the high-taxed affiliate to the lower-taxed conduit entity. From an empirical perspective this scheme does not lead to an incorrect measurement of debt shifting if internal gross liabilities are used as dependent variable. A greater threat to the empirical identification of debt shifting are conduit entities that simply pass through liabilities, by taking up a loan from a related affiliate and passing it as a loan to another affiliate. As in these conduit affiliates interest income from conduit claims offsets interest expenses due to conduit liabilities, using internal gross liabilities as proxy for profits shifted out through internal debt leads to biased estimates. Nevertheless previous empirical studies on debt shifting have not considered the existence of conduit entities and its potential impact on the estimation of debt

³Formally the negative interbank market rates that arose for certain funds in 2015 could reverse the debt shifting incentives as internal loans have to be priced according to the arm's length principle. Nevertheless I do not expect that negative interest rates have substantially affected debt shifting behavior of multinational banks so far: Banks have some discretionary powers for overpricing internal loans and they might also choose longer term periods to justify higher interest rates. The sample period in my regressions is from June 2010 to December 2015. As a robustness check I also estimated my regressions excluding all observations in 2015 from the sample and arrived at very similar results.

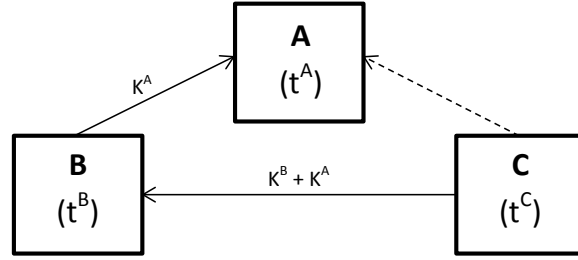


FIGURE 1: Conduit affiliate in internal debt financing

shifting.

This paper accounts for conduit entities in internal debt financing. I define conduit affiliates as entities that simply pass-through debt from one related affiliate to another affiliate. Figure 1 illustrates the simplest example of such an internal conduit debt scheme: affiliate C is located in a tax haven with corporate tax rate t_C . C lends K_B units of money to affiliate B which is taxed by $t_B > t_C$. Through the related interest payments profits are shifted from affiliate B to the tax haven affiliate C. Moreover also the headquarter in A wants to lend K_A from the tax haven affiliate. Instead of directly taking out a loan from affiliate C, it can pass-through this loan via affiliate B, the hub. In affiliate A the interest payments for K_A are tax-deductible. In affiliate B the pass-through is completely tax-neutral (given that the loans are subject to the same interest rates) as the interest income from A is offset by interest expenses to C. In affiliate C interest income is taxed at rate $t_A > t_C$. Hence from a tax perspective taking up the loan through the hub is equivalent to direct lending.

However, there might be some reasons why multinationals use such conduit entities in internal debt financing. First, additional debt streams offer additional scope for mispricing of internal loans. This form of transfer pricing is a profit shifting channel different from debt shifting and is not the subject of this paper. Second, passing internal debt through conduit subsidiaries can simply reflect real structures: the conduit entity can serve as a financial hub that plays the role of a capital coordinator for the group and distributes capital from tax havens to affiliates. This also allows to re-bundle debt, for instance by taking up loans from several low-taxed subsidiaries in the hub and distribute them to several high-taxed affiliates. Third, multinationals might also use conduit entities to conceal the real origin of internal loans. As tax avoidance schemes of several multinationals were recently addressed in the media, multinationals might be interested in making these schemes increasingly opaque, although they are legal.

How does the use of conduit subsidiaries affect the estimation of internal debt

responses to tax rates? In the simple example in figure 1, passing K_A through affiliate B increases the internal debt stocks of both affiliates A and B. However K_A does not shift any profit out of affiliate B. This double-counting of internal debt in conduit entities effectively assigns too high internal debt stocks to these intermediary affiliates. As I show in section 3.2 this leads to a bias in the classical debt shifting regressions employed by previous literature.

3 Empirical Specification

This section develops the baseline empirical specification that is employed to estimate debt shifting and then describes the data on German multinational banks used throughout this paper.

3.1 Baseline model

Like previous literature on debt shifting in non-financial sectors, I estimate the effect of corporate tax rates on internal leverages of affiliates, using variation in tax rates within a multinational bankgroup across countries and across time. Accordingly, the baseline regression equation writes:

$$\frac{InternalLiabilities_{ikt}}{TA_{ikt}} = \beta_0 + \beta_1 CTR_{ikt} + \beta_2 X_{ikt} + \gamma_t + \delta_k + u_{ikt} \quad (1)$$

where $InternalLiabilities_{ikt}$ are internal liabilities in affiliate i of bankgroup k in period t . TA_{ikt} are total assets. CTR_{ikt} is the statutory corporate income tax rate affecting affiliate i and X_{ikt} is a vector of control variables described below. γ_t are time fixed effects, δ_k are bankgroup fixed effects and u_{ikt} is the usual error term. If multinational banks indeed shift profits via internal debt I expect a positive estimate for β_1 .

