TAXATION AND LEVERAGE INSIDE BANK HOLDING COMPANIES

Silvia Bressan, MODUL University Vienna

ABSTRACT

This paper examines the effect of leverage on the corporate taxes paid by United States Bank Holding Companies. We find that, Bank Holding Companies reduce their tax burden when debt is raised from subsidiaries. However, taxes do not significantly change when debt is raised from the parent firm. Our view is that, the more favorable fiscal treatment of corporate debt against equity, gives an incentive to Bank Holding Companies towards the tax consolidation of subsidiaries. In this way they take advantage of the tax shield of the affiliates. The empirical results indicate that, the funding structure of the group plays a role on taxation. The results are important for the understanding of tax avoidance inside large banking institutions.

INTRODUCTION

The possibility to deduct interest paid on debt issuances from taxable income may lead corporations to adopt highly levered capital structures. This issue becomes especially relevant in the banking industry. Indeed, when financial firms take-on large amounts of debt, with respect to tiny shares of equity, the financial system becomes more fragile. This paper questions whether the tax burden of Bank Holding Companies (BHCs) is affected by their capital structure. The main goal is to understand whether BHCs can use funding strategies to avoid taxes. We define tax avoidance as Hanlon and Heitzman (2010), namely as the reduction in the explicit corporate taxes.

To the best of our knowledge, no paper provides evidence on how the tax burden of banking firms reacts to indebtedness. We contribute to filling this gap by analyzing a sample of 25,480 United States BHCs supervised by the Federal Reserve System. We employ data from the BHCs consolidated balance sheets, as well as the accounting information at the parent firm stand-alone level. Generally Accepted Accounting Principles (GAAP) require large corporations and their controlled subsidiaries to file consolidated financial statements. The GAAP requirement for accounting consolidation is that the controlling parent company must own at least 50% of the voting power of a subsidiary´s stock. In the United States business groups follow a regime of tax consolidation (or, combined reporting). In general, tax consolidation means that, the parent firm is responsible for all or most of the group-wide tax obligations. Thus, the parent is responsible for the taxes levied on the consolidated income.

Our empirical outcomes show that, the BHCs´ tax burden significantly reduces when consolidated leverage increases. For example, the average effective tax rate, calculated as the ratio of taxes over gross income, decreases by more than 7% when the leverage ratio raises by one percentage point. No interesting effect is sorted on taxes when the parent stand-alone leverage increases. It seems that the BHC allocates most group-wide debt on the subsidiaries rather than on the parent. In this way larger debt tax shields are more frequently observable for the affiliates. Our interpretation is, parent firms have a fiscal incentive in favor

of the tax consolidation of subsidiaries. We complete additional tests to verify whether BHC taxation is influenced by the holdings of reciprocal claims between parent and subsidiaries. This approach provides new evidence on how intra-firm exposures among entities of the same network may affect the taxes of large corporations, as compared to single operating entities. The remainder of the paper is organized as follows. The next section describes the relevant literature. Next, we discuss the data and methodology used in the study. The results are presented and discussed in the following section. The paper closes with some concluding comments.

LITERATURE REVIEW

This paper reviews the stream of financial literature regarding the interplay between capital structure and corporate taxes. The seminal theoretical article from Modigliani and Miller (1963) predicted that taxes are important drivers for the choice of firm capital structures. The following empirical research has tried to verify to what extent the argument made by Modigliani and Miller (1963) finds evidence on large samples of firms. The methodology employed is diverse. Some papers use cross-country studies to verify the sensitivity of capital structures to corporate income tax rates. These papers include Booth et al. (2001), and Heider and Ljungqvist (2015). Other articles analyze how changes in state laws induce adjustments in capital structures, van Binsbergen, Graham, and Yang (2010), and Lin and Flannery (2013). Graham and Leary (2011) provide an exhaustive survey on the empirical research on capital structure. Graham and Leary (2011) include found further literature arguing how taxes have an explanatory power on firm funding.

