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Thomas Hemmelgarn
Daniel Teichmann

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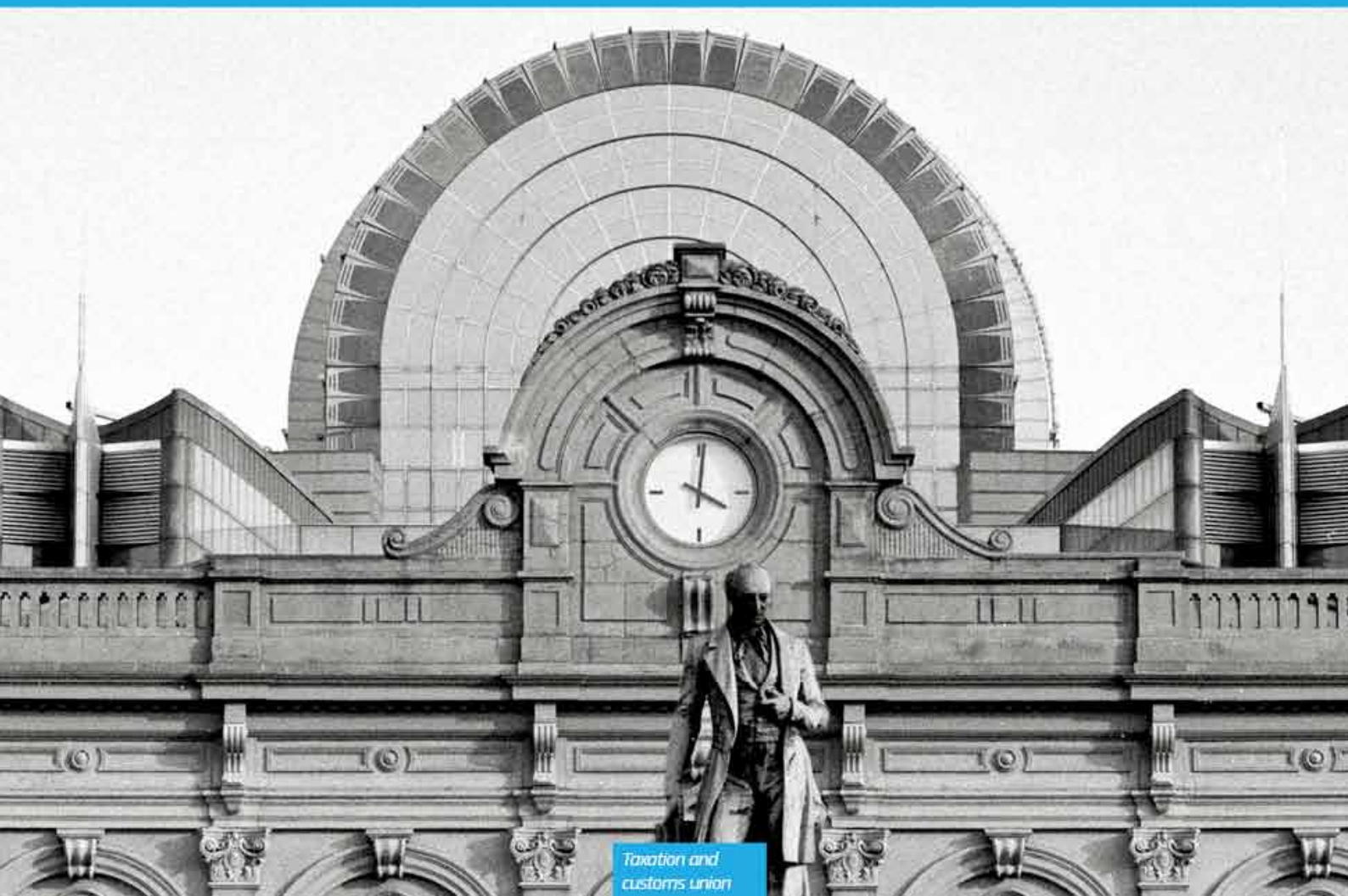

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Tax Reforms and the Capital Structure of Banks*

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Thomas Hemmelgarn† and **Daniel Teichmann**‡
European Commission, Fifo Policy-Fellow University of Frankfurt