To capture the size of an affiliate I include the inverse hyperbolic sine of total assets as a bank-specific control variable into X_{it} . Similar to the logarithmic transformation the inverse hyperbolic sine (IHS) allows to interpret the estimated coefficients as semi-

elasticities, but unlike the logarithm it is also defined for zero and negative values.⁴ As the magnitude of a bankgroup’s engagement in a country and thereby also the use of internal debt might be influenced by macroeconomic variables, I further control for GDP growth, consumer price inflation rates and the inverse hyperbolic sine of the host country’s nominal GDP. A further control is a country’s share of the financial sector in its gross value added which should account for countries that act as important financial centers.

Moreover I include two regulatory variables that potentially influence a bankgroup’s activities and financing decisions in a country: first I include the minimum regulatory capital requirement for banks and second I control for the capital regulatory index that is provided by Barth et al. (2013) based on the World Bank (2011) survey on bank regulation. This index captures whether a country’s capital requirement is adjusted for individual risk of banks, whether the regulatory capital is adjusted for certain market value losses and whether certain funds may be used to capitalize a bank. It ranges from 0 to 10 with higher values indicating greater stringency of a country’s capital regulation. Another issue with the sample in this paper is that all bankgroups are headquartered in Germany. As profit shifting is found to be less intense out of headquarters (see Dischinger et al. (2013)), as a robustness check I also exclude all German headquarters from the sample and re-estimate the regressions. However, the results I find are very similar.

3.2 Accounting for conduit entities

As outlined in section 2.2, the simple internal-liabilities-to-total-assets ratio also includes conduit liabilities that are only passed-through and hence do not reflect actual profit shifting. To solely capture internal debt that effectively shifts profits out of the respective affiliate we have to subtract such pass-through loans. Hence the ratio of internal debt net of pass-through loans divided by i ’s total assets is the appropriate measure for debt shifting out of affiliate i . A straightforward debt shifting regression with this ratio as dependent variable writes

$$\frac{InternalDebt_{it}^*}{TA_{it}} = \beta_0 + \beta_1 CTR_{it} + \beta_2 X_{it} + u_{it} \quad (2)$$

⁴The inverse hyperbolic sine (IHS) is defined as $\sinh^{-1}(x) = \log(x + (x^2 + 1)^{0.5})$. For a discussion of the advantages of transforming dependent variables by IHS see Burbidge et al. (1988).

where $InternalDebt_{it}^*$ denotes internal debt net of pass-through loans. TA_{it} are total assets held in affiliate i , CTR_{it} is the corporate tax rate, X_{it} is a vector of control variables and u_{it} is the error term. However, usual debt shifting regressions (like regression eq. (1)) do not subtract pass-through loans in the dependent variable: the common dependent variable is $\frac{InternalDebt_{it}}{TA_{it}} = \frac{InternalDebt_{it}^* + e_{it}}{TA_{it}}$ where e_{it} is debt that is passed through to other affiliates. The regressions therefore estimate

$$\frac{InternalDebt_{it}}{TA_{it}} = \beta_0 + \beta_1 CTR_{it} + \beta_2 X_{it} + u_{it} + \frac{e_{it}}{TA_{it}} \quad (3)$$

If the choice of the conduit affiliate's location is correlated with the corporate tax rate there is a bias in the estimate for β_1 similar to the bias that arises with a systematic measurement error in the dependent variable. As the correlation between the dependent variable in eq. (3) and $\frac{e_{it}}{TA_{it}}$ is positive by definition, the sign of the bias depends on the sign of the covariance between $\frac{e_{it}}{TA_{it}}$ and CTR_{it} :

$$\text{Cov}(CTR_{it}, \frac{e_{it}}{TA_{it}}) = \frac{1}{n} \sum_{i=1}^n (CTR_{it} * \frac{e_{it}}{TA_{it}}) - \overline{CTR} * \frac{1}{n} \sum_{i=1}^n (\frac{e_{it}}{TA_{it}}) \quad (4)$$

where \overline{CTR} is the sample mean of CTR_{it} . In all subsidiaries that do not serve as conduit entities e_{it} is equal to zero. Therefore one can rewrite (4):

$$\text{Cov}(CTR_{it}, \frac{e_{it}}{TA_{it}}) = \frac{1}{n} \sum_{i=1}^h (CTR_{it} * \frac{e_{it}}{TA_{it}}) - \overline{CTR} * \frac{1}{n} \sum_{i=1}^h (\frac{e_{it}}{TA_{it}}) \quad (5)$$

where subsidiaries $i = 1, \dots, h$ serve as conduit affiliates. Rearranging gives:

$$\text{Cov}(CTR_{it}, \frac{e_{it}}{TA_{it}}) = \frac{1}{n} \sum_{i=1}^h \left[(CTR_{it} - \overline{CTR}) * \frac{e_{it}}{TA_{it}} \right] \quad (6)$$