The link between taxes and funding structures has been examined extensively in the framework of non-financial firms. However, the issues has not been extensively explored for financial corporations. We focus on the banking sector. Some papers pointed out that inefficiencies in current taxation may lead banks to be more levered than they otherwise would, and the financial system to be ultimately more fragile. Keen and de Mooij (2012) show that both the leverage and the regulatory capital ratios of banks increase in the statutory income tax rate. The issuance of hybrid instruments does not significantly change with the tax rate. Langedijk et al. (2014) argue that a corporate income taxation system more favorable towards the usage of debt may have the adverse consequence of increasing risk and the cost of financial crises. Schepens (2016) confirms this view by showing that financial institutions would stay better capitalized if debt and equity would be subject to an equal fiscal treatment. Schandlbauer (2015) adopts a difference-in-difference methodology to show that an increase in the local United States state corporate tax rate leads better capitalized banks to raise long-term non-depository debt, rather than demandable debt. Finally, using a dataset on corporate income tax reforms, Hemmelgarn and Teichmann (2014) discover that tax rate changes induce changes in banks´ leverage, dividend policies, and loss loan reserves. Another hint on the existence of a relevant nexus between banks´ taxes and financing can be found in Ashcraft (2008). Ashcraft (2008) examines how the capital composition of banks can have disciplining effects. The author uses cross-state variation in corporate income tax rates as an indicator of the presence of subordinated debt in a bank's capital structure. Motivating this identification strategy is a strong and robust relationship between corporate tax rates and the mix of debt in regulatory capital, which is helpful to overcome selection issues.

We examine Bank Holding Companies, namely large multi-firm businesses. These firms are typically made of one parent firm, which owns one or more subsidiary companies. Few papers discuss taxation issues in relation to the organizational structure of groups. Desai, Foley, and Hines (2001) work on a sample of multinational firms, and observe that, when tax rates are higher, affiliates raise in debt. However, the wider tax shield is due more to internal borrowing of the affiliates from their parent, while external debt of affiliates is less reactive to tax changes. Gu, de Mooij, and Poghosyan (2012) analyze the sensitivity of multinational bank capital structures to taxation. They find the leverage of subsidiaries depends on corporate income taxes in two ways: the first is the traditional debt bias, measured by the debt impact of the local tax level in the host country of the same subsidiary; the second is international debt shifting, measured by the debt impact of the international tax difference *vis-avis* other subsidiaries of the same

multinational group. To summarize, the literature often suggests that banks want to include large amounts of debt on their balance sheets, to get higher tax advantages. Departing from this view, the task of our empirical analysis is to quantify the reduction in tax burdens from leverage. By doing this the paper provides an important new contribution to the literature.

DATA AND METHODOLOGY

We analyze data provided by SNL Financial LC (www.snl.com). We use information on balance sheets and income statements for all firms classified as Bank Holding Company (BHC), which file Federal Reserve System reporting forms FR Y9-C and FR Y9-LP. The United States law defines BHCs in the 12 United States Code Sections 1841-48 (so-called Bank Holding Company Act of 1956). BHCs are required to submit financial statements to the Federal Reserve System. Our sample includes domestic BHCs of large total assets size, which file Consolidated Financial Statements for Holding Companies (FR Y9-C), and Parent Company Only Financial Statements for Large Holding Companies (Y-9LP). The observation frequency is quarterly spanning from 2006q1 until 2014q1. In total, the sample includes 25,480 BHC-quarter observations. From the BHC accounting figures we construct empirical measures for the firms´ taxes, leverage, and additional features. The Appendix defines these measures in more detail. Table 1 reports their most important descriptive statistics.