Abstract
The paper studies the link between corporate income tax reforms and domestic bank entities' financing decisions. We use a dataset of corporate income tax (CIT) reforms and estimate the effect of tax rate changes on leverage, dividend policies and earnings management of banks. The results suggest that taxation influences all three variables in the first three years after the reform. Leverage increases with the CIT rate. The reason is that the statutory CIT rate determines the value of the debt tax shield. A higher tax rate increases incentives to use debt finance when interest payments are deductible from the CIT base. The tax effects we find are statistically and economically significant but considerably lower than those found in previous research. Also, dividend pay-outs increase after an increase of CIT rates. This could indicate that banks actively manage their pay-out policies around tax reforms and adjust their capital structure with changes in dividends. Furthermore, banks increase loss loan reserves in anticipation of tax rate cuts since losses become less valuable with lower CIT rates. In the context of the current regulatory reform in the financial sector, which focuses strongly on improving equity ratios of banks, our results suggest that future tax policies should focus on eliminating the favourable treatment of debt for banks. The reason is that this distortion at least partly undermines the objective of increasing regulatory capital in the financial sector.

JEL-Codes: G21, H25, H32

Keywords: Corporate income tax, tax reform, debt-equity bias, leverage, banks

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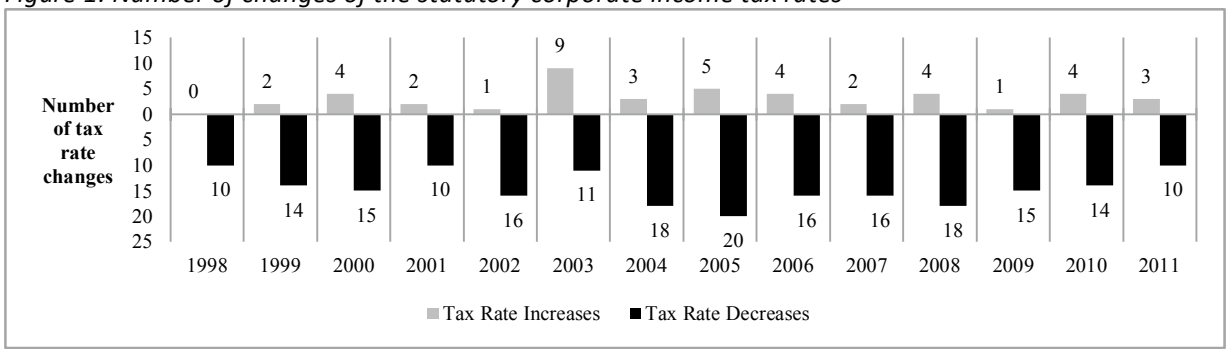
† Address: European Commission, Directorate-General for Taxation and Customs Union, SPA3 06/19A, B-1049 Brussels/Belgium. Email: thomas.hemmelgarn@ec.europa.eu. Tel. +32 2 29 56656.
‡ Address: Goethe University Frankfurt/Germany, House of Finance. Email: daniel.teichmann@hof.uni-frankfurt.de. Tel. +49 69 798 33700.

1. Introduction

Corporate income tax (CIT) systems generally favour debt financing over equity financing of investments. While the large majority of current CIT systems allow a deduction of interest paid on debt from the CIT base, there is no such deduction for equity. In theory, this distortion could be removed at shareholder level by taxing interest income at the CIT rate and exempting dividend income.[4] However, in practice this is rarely done and it is even less likely with the increasing internationalisation of capital markets makes this even more unlikely since shareholders and creditors are not necessarily taxed in the national tax system where the company is located.

The economic literature and policy makers have recognised this debt-equity distortion and its potentially harmful consequences. In particular, the economic and financial crisis demonstrated that high leverage of financial institutions, and to some extent of non-financial companies, can lead to serious economic consequences when re-financing options dry out overnight.[5] As a consequence, international institutions like the European Commission (2012) and the International Monetary Fund (2009) recommended adjusting national CIT systems to reduce this bias.