Eq. (6) is negative if the weighted average tax rate of hubs is lower than the average tax rate of all affiliates in the sample, with weights being equal to pass-through-debt-to-total-assets ratio $\frac{e_{it}}{TA_{it}}$. Hence if conduit entities are systematically located in countries that are taxed lower than the average of affiliates, classical debt shifting regressions estimate a downward biased coefficient for the corporate tax rate. If conduit entities

are, vice versa, located in higher taxed affiliates, there is an upward bias in estimates for β_1 in eq. (3).

To account for the use of conduit affiliates in internal debt financing I additionally use internal net debt (relative to total assets) as dependent variable. This variable is defined as

$$IntNetDebt_{ikt} = \max(InternalLiabilities_{ikt} - InternalClaims_{ikt} ; 0) \quad (7)$$

where $InternalLiabilities_{ijkt}$ denotes affiliate i 's internal liabilities and $InternalClaims_{ijkt}$ are claims to related parties of bankgroup k in period t . Therefore the difference is the effective amount of internal debt that shifts profits out of affiliate i , accounting for the potential existence of conduit debt. If negative, effectively no profits are shifted out via the internal debt channel (but rather shifted into the affiliate). The empirical specification for estimation with the ratio of $IntNetDebt_{ikt}$ to total assets TA_{ikt} as dependent variable is equivalent to eq. (1):

$$\frac{IntNetDebt_{ikt}}{TA_{ikt}} = \beta_0 + \beta_1 CTR_{ikt} + \beta_2 X_{ikt} + \gamma_t + \delta_k + u_{ikt} \quad (8)$$

The explanatory variables are as defined in section 3.1. With debt shifting I again expect a negative estimate for β_1 in eq. (8). As argued in the previous section the estimated tax rate coefficient is expected to be higher with internal net debt as dependent variable compared to internal liabilities if the conduit entities are located in low tax countries, and to be lower if conduit affiliates are located in high tax countries. As a robustness check I again re-estimate eq. (8) with exclusion of German headquarters to account for the sample's idiosyncrasy that all bankgroups are headquartered in Germany.

3.3 Bilateral regressions

Starting from June 2014 the External Positions of Banks database of the Deutsche Bundesbank (2015) used in this paper also splits up internal liabilities and loans by the country of the related affiliate from which the loan is taken or to which the loan is given. This allows to regress bilateral internal net debt on precise bilateral tax rate differentials that unambiguously identify the tax incentive to shift profits between two affiliates. For a subset of German non-financial multinationals Overesch and Wamser

(2014) show a positive effect of such precise tax rate differentials on bilateral debt stocks. So far nobody has used bilateral data for debt shifting in banks. Here I again use internal liabilities net of internal claims that affiliate i takes up from related affiliates in country j as my dependent variable:

$$IntNetDebt_{ijkt} = \max(InternalLiabilities_{ijkt} - InternalClaims_{ijkt} ; 0) \quad (9)$$

where $InternalLiabilities_{ijkt}$ are liabilities of affiliate i to other affiliates of the same bankgroup k in country j and $InternalClaims_{ijkt}$ are claims of affiliate i to related affiliates in country j . I then estimate the following equation for the full sample of German multinational banks and their foreign affiliates:

$$\frac{IntNetDebt_{ijkt}}{TA_{ikt}} = \beta_0 + \beta_1(CTR_{it} - CTR_{jt}) + \beta_2 X_{ikt} + \beta_3 Y_{jkt} + \gamma_t + \delta_k + u_{ijkt} \quad (10)$$

The main variable of interest is $CTR_{it} - CTR_{jt}$ which denotes the bilateral tax rate differential between the host country of affiliate i and the country of the internal creditor. X_{ikt} is the same vector of control variables as above. Y_{jkt} contains the macroeconomic control variables also for the internal net creditor's country. γ_t and δ_k are monthly time and bankgroup fixed effects and u_{ijkt} is the error term. Under the hypothesis that banks shift profits out of higher taxed to lower taxed affiliates via internal debt I expect a positive estimate for β_1 .

