

On the interdependency of profit-shifting channels and the effectiveness of anti-avoidance legislation

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Abstract: The issue of base erosion and profit-shifting (BEPS) has been on the international policy agenda for three years now. A key element in the discussion are strategies of multinationals using intra-group interest and royalty payments as well as transfer pricing to reallocate profits within the group in a tax minimizing manner. In recent years, anti-avoidance regulations have been introduced to limit these cross-border shifting activities. Existing evidence looks at the effectiveness of these regulations separately. The idea of this paper is to analyse the interdependence between different anti-avoidance regulations in place. Our empirical results confirm existing findings on the tax sensitivity of EBIT and the reduction of this sensitivity due to stricter transfer pricing regulations. In addition our results suggest that the positive impact of transfer pricing regulations is strongly mitigated if strict thin capitalization rules apply.

1 Introduction

The issue of base erosion and profit-shifting (BEPS) has been on the international policy agenda for two years now. A key element in the discussion are strategies of multinationals using intra-group interest and royalty payments as well as transfer pricing to reallocate profits within the group in a tax minimizing manner. There exist ample empirical evidence illustrating the relevance of these strategies. In view of the induced revenue losses and distortions in the competition between multinationals and domestic firms, many countries implemented measures to limit profit-shifting of multinationals unilaterally, in particular they introduced different forms of thin capitalization rules and transfer pricing regulations. The recent OECD BEPS report also suggests similar measures to restrict multinationals' tax planning opportunities. Previous studies showed that thin-capitalization rules indeed affect the financing behaviour of firms (e.g. Buettner et al. (2012), Weichenrieder and Windischbauer (2008), Overesch and Wamser (2010)). Empirical studies also suggest that transfer pricing regulations are effective in reducing the tax sensitivity of reported EBIT (e.g. Lohse and Riedel (2013)). While these papers study the impact of either thin capitalization or transfer pricing rules separately, the literature remains largely silent on the relationship between these two countermeasures and their mutual effect on BEPS. More precisely, are restrictions of one profit-shifting channel substituted by an intensified use of the remaining channels or do they achieve an overall reduction in shifting activity? This potential interdependence is relevant since it allows clearer predictions on real economic consequences of these anti-avoidance regulations. A substitutive relationship between the two channels of profit-shifting would also explain that several studies cannot establish a clear link between anti profit-shifting regulations and investment behaviour. For instance, Weichenrieder and Windischbauer (2008) show that there is no effect of thin capitalization rules on real investment of multinationals. Buettner et al. (2014), in contrast, do find evidence that thin-capitalization regulations affect real investments. However, their results suggest that transfer pricing regulations do not influence real investments.

2 Idea of this paper

Against this background, the idea of this paper is to analyse the interdependence between different anti-avoidance regulations in place. The rationale behind this idea is that each profit-shifting channel induces specific costs depending on the restrictions already imposed as well as on firm characteristics. For instance, Huizinga and Laeven (2008) argue that the shifting costs are a function of the real activities in respective subsidiary locations. Moreover it has been shown that knowledge intensive firms have a broader scope for transfer pricing adjustments Overesch and Schreiber (2010). When the firm is optimizing profit allocation between high- and low-tax entities, the tax incentive and channel specific costs determine the overall amount of profits shifted as well as the relative importance of each shifting channel. Making anti-avoidance regulations on one channel more restrictive induces a change in channel specific shifting costs. If profit-shifting channels are substitutes we would expect an increase in shifting activities via the respective other channel. Assuming that profit-shifting via transfer pricing or royalties offers a larger leeway for multinational groups with highly specific intragroup transactions and extensive use of intellectual property, we expect that for this group of firms both channels might indeed be substitutes to some extent. More specifically, for this group of firms we would expect that stronger thin-capitalization rules would increase profit-shifting via transfer pricing and royalties. Stronger transfer pricing requirements, in return, reduce the relative costs of debt-shifting. The substitution of debt shifting by transfer pricing or royalty shifting is less straight forward for multinationals whose intra-group transactions are less specific and rely less heavily on intellectual property since here the arm's length requirement can be more easily monitored. These firms might effectively be unable to conduct profit-shifting via transfer pricing arrangements or royalty flows and might therefore be more responsive towards restrictions of the debt channel. Our empirical testing is based on a panel of firm level data from Amadeus. We will exploit variation in tax rates, the strictness of anti-avoidance regulations across countries and time. Moreover, following the idea that shifting costs are related to firm characteristics, we study the heterogeneity in shifting response towards stricter anti-avoidance legislation. The paper contributes to a growing literature on the effect of anti-profit-shifting behaviour. In contrast to existing studies, we explicitly look at more than one profit-shifting channel at a time to identify their degree of interdependence. The greater the scope for substitution between different channels is the smaller should be the real economic response in terms of investment and labour. In that regard, our results should shed some light on the question why only few studies find effects of anti-avoidance regulations on Foreign Direct Investments (FDI).