Table 1: Summary Statistics for the Variables

Name	Mean	Std dev	5th Percentile	Median	95th Percentile
Dependent Variables					
Income Taxes/Assets (%)	0.051	0.099	-0.076	0.049	0.188
Income Taxes/Assets: Only if > 0 ("Tax Burden")	0.073	0.070	0.000	0.063	0.196
Income Taxes/Income	25.114	18.883	0.000	28.052	44.310
Parent Income Taxes/Parent Assets (%)	0.099	0.141	0.001	0.031	0.436
Dummy Negative Income	0.024	0.153	0.000	0.000	0.000
Dummy Negative Operating Income	0.037	0.189	0.000	0.000	0.000
(Parent Taxes – Consolidated Taxes)/Parent Assets (%)	-0.099	0.210	-0.069	-0.258	0.000
Variables for Leverage					
Consolidated Leverage (%)	90.314	3.279	84.840	90.630	94.800
Parent Leverage (%)	14.248	17.045	0.000	9.506	46.259
Risk-Weighted Capital Ratio (%)	15.090	4.763	10.250	14.150	23.690
Deposits (%)	78.092	10.751	61.643	80.255	88.902
Subordinated Debt (%)	0.143	0.471	0.000	0.000	1.133
Control Variables					
Size (Natural log)	13.855	1.372	12.250	13.498	16.636
Profitability (%)	0.676	1.104	-1.080	0.800	1.950
N Depository Subs	1.088	0.549	0.000	0.000	2
N Non-Bank Subs	9.097	106.283	0.000	0.000	8
Claims Parent-Subsidiaries					
Borrowing from Subsidiaries (%)	8.761	11.509	0.000	2.529	30.744
Dividend Income from Subsidiaries (%)	0.097	0.164	0.000	0.009	0.411
Equity into Subsidiaries (%)	85.218	26.740	0.000	95.588	99.954
Notes Payable to Special Purpose Subsidiaries (%)	8.186	10.851	0.000	0.341	29.082

The sample period is 2006q1-2014q1 and the results refer to a total number of 25,480 BHC-quarter observations

The first set of Ordinary Least Squares (OLS) regressions relates BHC consolidated taxes to leverage, according to Equation (1) below:

$$Consolidated\ Taxes_{i,t} = \alpha_0 + \beta_1 Consolidated\ Leverage_{i,t} + \beta_2 Parent\ Leverage_{i,t} + \beta_3 Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Controls = Size;\ Profitability;\ N\ Depository\ Subs;\ N\ NonBank\ Subs; BHC\ Fixed\ Effect; Quarter\ Fixed\ Effect$$

At every point in time t, and for every BHC i, the consolidated tax burden is regressed on consolidated leverage, the parent stand-alone leverage, plus additional controls. The control regressors are size, profitability, the number of bank and non-bank subsidiaries. All the specifications include time fixed effects and BHC fixed effects, and standard errors are clustered at the BHC level. The consolidated taxes in Equation (1) are alternatively measured by: (i) the amount of income taxes divided by consolidated assets, or (ii) the amount of income taxes divided by the corporate income, gross of income taxes and extraordinary items. The latter (ii) is close to the so-called corporate "effective tax rate," namely the average rate at which the business is taxed. In our sample the average tax rate is about 25%. In the OECD (2000) the effective tax rate is one indicator for the corporate tax burden. In the survey by Hanlon and Heitzman (2010) the effective tax rate is considered a measure for tax avoidance.

Equation (1) is estimated for those firms reporting a positive value in the consolidated income taxes during the year-quarter, namely firms that owe taxes to the local or non-United States tax authorities. We exclude from the sample the few BHCs with negative income taxes, i.e. the firms enjoying a tax benefit. The screen of the filing reports reveals that, in the majority of cases, the tax benefit depends on net operating losses, which translate into carrybacks or carryforwards. To gain further insights into what may have driven these firms to have negative taxes, we compared the information from regulatory filings to the more detailed information on taxes provided in 10-K filings with the United States Securities and Exchange Commission (SEC). Most frequently, income taxes are negative because of net operating loss carryforwards, and valuation allowances for deferred tax assets resulting from net operating losses. Fewer firms report small tax benefits due to changes in state law or international tax settlements. On the right-hand side of Equation (1), consolidated leverage is calculated as the difference between assets and equity, normalized by assets. From Table 1 above, the leverage of our BHCs averages above 90%.

The parent stand-alone leverage is the ratio of parent liabilities over parent assets. The parent firms of the sample are highly capitalized, with leverage of only 14%. Thus, parent firms finance only a tiny share of their assets through debt instruments. The much higher value for consolidated leverage suggests that, the larger part of the group-wide debt is issued from the subsidiaries, rather than from the parent. The next section shows the outcomes from the estimation of Equation (1). Afterwards, we make changes in Equation (1) and test additional specifications, to obtain evidence which makes the argumentation more robust.