4 Data and Descriptives

I use the External Position of Banks database of the Deutsche Bundesbank (2015), a unique dataset provided by the German central bank on assets and liabilities in foreign affiliates of German multinational banks and in the respective German headquarters. As this is an administrative dataset to which all German banks with foreign activities are obliged to report monthly it provides a complete and high quality sample of all German multinational banks. I observe separate records for all subsidiaries, whereas for branches I observe an aggregate figure per German bankgroup and country.

This paper uses internal liabilities held in an affiliate as dependent variable, and internal net debt which is calculated from internal liabilities and internal claims data.

For estimation of equations (1) and (8) these variables are available from June 2010 to December 2015 on a monthly basis. More precise data on bilateral internal loans and liabilities, separated by the country of the internal counterpart, is available from July 2014 until December 2015. Although the sample period for this bilateral data is relatively short, the variation over affiliate/counterpart-country-pairs allows estimation of eq. (10) and identification of the effect of precise corporate tax rate differentials on bilateral internal net debt.

To control for an affiliate's size I take the log of total assets as a bank-level control variable which is also taken from the External Positions of Banks database. The statutory corporate tax rates on a monthly basis are collected from the Worldwide Corporate Tax Guides of Ernst & Young (2011, 2014). Country-level controls are taken from the International Monetary Fund's (IMF) International Financial Statistics, the World Development Indicators of the World Bank, the United Nations Conference on Trade and Development (UNCTAD) statistics and the online data center of the Organisation for Economic Co-operation and Development (OECD). For some countries the data is complemented with data provided by national statistical offices. As nominal GDP is only available quarterly I transform it to monthly frequency with the normally applied proportional Denton method for flow series as described in Bloem et al. (2001), using the corresponding command that is available in Stata. Also the share of the financial sector in a country's gross value added is only available with quarterly frequency and is transformed by cubic spline interpolation to monthly frequency. GDP growth is calculated from interpolated quarterly GDP values. Capital requirements are taken from the World Bank (2011) survey on bank regulation. Based on several other questions in this survey Barth et al. (2013) provide an index on the stringency of capital regulation. As the most recent version of the World Bank survey was only provided in 2011, in my analysis these two variables are constant over time. Table 1 shows the basic descriptive statistics and data sources of all variables.

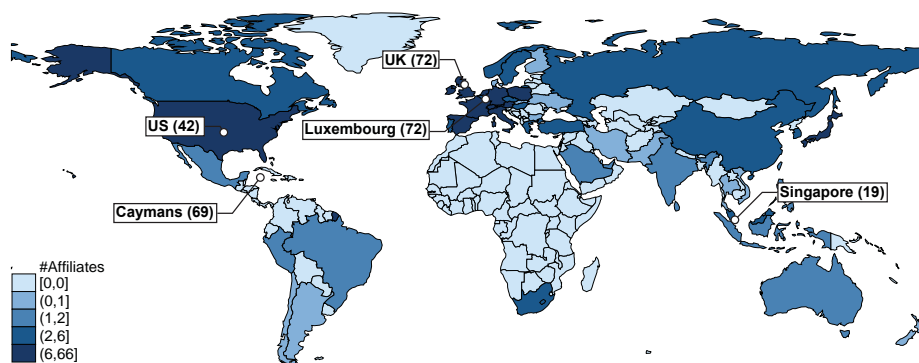
TABLE 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Median	Frequ.	Source
Aggregate data (06/2010-12/2015)						
Internal liabilities / Total assets	22,240	0.422	0.413	0.280	M	Deutsche Bundesbank (2015)
Internal net debt / Total assets	22,240	0.281	0.381	0.005	M	Deutsche Bundesbank (2015)
Total assets (in million €)	22,240	8,130	32,295	905	M	Deutsche Bundesbank (2015)
Statutory corporate tax rate	22,240	0.264	0.073	0.292	M	Ernst & Young (2011, 2014)
Nominal GDP (in billion €)	22,240	151	210	92	Q → M	IMF, OECD*
Inflation rate (%)	22,240	1.930	2.515	1.654	M	IMF, UNCTAD*
GDP growth (%)	22,240	2.130	2.757	1.766	Q → M	IMF, UNCTAD *
Financial sector share	22,240	0.090	0.087	0.053	Q → M	OECD*
Capital requirement	22,240	0.082	0.007	0.080	-	World Bank (2011) survey
Regulatory index	22,240	6.954	1.732	8.000	-	Barth et al. (2013)
Bilateral data (07/2014-12/2015)						
Bilateral internal net debt / Total assets	107,361	0.019	0.117	0.000	M	Deutsche Bundesbank (2015)
Corporate tax rate differential	107,361	0.022	0.100	0.021	M	Deutsche Bundesbank (2015)