3 Literature Review

There are several empirical studies on the impact of both different countermeasures. For example Wamser (2008), Weichenrieder and Windischbauer (2008) and Overesch and Wamser (2010) analyse the impact of the 2001 reform in Germany, which led to a tightening of the thin cap regulations. They argue that a direct consequence of the reform was a reduction in the amount of intra-company loans granted to German companies by their foreign affiliates. Weichenrieder and Windischbauer (2008) also study the investment effect of thin capitalization rules but do not find a visible effect on real investment of multinationals. Two working papers, Buslei and Simmler (2012) and Dreßler and Scheuering (2012), on the new German interest stripping rule introduced in 2008 show that the companies affected by this rule decreased their debt-to-asset-ratio. According to Dreßler and Scheuering (2012) external rather than internal debt was reduced. Buettner et al. (2012) use comprehensive micro-level data from the MIDI databank on German outbound investment to study the effects of interest deductibility restrictions in different countries on leverage of foreign affiliates of German multinationals. The authors argue that the introduction of thin capitalization rules in a country reduces tax-sensitivity of internal debt and gives an incentive to use external debt. More recently, Blouin et al. (2014) investigated the influence of thin capitalization rules on affiliate leverage using micro-level data on US multinationals and their foreign subsidiaries in 54 countries over the time period of 1982-2004. In contrast to the previous studies, the authors compare the effects from the mere existence of thin capitalization rules to the impact of their stringency and level of enforcement. They find that on average the presence of interest deduction restrictions reduces affiliate's debt ratio; an even more significant decrease occurs if there are limitations on borrowing from a parent company. Besides, Blouin et al. (2014) argue that the impact of thin capitalization rules on leverage is stronger in countries with automatic application of the restrictions compared to the ones with discretionary enforcement.

The first known attempt to measure the influence of transfer pricing regulations on profit-shifting was carried out by Bartelsman and Beetsma (2003). They empirically test the effect of a broad range of factors on reported profits of multinationals using sector-level data. The authors argue, for example, that differences in the corporate tax rates between countries, special features of a tax system in a given state, as well as its enforcement of transfer pricing regulations constitute major incentives or discouragements for profit-shifting by multinationals in or out of this country. However, they reach these conclusions using a rather limited measure for transfer pricing regulations, which was calculated only for the companies located in sixteen countries.

Lohse and Riedel (2013) conduct an empirical investigation using micro-level panel data on

multinationals from twenty six European states. In the first step of their analysis, the authors confirm general findings in the related literature that corporate taxes reduce reported pre-tax profits of multinationals. Furthermore, Lohse and Riedel (2013) find some evidence that transfer pricing regulations significantly mitigate tax incentives to shift profits. Namely, they argue that firms in high-tax jurisdictions with strict transfer pricing regimes are less prone to income shifting compared to companies in high-tax countries without enforced transfer pricing regulations.

Another recent study on transfer pricing regulations was carried out by Klassen and Laplante (2012), in which they analyse various factors that affect profit-shifting using micro-level data on US multinationals and their foreign subsidiaries. A major contribution of this study to previous papers is recognizing that profit-shifting in a given country might depend not only on the enforcement of transfer pricing regulations in this state, but also on the implementation of transfer pricing rules in other jurisdictions.