RESULTS AND DISCUSSION

Effect from Leverage on Consolidated Taxes

Table 2 – Column 1/2 displays outputs on the effect of leverage on the consolidated tax burden. Taxes are decreasing in both the consolidated leverage and in the parent stand-alone leverage, although coefficients are statistically stronger on the consolidated leverage. In economic terms, by looking at Table 2 – Column 2, the average effective tax rate decreases by more than 7% when the BHC leverage ratio raises by one percentage point. This number is calculated by multiplying the standard deviation of the effective tax rate by the coefficient estimated on the consolidated leverage. Given the correlation between consolidated and parent leverage is only 0.48, and the two are not highly correlated, we are less worried that, the simultaneous inclusion of the two variables in the same specification is carrying some endogeneity which may severely distort the outcomes.

In the model of Equation (1) we replace both variables for leverage (consolidated and parent leverage) with one regressor for the consolidated risk-weighted capital ratio. The latter ratio is the regulatory risk-weighted capital standard calculated according to the rules developed under the framework of the 1988 Basel Capital Accord. The capital ratio is inversely related to the degree of leverage. In Table 2, Column 3 the regulatory capital standard has a positive coefficient on taxes, so the BHCs, endowed by a strong

regulatory capital buffer, are also paying higher taxes. This result supports the opinion that, when the qualified capital diminishes, and the funding structure levers up, the tax burden reduces.

We exploit information on the composition of the consolidated liabilities. Our data allow disentangling from the consolidated debt figure the liabilities in the form of (i) banking deposits or (ii) subordinated debt. Subordinated debt includes all forms of unsecured long-term debt, which are subordinated to the remaining debt securities. We expect that, the firm is paying a higher interest on the junior debt rather than on deposits. Given that, in general terms, deposits are withdrawable upon demand and, up to a certain limit, are protected by deposit insurance schemes. They should also offer a lower compensation. Our consequent prediction is that, the issuance of subordinated debt leads to a larger deduction of interest from consolidated revenue, so the tax burden should decrease more evidently in the subordinated debt, rather than in deposits. We approximate the leverage associated to deposits and to subordinated debt by taking their respective amounts as ratios over total assets. The two variables are then regressed to taxes. Table 2, Column 4/5 confirm our expectation, revealing a stronger negative and significant sign on subordinated debt.

Table 2: The Effect from Leverage on Consolidated Taxes

	Consolidated Tax Burden				
	Income Taxes/Assets		Income Taxes/Income		
	(1)	(2)	(3)	(4)	(5)
Consolidated Leverage	-0.004***	-0.396***			
	(0.001)	(0.107)			
Parent Leverage	0.000	-0.029			
	(0.000)	(0.024)			
Risk-Weighted Capital Ratio			0.262***		
			(0.084)		
Deposits				-0.043	
				(0.029)	
Subordinated Debt					-2.099***
					(0.711)
Control Variables	Yes	Yes	Yes	Yes	Yes
Quarter Dummies	Yes	Yes	Yes	Yes	Yes
N	21,877	23,548	21,920	23,559	23,559
R^2	0.144	0.050	0.026	0.044	0.047

*The table reports outputs from pooled ordinary least squares (OLS) regressions. The sample period is 2006q1-2014q1. The control variables include size, profitability and the number of depository subsidiaries and non-bank subsidiaries. Robust standard errors are clustered at the BHC level and are reported in parentheses. * p < 0.10, ** p < 0.05, *** p <0.01*

Analysis Using the Parent Stand-Alone Taxes

In this sub-section we use the parent *solo* information, and model parent stand-alone taxes according to the following Equation (2):

$$Parent\ Taxes_{i,t} = \alpha_0 + \beta_1 Consolidated\ Leverage_{i,t} + \beta_2 Parent\ Leverage_{i,t} + \beta_3 Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Controls = Size;\ Profitability;\ N\ Depository\ Subs;\ N\ NonBank\ Subs; BHC\ Fixed\ Effect; Quarter\ Fixed\ Effect$$

The dependent variable is the ratio of parent stand-alone income taxes over parent assets. From Table 3 we see that leverage does not play an important role on the parent tax burden. Comparing Table 1 to Table 2, we conclude that, only when we look at the consolidated balance sheet items do we get stronger evidence of a fiscal advantage from debt. Our view is that, the parent firms of the sample remain highly capitalized, while they can reduce the group-wide taxable income thanks to the deductions of debt interests issued by

subsidiaries. We now compare taxes of the parent *versus* taxes bearing on the subsidiaries. More precisely, in Table 4 the dependent variable is the difference between parent and consolidated taxes, normalized by consolidated assets. This variable is proportional to the fiscal benefit for the parent from the consolidation of subsidiaries. Indeed, the ratio is positive when the parent taxes overcome consolidated taxes, which would suggest some tax deductions on the subsidiaries´ income.