Internal net debt are internal liabilities net of internal loans if positive and zero otherwise. *M/Q/A* indicate monthly, quarterly and annual frequency, respectively. Quarterly nominal GDP is transformed to monthly frequency with the proportional Denton method for flow data. Monthly GDP growth is calculated from interpolated GDP values. *Financial sector share* denotes the share of the finance and insurance sector in a country's gross value added. Monthly frequency is calculated by cubic spline interpolation. *Regulatory index* is an index for the stringency of capital regulation in a country, ranging from 0 to 10 (higher values indicating greater stringency). Data sources marked with a * are complemented by data from national statistical offices.

Figure 2 illustrates the geographical distribution of German bank affiliates.⁵ Most affiliates are located in Europe, probably due to the proximity to the home country and the commonly regulated European market that facilitates foreign activities. The most important foreign market for German banks is Luxembourg with 42 affiliates, followed by the United Kingdom with 32 affiliates (in 2013). Outside Europe the United States (20 affiliates) and Singapore (19 affiliates) are the most important markets. Furthermore Figure 2 illustrates the location of the top 5 countries for conduit debt, defined as the sum of $\min(\text{InternalClaims}; \text{InternalLiabilities})$ over all affiliates of German banks in a country. First note that these most important conduit countries are distributed around the world, suggesting that they serve as regional hubs for different world regions in which German banks are active. Second, three of the five most important conduit countries (Cayman Islands, Luxembourg, Singapore) are classified as tax havens by both Dharmapala and Hines (2009) and Johannesen and Zucman (2014) and also the United Kingdom (the most important conduit country) offers a relatively low tax rate. This already suggests that in the sample of German multinational banks conduit entities tend to be located in low tax countries.

FIGURE 2: German bank affiliates and top 5 conduit countries in 2013



Sum of conduit debt (in billion €) held by German bank affiliates in a country in parentheses, defined as $\min(\text{InternalClaims}; \text{InternalLiabilities})$. Calculated from data of the External Positions of Banks database of Deutsche Bundesbank (2015).

⁵Note that in the External Positions of Banks database of the Deutsche Bundesbank (2015) I observe all subsidiaries of German banks separately. However I cannot distinguish different branches of German banks in a country as there is only one aggregate observation per bankgroup, country and month for branches. I therefore count all branches of a bankgroup in a country as one single affiliate, whereas all subsidiaries are counted separately.

For a further descriptive investigation of the use of internal debt Table 2 ranks countries according to the mean of the internal-liabilities-to-total-assets-ratios of German bank affiliates in the respective country in 2013. As expected there are several high tax countries at the top: For instance in Japan with its then 38.0% corporate tax rate German bank affiliates were on average internally debt financed by 88.6%. Also internal leverages of German bank affiliates in France and Spain (two further high tax countries) are on a relatively high level around 80%. Surprisingly also some tax havens appear in the ranking: in Hong Kong German bank affiliates have a similar internal leverage as in Portugal, despite the substantially lower corporate tax rate that would suggest that banks shift profits into affiliates in Hong Kong rather than out of them. Considering the last column in Table 2 can explain this finding: it reports for each country the average conduit share of internal debt that is passed through an affiliate (formally defined as $\min(\frac{InternalClaims_{it}}{InternalLiabilities_{it}} ; 1)$). In Hong Kong on average 94.9% of internal liabilities are merely passed through the affiliates, whereas in Portugal the average conduit share is only 25.7%. Hence even though German banks have similar internal leverages in both countries, the tax-effective internal-debt-to-total-assets ratio is substantially higher in Portugal. Also bank affiliates in Singapore and the Cayman Islands hold similar internal leverages as affiliates in high tax countries (e.g. Italy) that can be explained with substantially larger conduit shares of internal debt.

Both Figure 2 and Table 2 suggest that the conduit affiliates in the sample of German multinational banks are located in tax havens and low tax countries, implying an underestimation of debt shifting with the classical dependent variable (the internal-liabilities-to-total-assets ratio). Regressing the conduit share of internal debt in an affiliate on the corporate tax rate and controlling for other macroeconomic variables (see regression results in the Appendix) indeed leads to a significantly negative tax coefficient. Hence in the sample used in this paper the conduit entities are systematically located in low tax countries. From a debt shifting perspective this assigns too high internal liabilities to low taxed affiliates, leading to an underestimation of debt shifting with the classical internal-liabilities-to-total-assets ratio as dependent variable. I therefore expect a larger tax coefficient with the internal-net-debt-to-total-assets ratio as dependent variable.