Figure 1: Number of changes of the statutory corporate income tax rates

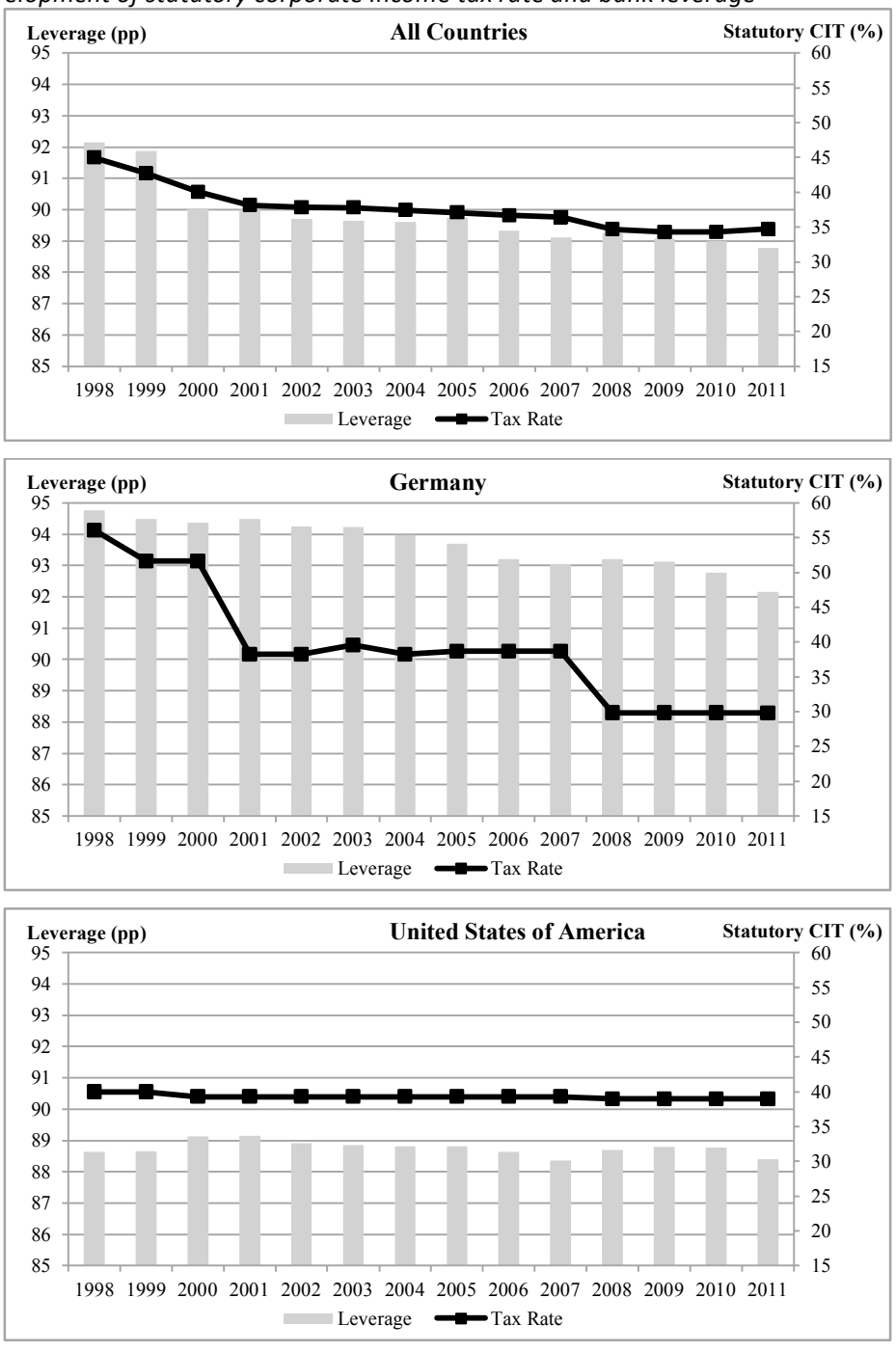


The goal of this paper is to assess the short-run impact of changes in the preferential treatment of debt financing on financing and accounting decisions of banks. For this purpose we have used data on a large number of tax reforms involving changes in the statutory corporate income tax rate (see Figure 1). Such changes in the taxation of company profits shift the relative advantage deducting interest payments. Based on the results we quantify the domestic impact of tax rate changes and the change of the debt-equity distortion.