The main purpose of Saunders-Scott (2013)'s study is not only to analyse the relationship between reported profits and transfer pricing rules, but also to explain all possible channels through which this type of regulations might influence governments' tax revenues. The author develops a theoretical model and also finds some empirical evidence to support the idea that a stricter enforcement of transfer pricing laws limits both profit-shifting outflows from and inflows into a country. According to Saunders-Scott (2013), if a company has more subsidiaries in high-tax jurisdictions, it starts reporting fewer profits once stricter transfer pricing regulations are introduced in its country of residence. On the other hand, if the affiliates of this firm are located in low-tax states, it begins to report higher profits after the enforcement of transfer pricing rules.

Furthermore, Saunders-Scott (2013) argues that a higher level of enforcement of transfer pricing laws leads to greater compliance costs for individual firms. These additional expenses reduce companies' profitability contributing to an overall negative effect of the enforcement of transfer pricing regulations on reported profits and therefore tax revenues. Overall the author contributes to the related literature by summarizing and analysing the most commonly used measures for transfer pricing rules and by trying to measure the welfare effects of these regulations.

Beer and Loeprick (2013) also assess the impact of transfer pricing regulations on multinational profit-shifting, finding that the introduction of mandatory documentation requirements on average decreased shifted profits among MNE subsidiaries by about 60% within four years after the introduction. They show that the profit-shifting behavior of subsidiaries with a high intangible to total asset ratio is less influenced by documentation requirements than the profit-shifting behavior of subsidiaries with a low level of intangible assets.

4 The data

4.1 Firm level Data

For the implementation of this project, firm-level accounting data from the Amadeus databank, which is provided by the Bureau van Dijk, is used. Our final sample includes 31,182 firms, which are located in 34 countries. The panel covers a nine-year period from 2004 to 2012. We restrict the sample to firms reporting unconsolidated accounts as we require information on the activities of the single affiliates. We moreover restrict our sample to affiliates of a multinational group that are wholly owned by a foreign parent company as profit-shifting opportunities require international links along with a controlling influence. We exclude headquarter firms due to the finding that location of profits and profitable assets may be biased in favor of the headquarter firm (Dischinger and Riedel(2010)).

4.2 Measuring the strictness of anti-avoidance regulations

The data on tax rates were obtained using the TAXUD Data, the Oxford CBT tax database, as well as the Ernst & Young's Worldwide Corporate Tax Guides and the IBFD Tax Handbooks. The information on transfer pricing regulations was collected from the transfer pricing guides published by Deloitte, Ernst & Young, KPMG, and PwC. Information on thin-capitalization rules was collected from IBFD Tax Handbooks. In order to enlarge the sample, data sources from the Big Four consulting firms, the EU Commission, National Tax Offices, and HSBC were used. For both transfer pricing and thin capitalization rules, we do not focus on their mere existence in a country, but measure their level of strictness, as only rules that bite are likely to impact on profit shifting. Concerning transfer pricing regulations, in line with Lohse and Riedel (2013) we use the existence of formal transfer pricing documentation requirements in a country as an indicator for strictness. To be more precise, we only consider a country to apply strict transfer pricing regulations if the country introduced explicit transfer pricing documentation requirements into its national tax law and if documentation has to be made available to the tax authorities either upon request or with the tax return. In this case the transfer pricing strictness indicator is set to 1. We use formal transfer pricing documentation requirements as the indicator for strictness as we consider them to be the crucial element for increasing transparency of transfer price determination. Countries that have not implemented explicit transfer pricing regulations or do not formally require transfer pricing documentation are not considered to have strict transfer pricing regulations. Thus the transfer pricing strictness indicator variable is set to 0 for those countries. With respect to thin capitalization rules, determining the strictness of the rules is more challenging, as the details of those regulation vary widely across countries. Most countries apply debt-to-equity

ratios, which allow interest deduction only up to a certain threshold level of debt in relation to equity. The level of this ratio varies between 1,5 and 8 in our sample. We define such debt-to-equity ratios as being strict, if the acceptable ratio of debt to equity is put at a maximum of 4. This means that our thin capitalization strictness indicator is set to 1 if the debt-to-equity ratio in a country is 4 or smaller. If the debt-to-equity ratio is higher than 4, e. g. if like in Luxembourg the debt-to-equity ratio is 5,7, companies are still able to shift a rather high amount of profits via interest payments and those rules can thus not be considered as having a strong impact on profit shifting. For these countries the thin capitalization indicator is set to 0. Some countries apply earnings based ratios instead of debt-to-equity ratios, limiting the interest deductibility to a certain percentage of EBIT(DA). These earnings based ratios are not generally comparable to the debt-to-equity ratios. However, while debt-to-equity rules may be circumvented by increasing equity levels, e.g. by a controlled entity issuing new shares, earnings-based rules are generally less manipulable and are hence considered as being even stricter than debt-to-equity rules. For this reason, we also use a strictness indicator of 1 for earnings based regulations.