TABLE 2: Intragroup liabilities in 2013

Country	CTR	IntLiab/TA	Conduit share
Japan	38.0%	88.6%	20.8%
France	34.0%	83.8%	22.3%
Spain	30.0%	79.2%	7.7%
United Kingdom	23.0%	75.1%	43.8%
Greece	26.0%	74.4%	38.8%
Hong Kong	16.5%	72.6%	94.9%
Portugal	25.0%	70.9%	25.7%
Sweden	22.0%	70.7%	50.1%
Belgium	34.0%	69.6%	32.1%
Singapore	17.0%	67.0%	59.0%
Italy	40.7%	65.2%	13.1%
Cayman Islands	0.0%	63.2%	68.3%
United States	39.1%	61.1%	36.8%
China	25.0%	57.2%	16.1%
...			

Due to confidentiality reasons, only countries with at least 3 affiliates shown here. CTR denotes a country's statutory corporate income tax rate in 2013. Col. 3 reports the average gross internal-liabilities-to-total-assets ratio of German bank affiliates in the respective country. Col. 4 contains the average conduit share of internal debt, defined by $\min(\frac{InternalClaims_{it}}{InternalLiabilities_{it}} ; 1)$. Source: Ernst & Young (2011, 2014) and External Positions of Banks database of Deutsche Bundesbank (2015).

5 Results

Table 3 shows the baseline estimation results for the determinants of the internal debt variables in affiliates and headquarters of German multinational banks. As in previous studies on debt shifting, in column 1 the dependent variable is the ratio of internal liabilities to total assets. I find a significantly positive coefficient of 0.495 for the corporate tax rate, indicating that a 10 percentage points higher corporate tax rate means an increase in the internal liabilities to total assets ratio by about five percentage points. At the mean (42.2%) this corresponds to an increase by 12%. This effect of corporate tax rates on internal liabilities in the banking sector is quantitatively larger than previous studies estimated for other sectors, both in absolute terms and relative to the sample mean: Fuest et al. (2011) and Buettner et al. (2012) use an equivalent setting for data on German multinationals and find a coefficient for the corporate tax rate of only 0.177 and 0.214, respectively. In relative terms a 10 percentage points tax rate increase in these studies implies at the sample means (23% and 28%) an increase in the internal leverage by around 7% to 8%.

The greater impact of tax rates on internal debt in the financial sector even intensifies if I use internal net debt as the dependent variable in column 2, the effective amount of debt that shifts profits out of an affiliate. As shown in the previous section the reason is that conduit entities in internal debt financing are mainly located in low tax countries, resulting in a downward biased estimate of the tax coefficient when using internal gross liabilities as proxy for debt shifting. The tax coefficient in column 2 is 0.563, which is about 14% larger than the estimate in column 1. At the sample mean (28.1%) a 10 percentage points corporate tax rate increase implies an increase in the internal-net-debt-to-total-assets ratio by 20%. Previous literature has not analyzed the tax response of internal net debt, therefore comparability to non-financial sectors is limited in column 2. However as also non-banks might use conduit entities (e.g. internal financing hubs), accounting for conduit debt is an interesting extension for future research on debt shifting in non-financial sectors.

Columns 3 and 4 show the results of re-estimating the two specifications with exclusion of German headquarters. This accounts for the fact that in the External Positions of Banks database of the Deutsche Bundesbank (2015) all headquarters reside in Germany, and Dischinger et al. (2013) show that multinationals might be reluctant to shift profits away from headquarters. However I find smaller tax coefficients (0.454 and 0.510) when excluding headquarters from my sample of German multinational

banks. There are two potential explanations for this finding: First banks might use debt shifting to substantially shift profits out of their German headquarters. Second, headquarters partially finance their foreign affiliates with internal debt, leading to a ‘base’ stock of internal debt in these affiliates that does not respond to tax rates and leads to the smaller estimated responses in regressions 3 and 4.

Results on control variables furthermore show a small negative effect of an affiliate’s size (measured in total assets) on the use of internal debt in the full sample, but estimates in the subsample of foreign affiliates are insignificant. Inflation rates in the host country have a significantly negative impact on both the internal-gross-liabilities-to-total-assets ratio and the internal-net-debt ratio, perhaps reflecting higher risks. A negative effect also arises from GDP growth, possibly because banks do not shift funds away from affiliates in fast growing countries. As expected the share of the financial sector in a country’s value added has a significantly positive effect on the internal gross liabilities ratio in the first regression. However, the effect on the internal-net-debt ratio is not as clear, indicating that affiliates in financial center countries might serve as internal banks or hubs.