Table 3: The Effect from the Parent Stand-Alone Leverage on the Parent Stand-Alone Taxes

	Parent Income Taxes/Parent Assets
Consolidated Leverage	-0.002
	(0.002)
Parent Leverage	0.003
	(0.001)
Control Variables	Yes
Quarter Dummies	Yes
N	2,522
R^2	0.161

*The table reports outputs from pooled ordinary least squares (OLS) regressions. The sample period is 2006q1-2014q1. The control variables include size, profitability and the number of depository subsidiaries and non-bank subsidiaries. Robust standard errors are clustered at the BHC level and are reported in parentheses. * p < 0.10, ** p < 0.05, *** p <0.01*

Table 4: The Effect from Leverage on the Difference Between Parent *Versus* Consolidated Taxes

	(Parent Taxes – Consolidated Taxes)/Assets
Consolidated Leverage	0.005***
	(0.002)
Parent Leverage	-0.001***
	(0.000)
Control Variables	Yes
Quarter Dummies	Yes
N	2,176
R^2	0.206

*The Table reports outputs from pooled ordinary least squares (OLS) regressions. The sample period is 2006q1-2014q1. The control variables include size, profitability and the number of depository subsidiaries and non-bank subsidiaries. Robust standard errors are clustered at the BHC level and are reported in parentheses. * p < 0.10, ** p < 0.05, *** p <0.01*

In Table 4 the gap in taxes reacts positively to consolidated leverage, while negatively to parent leverage. This reinforces our opinion that, when debt is issued from subsidiaries and the group leverage gets higher, there is a reduction only in the consolidated taxes, while the parent taxes remain unaffected. In other words, our BHCs are more likely to shield taxation when subsidiaries become more indebted. Therefore, parent firms may want to consolidate their affiliates in order to smooth their stand-alone taxation.

To strengthen the above argument, we stress the impact from leverage on income losses. We create a dummy variable assuming value one when the BHC consolidated income is negative. A logit model regresses this dummy on leverage and the usual control variables. The logit specification allows to interpret the estimated coefficient as the impact from leverage on the probability of income losses. Table 5, Column 1 displays a positive coefficient on leverage, revealing that, when the firm has got huge debt income losses become more likely. For robustness, we perform the same test on a dummy variable denoting a negative value in the *operating* income. The operating income is the sum of income from subsidiaries and associated institutions, and stems from the parent only income statement. The pattern in Table 5, Column 2 is consistent with the previous one, and the coefficient on consolidated leverage remains highly significant.

Table 5: The Effect from Leverage on Dummies for Negative Income

	Dummy Negative Income	Dummy Negative Operating Income
	(1)	**(2)**
Consolidated Leverage	0.188***	0.103***
	(0.020)	(0.020)
Parent Leverage	0.016***	0.007
	(0.004)	(0.005)
Control Variables	Yes	Yes
Quarter Dummies	Yes	Yes
N	19,387	12,857

The table reports outputs from the estimation of fixed-effects LOGIT model. The sample period is 2006q1-2014q1. The control variables include size, profitability and the number of depository subsidiaries and non-bank subsidiaries. Robust standard errors are reported in parentheses. * p < 0.10, ** p < 0.05, *** p <0.01

Effect on Taxes from Intra-Firm Claims Between Parent and Subsidiary

The Report Y-9LP includes information on parent holdings inside subsidiaries. Indeed, the parent may hold on its balance sheet some claims issued by the subsidiaries. We now show that certain intra-firm holdings may affect taxes. The three regressions estimated in this sub-section follow Equation (3):

$$Consolidated\ Taxes_{i,t} = \alpha_0 + \beta_1 Variable\ for\ IntraFirm\ Holdings_{i,t} + \beta_3 Controls_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$IntraFirm\ Holdings =$$
$$Dividend\ Income\ from\ Subs;\ Borrowing\ from\ Subs;\ Notes\ Payable\ to\ Special\ Purpose\ Subs$$

$$Controls$$
$$= Size;\ Profitability;\ N\ Depository\ Subs;\ N\ NonBank\ Subs;\ BHC\ Fixed\ Effect;\ Quarter\ Fixed\ Effect$$