As the level of transfer pricing and thin capitalization regulations in the countries is key to our analysis, we plan to further enrich our study by controlling for additional factors of countries' transfer pricing and thin capitalization rules in future work. For transfer pricing rules, such factors will be the existence of transfer pricing penalties, the possibility to enter into APAs and the actual prevalence of APAs in the countries. For thin capitalization rules, escape clauses, different effects of debt-to-equity rules and earnings-based rules, the fact whether net or gross interest is non-deductible and several other details may be considered. In addition, based on Lohse and Riedel (2013), we plan to further refine the transfer pricing indicator by applying a three scale variable, which takes the value of 1, if transfer pricing rules are not existent or a country has very limited transfer pricing regulations. The value is 2, if a country has transfer pricing regulations and no formal transfer pricing documentation requirements exist but transfer pricing documentation is often required in practice. A value of 3 applies to countries that have formal transfer pricing documentation requirements. Category 3 corresponds to a value of one in our strictness indicator explained above. Also for thin capitalization rules we plan to apply a multi-level variable better capturing the nuances of strictness in thin capitalization rules.

4.3 Macroeconomic controls

The statistics on country control variables were obtained from a few different sources. For example, the data on GDP, GDP growth, and GDP per capita were extracted from the World Bank Database using constant 2005 US-Dollar. The unemployment rate parameters

were obtained from the World Bank Database as well. They reflect the total unemployment rate in percent of total labor force as estimated by the International Labor Office. Table 1 summarizes the main features of variables that are used in the regression analysis.

Table 1: Descriptive Statistics

	Obs.	Mean	Std. Dev.	Min	Max
<i>EBIT</i>	165732	5629.547	55763.75	0.0013434	5188823
<i>CIT</i>	165732	0.254	0.067886	0.1	0.4263
<i>TP_Rules</i>	165732	0.495	0.4999808	0	1
<i>CAP_Rules</i>	165732	0.748	0.4340472	0	1
<i>Fixed Assets</i>	165732	35476.60	566459.6	0.0005864	5.06E+07
<i>Number of Employees</i>	165732	0.1757469	1.617266	0	264.887
<i>GDP</i>	165732	9.50E+08	1.07E+09	5.99E+06	3.16E+09
<i>GDP/capita</i>	165732	25.346	15.42588	1.76763	86.129
<i>Unemployment rate</i>	165732	8.770	3.641869	2.3	31.8
<i>GDP growth rate</i>	165732	1.414	3.786824	-14.814	12.1

Note: EBIT denotes earnings before interest and taxes and is measured in thousand Euros. *TP_Rules* and *CAP_Rules* are binary. *NumberofEmployees* is in thousands. GDP and GDP/capita are in thousand US Dollars.

5 Estimation Approach

In our estimation, we first investigate the general tax sensitivity of reported profits. Second, we follow the transfer pricing literature and include a measure for the strictness of transfer pricing documentation requirements TP_Rules . Our main focus is, however, on the interaction of the different profit-shifting channels and the respective anti-avoidance regulations. In particular, to test the impact of transfer pricing rules in the presence of no vs. strict thin-capitalization rules, we use the following basic estimation approach:

$$\begin{aligned}
 \ln(EBIT_{it}) = & \beta_0 + \beta_1 CIT_{it} + \beta_2 TP_Rules_{it} + \beta_3 TP_Rules * CIT_{it} \\
 & + \beta_4 CAP_Rules + \beta_5 CAP_Rules * CIT_{it} \\
 & + \beta_6 CAP_Rules * TP_Rules + \beta_7 CAP_Rules * TP_Rules * CIT_{it} \\
 & + \beta_8 X_{it}^n + \mu_i + \eta_{jt} + \epsilon_{it}
 \end{aligned} \tag{1}$$