Table 4 shows results of the bilateral debt shifting regressions that allow to use the precise corporate tax rate differential as measure for the shifting incentive. For this tax rate differential a significantly positive effect of 0.033 on bilateral internal net debt arises. In the subsample of foreign affiliates this effects is even larger, with a coefficient of 0.059. This means that a 10 percentage points higher corporate tax rate differential leads to an increase in the bilateral internal net debt ratio by 0.59 percentage points. Compared to the sample mean (3.2%) this corresponds to an increase by 18%. These results are in line with banks shifting profits through internal debt from higher taxed to lower taxed affiliates.

Results on host country control variables of affiliate i are qualitatively similar to the estimates for aggregate debt data in Table 3. In bilateral regressions I also include macroeconomic control variables for the country from which the internal net debt is taken. For the internal counterpart’s country I find a positive effect of the GDP that probably comes from the fact that German banks partially finance a stronger engagement in large countries through internal debt. Interestingly the capital requirement in the internal counterpart’s country has a significantly negative effect on bilateral internal net debt: Additional claims have to be backed by additional equity to fulfill capital requirements, hence a higher capital requirement can discourage also internal lending.

TABLE 3: Baseline intragroup debt regressions

Dep. var.:	Sample: All entities		Sample: Foreign affiliates	
	$\frac{IntLiab}{TA}$	$\frac{IntNetDebt}{TA}$	$\frac{IntLiab}{TA}$	$\frac{IntNetDebt}{TA}$
CTR	0.495* (0.271)	0.563** (0.225)	0.454* (0.266)	0.510** (0.214)
IHS(TA)	-0.023*** (0.007)	-0.016*** (0.001)	-0.004 (0.007)	0.004 (0.006)
IHS(GDP)	0.017 (0.015)	-0.002 (0.012)	0.020 (0.014)	-0.001 (0.011)
Inflation	-0.007* (0.004)	-0.005** (0.003)	-0.013*** (0.004)	-0.009*** (0.003)
GDP growth	-0.009* (0.004)	-0.008** (0.004)	-0.010*** (0.004)	-0.009*** (0.003)
Financial sector share	0.829*** (0.314)	0.078 (0.230)	0.445 (0.305)	-0.302 (0.220)
Regulatory index	-0.018** (0.009)	-0.004 (0.008)	0.003 (0.008)	0.018** (0.007)
Capital requirement	-0.142 (2.737)	1.056 (1.987)	-0.803 (2.476)	-0.092 (1.816)
Monthly time FE	Yes	Yes	Yes	Yes
Bankgroup FE	Yes	Yes	Yes	Yes
R^2	0.355	0.327	0.398	0.477
Observations	22,240	22,240	16,451	16,451

Dependent variable is the ratio of internal liabilities to total assets in col. 1 and 3, and the ratio of internal net debt (internal liabilities net of internal claims if positive, zero otherwise) to total assets in col. 2 and 4. *Financial sector share* is the share of the banking and insurance sector in a country's gross value added. *Regulatory index* captures the stringency of capital regulation in a country, ranging from 0 to 10 (higher values indicating greater stringency). *Capital requirement* is the legal capital requirement for banks in a country. Standard errors in parentheses, clustered by bank and by country-month. Regressions based on monthly data for 2010/06-2015/12 from the External Positions of Banks database of Deutsche Bundesbank (2015).

TABLE 4: Bilateral regression results

Dep.var.:		Sample:	
$\frac{InternalNetDebt_{ijt}}{TA_i}$		All entities	Foreign affiliates
$CTR_{it} - CTR_{jt}$		0.033* (0.018)	0.059** (0.026)
IHS(Total assets)		-0.009*** (0.002)	-0.005*** (0.002)
IHS(GDP)	host country i	0.002 (0.002)	0.001 (0.002)
	counterpart j	0.008*** (0.002)	0.012*** (0.003)
Inflation rate	host country i	-0.002*** (0.001)	-0.002*** (0.001)
	counterpart j	-0.001*** (0.000)	-0.001*** (0.000)
GDP growth	host country i	-0.001 (0.001)	-0.001 (0.001)
	counterpart j	-0.001** (0.000)	-0.002** (0.001)
Regulatory index	host country i	-0.000 (0.001)	0.001 (0.001)
	counterpart j	0.004*** (0.001)	0.007*** (0.002)
Capital requirement	host country i	0.453 (0.279)	0.397 (0.244)
	counterpart j	-0.344*** (0.107)	-0.375** (0.184)
Financial sector share	host country i	0.077** (0.038)	0.067* (0.039)
	counterpart j	0.031* (0.017)	0.045 (0.119)
Monthly time FE		Yes	Yes
Bankgroup-FE		Yes	Yes
R^2		0.078	0.146
Observations		107,361	57,628