First, we consider the case when the parent holds equity issued by the subsidiaries. In our sample, almost 85% of the parent assets coincides with participations in the equity of subsidiaries. As a stockholder, the parent is entitled to receive dividends distributed from the subsidiary. This dividend though, is subject to the Intercorporate Dividend Taxation (IDT). In principle, the levy on intercorporate dividends increases the group tax payment. However, tax rules call for deductions. Under the United States federal income tax law (Internal Revenue Code Section 243), according to the rule of Dividends-Received Deduction (DRD), a company can deduce the dividends received by a participated firm in a proportional way to the stake of ownership held in the same firm. Generally, a company is able to deduct the 70 percent of the dividends received. Nonetheless, if the same company has an ownership stake of 20 percent or more in the affiliate, then the deduction increases to 80 percent. When the stockholding overcomes the 80 percent, then 100 percent of the dividend is deducted from the taxable income.

For an academic references on effects of IDT we note Nicodano and Regis (2015), who develop a theory where IDT is an important determinant of the organizational structure of multi-firm companies. In Table 6, Column 1, consolidated taxes are regressed on income from subsidiaries´ dividends normalized by assets. We observe that taxes increase in dividends. Nonetheless, there is a negative sign on the interaction term between dividends and the share of parent ownership of subsidiaries. Such negative coefficient may reflect the dividend deduction mentioned above. Namely, as soon as the parent has a larger ownership of the subsidiary, the deduction of the dividend income "upstreamed" from the affiliate gets wider. A second situation, which may interfere with taxation, regards borrowing of the parent from subsidiaries. The parent firms of our sample are funding 8% of their assets *via* credit obtained from subsidiaries (see Table 1 above). As from Table 6, Column 2, such intra-firm debt impacts in a negative way on taxes. We explain this result arguing that, the parent can more extensively use leverage rather than in the stand-alone case, since it can

rely on both external and intra-firm credit. Having multiple sources of debt, the deductions on the taxable income can be wider, as well.

Finally, we exploit information on the parent issuance of notes payable to special purpose subsidiaries, which, in turn, have issued trust-preferred securities. In these transactions, a special purpose subsidiary (typically a trust) issues preferred securities, and lends the proceeds from the issuance to the parent in exchange for a deeply subordinated inter-company note. Note that, trust preferred securities are treated as debt for tax purposes, namely their interest payments are deductible, while are treated as Tier 1 capital for regulatory purposes. From Table 6, Column 3, we observe a negative effect on tax burdens from notes payable to special purpose subsidiaries is significantly. This confirms the view that taxes may be important for the decision of banks on the issuance of hybrid claims, as trust-preferred securities. Altogether, the tests performed in this subsection aimed at providing evidence that parent-subsidiary transactions can have an ultimate effect in curtailing the taxes weighing on BHCs.

Table 6: The Effect on Taxes from Intra-Firm Claims Between Parent and Subsidiary

	Income Taxes/Assets	Income Taxes/Assets	Income Taxes/Assets
	(1)	(2)	(3)
Dividend Income from Subsidiaries	0.156***		
	(0.055)		
Dividend Income from Subsidiaries*Equity into Subsidiaries	-0.002***		
	(0.001)		
Borrowing from Subsidiaries		-0.0004***	
		(0.000)	
Notes Payable to Special Purpose Subsidiaries			-0.0003***
			(0.001)
Control Variables	Yes	Yes	Yes
Quarter Dummies	Yes	Yes	Yes
N	21,865	21,887	21,887
R^2	0.123	0.123	0.122

*The table reports outputs from pooled ordinary least squares (OLS) regressions. The sample period is 2006q1-2014q1. The control variables include size, profitability and the number of depository subsidiaries and non-bank subsidiaries. Robust standard errors are clustered at the BHC level and are reported in parentheses. * p < 0.10, ** p < 0.05, *** p <0.01*

CONCLUDING COMMENTS

The goal of this paper is to explore whether corporate leverage has an ultimate effect on taxes paid by banking firms. There is no consensus in the financial literature that banks can shield their tax obligations by issuing debt. Our article addresses this issue, providing empirical evidence on how Bank Holding Companies (BHCs) exploit leverage in order to reduce their tax burdens. We use accounting data for a sample of 25,480 BHCs supervised from the United States Federal Reserve System. The effect from the BHCs´ leverage on taxes is estimated using several types of Ordinary Least Squares regression models.