In equation 1, $\ln(EBIT)_{it}$ is the dependent variable and denotes the natural logarithm of earnings before interest and tax of affiliate i in year t . We use earnings before tax as the measure of reported pre-tax profits because this measure is expected not to be influenced by profit-shifting via interest payments. This allows us to separate the effect of profit-shifting via transfer pricing. The variable CIT_{it} represents the corporate income tax rate augmented by local profit taxes on firms that is levied in the country where firm i is located. Following previous literature, we employ this variable as the main indicator for profit-shifting incentive and expect its coefficient to be negative. In our robustness checks, we use the tax rate differential between the tax rate in the residence country of firm i and the unweighted average of tax rates applicable for other entities of that multinational group. CAP_Rules and TP_Rules are binary variables, which equal one if respectively strict thin capitalization rules or transfer pricing regulations are introduced in a country and zero otherwise. In accordance with the literature on the effect of transfer pricing regulation we expect that strict transfer pricing regulations effectively reduce the tax sensitivity of EBIT ($\beta_3 > 0$). Assuming that the two dominant profit-shifting channels, interest payments and transfer pricing, are substitutes, the measured tax sensitivity of EBIT should be increased if thin capitalization rules are tightened. In the model, this is accounted for by an interaction term between the tax rate and the existence of strict thin capitalization rules. Thus, we expect $\beta_5 < 0$. $CAP_Rules * TP_Rules * CIT_{it}$ represents a triple interaction of the tax rate, thin-cap and transfer pricing strictness. This term takes into account that if there exists a certain scope to substitute profit-shifting via transfer price adjustments by debt related shifting or vice versa, the impact of one anti-avoidance regulation would be conditional on the level of

the other. Finally, X_{it}^n represents a vector of relevant firm- and country-level control variables that vary over time. For example, it includes company's main input factors such as its fixed assets and its number of employees. Besides, it captures such host-country features as GDP, GDP per capita, GDP growth rate and the unemployment rate. μ_i and η_{jt} are company and industry-year fixed effects respectively; ϵ_{it} is an error term.

6 Results

Table 2 demonstrates in the first column the basic profit-shifting regression with the profit tax rate as the main independent variable of interest. Subsequently we add transfer pricing *TP_Rules* and *CAP_Rules* and their interactions with the tax incentive to the estimation. Finally, the estimation results of our model shown in equation 1 are depicted in column 4. Column I illustrates a negative and statistically significant tax sensitivity of reported EBIT. Holding other factors constant, on average a one percentage point increase in the tax rate leads to a 0.6 percent decrease in company's reported profits. This negative relationship has already been shown in numerous other studies in the literature (see e.g. the Meta-Study of Heckemeyer and Overesch (2013)). The effect size is, however, somewhat smaller than the average effect size derived by this Meta-Study. As for the other control variables, firm's input factors such as its total assets and a number of employees seem to play an important role in determining company's profits, which is also consistent with our predictions and findings of earlier studies. A higher GDP growth rate and GDP also seem to be positively correlated with reported profits, while a higher unemployment rate in a country is likely to decrease firms' earnings. These findings are also in line with previous literature, such as Lohse and Riedel (2013).

Column II of Table 2 reinvestigates the influence of transfer pricing regulations on firm's profits (see e.g. Saunders-Scott (2013), Bartelsman and Beetsma (2003), Lohse and Riedel (2013), Beer and Loepnick (2013)). Consistent with previous studies, we find that an implementation of strict transfer pricing regulations in high-tax countries leads to an increase in firm's reported profits, i.e. reduces their tax sensitivity. Comparing the coefficients, our results suggest that the tax sensitivity is reduced by about 80% which is substantial and in the same range as the results of Lohse and Riedel (2013). This finding suggests an impressive effectiveness of transfer pricing regulations. Columns III and IV represent the main contribution of this paper to earlier literature. Namely, the regression is augmented by not only including an indicator for transfer pricing regulations but also for anti-avoidance regulations targeting the potentially substitutive shifting channel of debt shifting, i.e. thin-capitalization rules. In Column III the two-way interaction between tax rate and thin capitalization strict-