i indicates the affiliate and j the country of the internal counterpart to/from which loans are given/taken. $\frac{InternalNetDebt_{ij}}{TA_i}$ is the ratio of internal liabilities net of internal claims between affiliate i and affiliates of the same bankgroup in country j relative to total assets of affiliate i if positive, and zero otherwise. *Regulatory index* captures the stringency of capital regulation in a country, ranging from 0 to 10 (higher values indicating greater stringency). Standard errors in parentheses, clustered by bank-counterpart-pairs and country-month. Monthly bilateral bank data for 2014/07-2015/12 from the External Positions of Banks database of Deutsche Bundesbank (2015).

To summarize, both aggregate and bilateral internal debt regressions on German multinational banks indicate that banks engage in debt shifting. Moreover, the estimated effect in the banking sector is larger than previous studies estimated for non-financial firms, both absolutely and relatively to the sample average of internal debt ratios. This becomes even clearer when I correct for conduit entities: since conduit affiliates are taxed lower than the sample average, using the internal-net-debt ratio as dependent variable leads to even larger estimated tax responses. Accounting for conduit debt is also a more general methodological issue that can be implemented by future empirical debt shifting studies on non-banks.

6 Conclusion

The immaterial nature of the banking business and the concentrated expertise in optimally designing financial transactions suggest that the financial sector uses its tax planning possibilities more aggressively than other sectors do. However, there are only few studies considering tax avoidance in the banking sector. Contributing to this literature, my paper is the first that investigates debt shifting in the financial sector. I find convincing evidence that banks engage in debt shifting, with a ten percentage points higher tax rate increasing the internal-net-debt-to-total-assets ratio by about 5.6 percentage points. At the mean this corresponds to an increase by 20%. Moreover a comparison of my results to previous studies on non-financial firms suggests that banks use debt shifting more aggressively.

Considering the broader scope for debt shifting in the financial sector it is surprising how loose legislation and regulation in this area is so far. Especially the (partial) exemption of banking income from CFC rules in several countries facilitates profit shifting compared to other sectors. Bank levies also introduced additional costs of debt shifting in recent years. However, in the course of European harmonization bank levy rates for intragroup debt are now reduced by half compared to external debt. The abolition of these special regulations would be effective measures against debt shifting in the financial sector that are relatively easy to implement. Nevertheless, a compulsory leverage ratio on banks' use of debt is planned to be introduced in the course of Basel III in 2018. At least at the margin this would also provide some upper limit on the use of internal debt to avoid corporate taxation.

Appendix

TABLE 5: Conduit share regressions

Dep. var.:	Conduit share in internal debt		
	(1)	(2)	(3)
CTR	-0.550*** (0.048)	-0.527*** (0.047)	-0.347*** (0.044)
IHS(TA)	-0.005*** (0.001)	0.006*** (0.001)	-0.001 (0.001)
IHS(Population)	-0.032*** (0.003)	-0.034*** (0.003)	-0.037*** (0.003)
Inflation rate	0.018*** (0.001)	0.022*** (0.001)	0.016*** (0.001)
GDP growth	0.011*** (0.001)	0.015*** (0.001)	0.006*** (0.001)
Financial sector share	0.407*** (0.062)	0.387*** (0.062)	0.361*** (0.059)
Headquarter	0.379*** (0.009)	0.372*** (0.009)	0.468*** (0.010)
Regulatory index	-0.029*** (0.002)	-0.028*** (0.002)	-0.025*** (0.002)
Capital requirement	-3.091*** (0.489)	-3.580*** (0.487)	-5.598*** (0.445)
Monthly time FE	No	Yes	Yes
Bankgroup FE	No	No	Yes
R^2	0.127	0.147	0.345
Observations	19,754	19,754	19,754

Dependent variable is the share of conduit debt in total internal liabilities as defined by $\max(\frac{InternalClaims_{it}}{InternalLiabilities_{it}}; 1)$. $IHS(TA)$ is the inverse hyperbolic sine of affiliate i 's total assets. *Financial sector share* is the share of the banking and insurance sector in a country's gross value added. *Headquarter* is a dummy indicating whether affiliate i is a German headquarter. *Regulatory index* captures the stringency of capital regulation in a country, ranging from 0 to 10 (higher values indicating greater stringency). Standard errors in parentheses. Monthly bilateral bank data for 2010/06-2015/12 from the External Positions of Banks database of Deutsche Bundesbank (2015).

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