The empirical results hint that the tax burden of BHCs changes their capital structure. More precisely, taxes are lower when leverage is taken from the subsidiaries. We do not see significant evidence that taxes are affected from the parent stand-alone leverage. Our interpretation is that parent firms remain highly capitalized. They prefer to consolidate the more levered subsidiaries, to deduct from the consolidated group-wide income the debt interests of the subsidiaries. Put differently, we argue that there exists a fiscal incentive for the consolidation of subsidiaries. Additional tests reveal an impact on taxes from the intra-firm claim holdings between parent and subsidiary. In particular, we considered cases in which the parent holds stocks, loans, or hybrid claims originated from the subsidiary. Overall, the evidence from this paper suggests that, tax motives may importantly contribute to the decisions of BHCs on their capital structure. Our findings are important for a better understanding on how banking groups may have opportunities for tax avoidance.

While we have analyzed the banking industry, future research may examine the non-financial sector. Our methodology relies on panel data techniques, which may lack strong power in addressing endogeneity issues. Future research may employ an event study design which could more narrowly investigate causality from leverage on taxes. Finally, our main interpretation based on outcomes from accounting data would be stronger if supported by additional evidence working on tax return data filed with the Internal Revenue Service (IRS).

APPENDIX

Definition of Variables

Variable Name	Description
Dependent Variables	
Income Taxes/Assets	Total income taxes as a percent of total assets. Income taxes include total estimated federal, state, and local, and non-U.S. income tax expenses applicable to income before income taxes and extraordinary items and other adjustments, including the tax effects of gains on securities not held in trading accounts. Includes both the current and deferred portions of these income taxes and tax benefits from operating loss carry backs realized during the reporting period. Applicable income taxes include all taxes based on a net value of taxable revenues less deductible expenses (FR Y-9C)
Income Taxes/Income	Total income taxes as a percent of net income before income taxes and extraordinary items (FR Y-9C)
Parent Income Taxes/Parent Assets	Parent income taxes as a percent of parent assets. Parent income taxes include total estimated federal, state, and local income tax expenses on a parent company only bases for the period (FR Y-9LP)
Dummy Negative Income	Dummy variable denoting with value one non-positive net income. Net income is the sum of net interest income after provision, non-interest income, gain on securities, extraordinary items less non-interest expense and taxes (FR Y-9C)
Dummy Negative Operating Income	Dummy variable denoting with value one non-positive operating income. Operating income is the sum of income from subsidiaries and associated institutions; income from non-bank subsidiaries and associated non-bank companies; income from subsidiary holding companies and associated holding companies; securities gains; and all other operating income (FR Y-9LP)
Regressors	
Variables for Leverage	
Consolidated Leverage	One minus the total equity as a percent of total assets (FR Y-9C)
Parent Leverage	One minus the total parent equity as a percent of total parent assets (FR Y-9LP)
Risk-Weighted Capital Ratio	Total risk-weighted capital ratio calculated as the total capital (tier 1 core capital + tier 2 supplemental capital) divided by risk-weighted assets, in percentage terms (FR Y-9C)
Deposits	Total deposits included domestic and foreign deposits as a percent of total assets (FR Y-9C)
Subordinated Debt	Total subordinated notes and debentures as a percent of total assets (FR Y-9C)
Control Variables	
Size	Natural logarithm of total consolidated assets (FR Y-9C)
Profitability	Return On Assets (ROA) calculated as net income as percentage of the average total assets (FR Y-9C)
N Depository Subs	Number of all depository subsidiaries. Depository subsidiaries are the federally insured banking or thrift subsidiaries owned (Data Created by SNL Financial)
N Non-Bank Subs	Number of all non-bank subsidiaries (FR Y-9C)
Claims Parent-Subsidiaries	
Borrowing from Subsidiaries	Parent borrowings from subsidiaries (subsidiary banks, non-banks, and other BHCs) and associated companies, as a percent of parent total assets (FR Y-9LP)
Dividend Income from Subsidiaries	Dividend income declared or paid to the reporting holding company from banking subsidiaries and associated banks, as a percent of total assets (FR Y-9LP)
Equity into Subsidiaries	Equity investment into subsidiaries (subsidiary banks, non-banks, and other BHCs), as a percent of parent total assets (FR Y-9LP)
Notes Payable to Special Purpose Subsidiaries	Outstanding amount of notes payable by the parent bank holding company to special-purpose subsidiaries that have issued trust preferred securities, as a percent of parent total assets. In these transactions, a special purpose subsidiary (typically a trust) of the parent company issues preferred securities and lends the proceeds of its issuance to its parent company in exchange for a deeply subordinated intercompany note from the parent company (FR Y-9LP)