Table 2: Regression Results

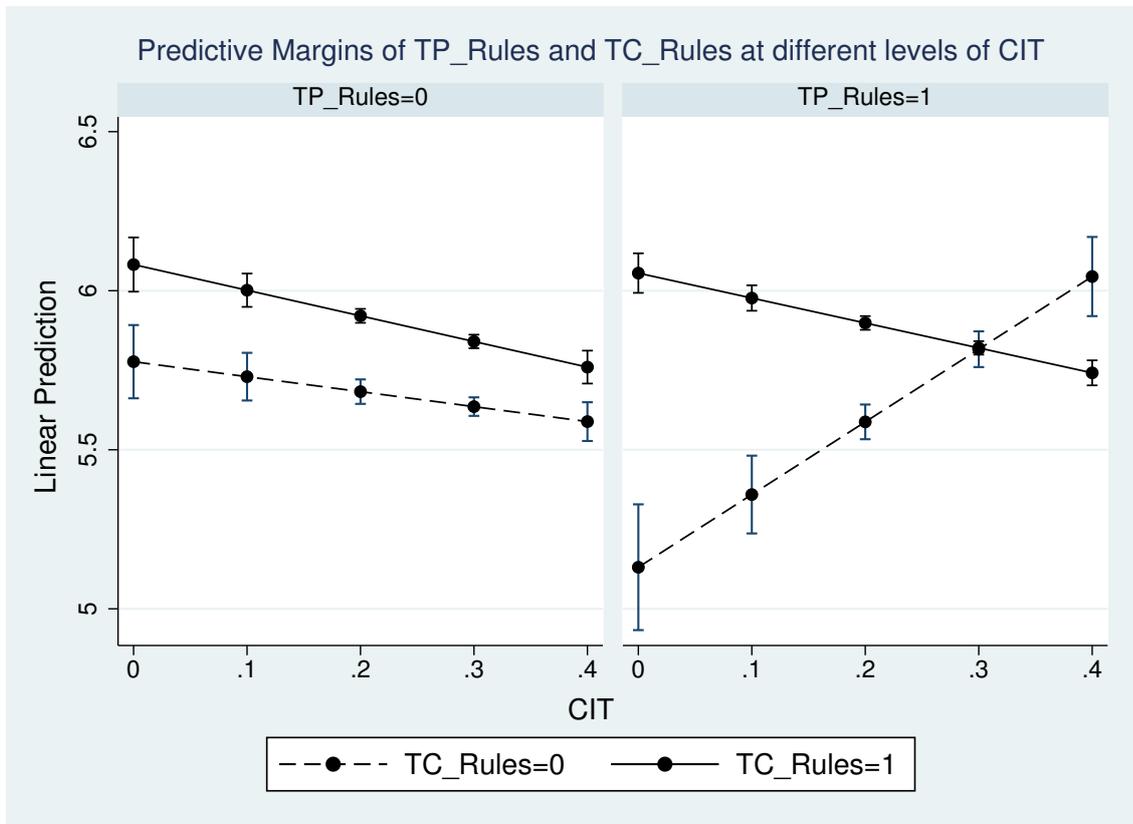
	I	II	III	IV
<i>CIT</i>	-0.578*** (0.138)	-0.806*** (0.183)	-0.582** (0.234)	-0.417* (0.234)
<i>TP_Rules</i>		-0.224*** (0.04)	-0.228*** (0.04)	-0.523*** (0.09)
<i>TP_Rules*CIT</i>		0.654*** (0.153)	0.683*** (0.153)	2.161*** (0.365)
<i>CAP_Rules</i>			0.150*** (0.055)	0.161*** (0.056)
<i>CAP_Rules*CIT</i>			-0.342* (0.181)	-0.333* (0.182)
<i>TP_Rules*CAP_Rules</i>				0.302*** (0.098)
<i>TP_Rules*CAP_Rules*CIT</i>				-1.702*** (0.392)
<i>Log(Fixed Assets)</i>	0.141*** (0.005)	0.140*** (0.005)	0.140*** (0.005)	0.140*** (0.005)
<i>Number of Employees</i>	0.028 (0.023)	0.028 (0.023)	0.028 (0.023)	0.028 (0.023)
<i>Log(GDP)</i>	1.385*** (0.286)	0.619** (0.304)	0.831*** (0.309)	0.442 (0.329)
<i>Log(GDP/capita)</i>	0.083 (0.244)	0.761*** (0.264)	0.643** (0.266)	1.032*** (0.280)
<i>Unemployment rate</i>	-0.007*** (0.002)	-0.006** (0.003)	-0.004* (0.003)	-0.003 (0.003)
<i>GDP growth rate</i>	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)
<i>Industry-year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Company fixed effects</i>	Yes	Yes	Yes	Yes
<i>Observations</i>	165,732	165,732	165,732	165,732
<i>R-squared (within)</i>	0.065	0.066	0.066	0.067
<i>Number of companies</i>	31,182	31,182	31,182	31,182