REFERENCES

Ashcraft, A. B., 2008, "Does the Market Discipline Banks? New Evidence from Regulatory Capital Mix," *Journal of Financial Intermediation* 17 (4), 543-561

van Binsbergen, J. H., J. R. Graham, and J. Yang, 2010, "The Cost of Debt," *The Journal of Finance* 65 (6), 2089-2136

Booth, L., V. Aivazian, A. Demirguc-Kunt, and V. Maksimovic, 2001, "Capital Structures in Developing Countries," *Journal of Finance* 56 (1), 87-130

Desai, M. A., C. F. Foley, and J. R. Hines, 2004, "A Multinational Perspective on Capital Structure Choice and Internal Capital Markets," *Journal of Finance* 59 (6), 2451-2487

Gu, G. W., R. de Mooij, and T. Poghosyan, 2015, "Taxation and Leverage in International Banking," *International Tax and Public Finance* 22 (2), 177-200

Hanlon, M., and S. Heitzman, 2010, "A Review of Tax Research," *Journal of Accounting and Economics* 50 (2), 127-178

Heider, F., and A. Ljungqvist, 2015, "As Certain as Debt and Taxes: Estimating the Tax Sensitivity of Leverage from State Tax Changes," *Journal of Financial Economics* 118 (3), 684-712

Hemmelgarn, T., and D. Teichmann, 2014, "Tax Reforms and the Capital Structure of Banks," *International Tax and Public Finance* 21 (4), 645-693

Keen, M. M., and R. A. de Mooij, 2012, "*Debt, Taxes, and Banks*," International Monetary Fund Working Paper No. 48, 1-31

Langedijk, S., G. Nicodème, A. Pagano, and A. Rossi, 2015, "Debt Bias in Corporate Taxation and the Costs of Banking Crises in the EU," Directorate General Taxation and Customs Union, European Commission, Working Paper No. 50, 1-37

Lin, L., and M. J. Flannery, 2013, "Do Personal Taxes Affect Capital Structure? Evidence from the 2003 Tax Cut," *Journal of Financial Economics* 109 (2), 549-565

Modigliani, F., and M. Miller, 1963, "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review* 53 (3), 433–443

Morck, R., 2005, "How to Eliminate Pyramidal Business Groups - The Double Taxation of Intercorporate Dividends and other Incisive Uses of Tax Policy," in J. Poterba (ed.), *Tax Policy and the Economy*, Volume 19, 135-179, MIT Press

Nicodano, G., and L. Regis, 2015, "Ownership, Taxes and Default," IMT Institute for Advanced Studies Lucca, Working Paper, 1-38

OECD, 2000, "Tax Burdens: Alternative Measures," OECD Tax Policy Studies No. 2, OECD Publishing, Paris, 65-73

Schandlbauer, A., 2015, "How Do Financial Institutions React to a Tax Increase?" SSRN Working Paper No. 2397030, 1 - 66

Schepens, G., 2016, "Taxes and Bank Capital Structure," *Journal of Financial Economics* 120 (3), 585-600

ACKNOWLEDGEMENTS

BIOGRAPHY

Silvia Bressan is Assistant Professor at MODUL University Vienna. She holds a PhD in Finance from the Vienna Graduate School of Finance, and her research activity focuses on the corporate finance of banking firms. She can be reached at MODUL University Vienna, Am Kahlenberg 1 1190, Vienna, Austria. silva.bressan@modul.ac.at