Note: Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent Variable is Log(EBIT)

ness tells us that the negative tax rate sensitivity of EBIT is increased (-0.342) if thin capitalization strictness increases. Since reduced debt financing does not directly affect reported earnings before interest and taxes, we conclude that there seems to be an indirect effect. As thin-capitalization rules reduce the scope for debt related shifting, firms might be inclined to rely more heavily on the transfer pricing channel to achieve an optimal allocation of profits. To investigate the interdependency between the two profit-shifting channels more closely, Column IV of table 2 demonstrates the results of a model shown in equation 1. It includes not only a tax rate, transfer pricing rules and thin capitalization restrictions as the main independent variables of interest, but also pairwise interactions and an interaction term between all three variables of interest. In particular, the triple interaction takes into account that the effect of thin capitalization strictness on tax rate sensitivity of EBIT could be dependent on the strictness of transfer pricing in the country and vice versa. Put differently, the effect of anti-avoidance regulations on the tax sensitivity of reported profits is conditional on the strictness of the anti-avoidance regulations addressing other profit-shifting channels. In presence of the triple interaction, the effect of the two-way interaction $TP_Rules * CIT_{it}$ represents the case where thin-capitalization strictness is low. Since the effect of $TP_Rules * CIT_{it}$ is positive, we conclude that an introduction of strict transfer pricing regulations is likely to effectively hinder profit-shifting via transfer pricing in a high-tax jurisdiction if there are no or weak thin-capitalization rules. If there is scope to substitute profit-shifting via transfer prices by debt shifting, the tax sensitivity of EBIT decreases with the strictness of transfer pricing regulation. This possibly implies that companies substitute shifting via transfer pricing with debt shifting. Companies may even channel profits via this country by shifting profits into the country via transfer pricing and shifting this profit further to other countries via interest payments. However to validate this, the influence of the triple interaction on leverage of the company would have to be tested. While we do not directly investigate the impact on the debt channel so far, the triple interaction $CAP_Rules * TP_Rules * CIT_{it}$ representing the case of a coexistence of strict transfer pricing and thin-capitalization rules in a high-tax country suggests that the positive effect of TP_Rules is diminished if CAP_Rules are strong (-1.702). Hence, if the costs for transfer pricing shifting are increasing but debt shifting is strongly restricted, the positive impact of TP_Rules (2.161) is substantially reduced. This can be explained by the fact that transfer pricing documentation requirements not generally restrict the amount of profit that can be shifted via transfer pricing but only increase the cost of profit-shifting that is traded of the associated tax savings. If no other profit shifting channel is available ($TC_{Rules} = 1$) these costs seem to be lower than the advantage stemming from the profit-shifting if tax rates are high. Focusing on the impact of stricter CAP_Rules in the presence of the triple interacti-

on, the two-way interaction with the tax rate shows that if transfer pricing strictness is low, thin-capitalization strictness has a negative impact on the tax sensitivity of EBIT in high tax countries (-0.333). This effect is, however, only significant at 10% level and of about the same size as in column III where we do not condition on the transfer pricing strictness (-0.342). As opposed to the impact of transfer pricing regulations conditioning on the respective other anti-avoidance regulation does not seem to matter for the tax sensitivity of EBIT in the presence of strict thin-capitalization rules. This can be due to the fact, that not all firms engaging in debt-shifting are able to switch to transfer pricing shifting if the costs for debt shifting increase. To sum up, the results of the triple interaction show that thin-capitalization matter substantially for the impact of transfer pricing regulations on the tax sensitivity of EBIT. Transfer pricing strictness, in contrast, affects the impact of thin capitalization rules on the tax sensitivity of EBIT to a much lesser extent. This is potentially due to the fact that transfer pricing shifting can much more easily substituted by debt-shifting if the costs of transfer pricing increase while not all firms engaging in debt shifting can switch to transfer pricing shifting if these costs decrease. Figure 1 illustrates the triple interaction graphically in a margins plot. In particular, it depicts the impact of increasing the strictness of transfer pricing regulations (left figure: $TP_{Rules} = 0$; right figure $TP_{Rules} = 1$) conditioned on the strictness of thin-capitalization rules (dashed line: $TC_{Rules} = 0$; solid line: $TC_{Rules} = 1$) at different levels of the tax rate. In absence of strict transfer pricing regulations, the tax sensitivity of EBIT is slightly larger (slope more negative) if thin-capitalization rules are strict, indicating some substitution towards transfer pricing shifting. Looking at the introduction or strengthening of transfer pricing regulations (right part of Figure 1), it is striking that the tax sensitivity of EBIT is largely reduced in absence of thin-capitalization rules (increasing dashed line) while it remains almost unchanged if thin-capitalization rules are strict (solid line). Hence we attribute the significant negative effect of the triple interaction to the fact that conditioning on strict thin-capitalization rules reduces the initially positive impact of introducing transfer pricing regulations to a large extent. This is a hint that disregarding the interdependence with thin capitalization rules, the coefficient potentially measures at least to some extent a substitution effect towards debt-shifting and not the pure effectiveness of transfer pricing regulations.

Figure 1: Illustration of triple interaction in a margins plot



Note: The figure shows for different levels of the tax rate the interaction between transfer pricing strictness and thin capitalization strictness.

7 Conclusion

This paper presents an empirical analysis of the interdependency between two main profit shifting channels, the strategic use of transfer pricing and internal debt and in particular of anti-avoidance measures targeting these channels. Firm level data on 31.182 European companies over the time period of 2004-2012 are used to test the hypothesis that the impact of strengthening transfer pricing regulations depends on whether firms have other options for profit shifting (as in case of weak thin capitalization rules) or not. Similarly we are interested in whether strengthening thin capitalization rules has an impact on EBIT via increased shifting activity via transfer prices. The main contribution of this study lies in combining two strands of literature, which analyze either only the influence of transfer pricing rules on firms' reported profits (e.g. Saunders-Scott (2013), Bartelsman and Beetsma (2003), Lohse and Riedel (2013), Beer and Loeprick (2013)) or only the impact of interest deductibility restrictions on companies' internal leverage (e.g. Weichenrieder and Windischbauer (2008), Overesch and Wamser (2010), Buettner et al. (2012), Blouin et al. (2014)).

In line with previous literature, we find a negative and significant impact of the tax rate on reported profits and that an enforcement of strict transfer pricing regulations in a high-tax country leads to an increase in the amount of EBIT reported by its resident companies, thus reducing the tax rate sensitivity of EBIT. Taking into account that firms might be able to choose between transfer pricing shifting and debt shifting and that anti-avoidance regulations might therefore interact, we explicitly consider a triple interaction of the tax rate and both the strictness of transfer pricing and thin capitalization rules. We find that the tax rate sensitivity of EBIT is, however, only reduced, if a country does not apply strict thin capitalization regulations. Put differently, we investigate whether the impact of transfer pricing regulations is conditional on the level of thin capitalization and vice-versa. Our results highlight that conditioning on the strictness of thin capitalization rules compensates the positive impact of transfer price restrictions on reported profitability almost entirely. An explanation for these findings may be that companies substitute profit shifting via transfer pricing with profit shifting via interest payments if the cost of transfer pricing increases but interest shifting is not restricted. If strict thin capitalization rules are implemented additionally, however, companies are not able to substitute all profit shifting via transfer pricing with debt shifting and thus continue to shift profits via transfer pricing. This shows that opposed to thin capitalization rules, transfer pricing rules do not set a strict limit to the amount of profits that can be shifted but only make profit shifting more costly. Companies try to avoid these cost by shifting via interest payments instead but are ready to take the costs if profit shifting via interest payments is strictly limited. In addition, the results hint that disregarding the conditional effect might provide biased conclusions on the

effectiveness of introducing transfer pricing regulations since it might be the case that part of the shifting activity is substituted by debt-shifting.

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