[4] An example of a model which illustrates this potential neutrality is in Fuest and Hemmelgarn (2005). Their model analyses theoretically the profit shifting issues related to debt financing in an international setting.

[5] de Mooij (2011) discusses the potential welfare costs related to the debt bias in more detail. He concludes that "the welfare costs of debt bias are probably substantial." The reason is that standard welfare considerations usually neglect negative externalities from tax distorted tax financing, notably with respect to the financial sector. In addition, different tax rates between countries and varying rules offer profit shifting possibilities

Figure 2: Development of statutory corporate income tax rate and bank leverage



Our starting point is the observation that the average statutory corporate tax rate has decreased significantly over the last decade, while over the same period bank leverage also has decreased moderately (see Figure 2). Looking at two stylised, descriptive examples in Figure 2 we see that in Germany, a country with a significant reduction of the CIT and thereby a reduction of the tax preferential

for debt on the corporate level[6], leverage fallen more sharply than in the US where the CIT has been largely constant over the last years. In this paper we aim to substantiate this initial observation with multivariate analyses.

In the empirical literature, the robust identification of tax effects was for many years a difficult task, most notably due to the lack of good quality micro-level data which allow one to control for the numerous factors, besides taxation, that influence capital structures. While this has changed somewhat recently, the focus of the majority of studies has been on the non-financial sector and the tax effects in this area.[7] In fact, most studies eliminate the financial sector from the panel due to their very different balance sheet structure compared with, for example, manufacturing companies.

Notable exceptions are the papers by Keen and de Mooij (2012) and Gu, de Mooij, and Poghosyan (2012). They analyse the effect of taxes on leverage for financial institutions. Keen and de Mooij (2012) estimate the tax effect on leverage with a series of panel regressions. They find that a 10 percentage points (pp) increase in the tax rate leads to an increase in leverage of about 1.8 pp in the short run and about 2.7 pp in the long run. Gu, de Mooij, and Poghosyan (2012) focus instead on multinational banks and whether international tax rate differentials influence the multinationals' capital structure. They find that there are international debt spill-overs from tax differentials in addition to the standard debt bias from local taxation. For the latter effect they find that a 10 pp increase in the CIT rate increases the leverage ratio by 2.5 pp. For the international tax difference they find that a 10 pp decrease in the jurisdiction of a subsidiary leads to a decrease in leverage of about 1.8 pp keeping all other tax rates constant.

While this paper addresses a similar question, namely the effect of local taxes on leverage of local bank entities, it provides additional insight compared with previous work. Firstly, the estimation approach here is more focused on the short-term effects of tax reforms, namely the first four years after the reform. Secondly, we use a more comprehensive dataset of tax rate changes in 87 countries in combination with firm-level banking data. Thirdly and most importantly, the analysis adds further insight through the analysis of other financial decisions, notably the effect of tax rate changes on dividend policies and loss loan reserves.

The results suggest that taxation influences all three variables. Leverage increases with the CIT rate because the latter determines the value of the debt tax shield. A higher statutory tax rate increases the incentive to use debt finance when interest payments are deductible from the CIT base. We find that a 10 pp increase in the statutory tax rate increases leverage by 0.98 pp. In line with this, dividend pay-outs rise after an increase in CIT rates. This shows that banks actively manage their pay-out policies around tax reforms and adjust their capital structure with changes in dividends. The increase in dividends is a possible means to reduce the share of equity. Lastly, changes in the statutory CIT rate affect loan loss reserves. Banks increase loan loss reserves in anticipation of a tax rate cut since losses become less valuable with lower CIT rates. In the context of the current regulatory reform in the financial sector, which focuses strongly on improving equity ratios of banks, our results suggest that future tax policies

[6] We acknowledge that there at the same time have been substantial changes in the taxation on the personal level that might have had significant impact on the overall tax burden. However, in times of increasing international financial flows it is not trivial to determine the correct tax treatment on the personal level as the investor not necessarily must be taxed in the same jurisdiction. Including personal income taxation is a challenge we leave for future research.

[7] While improvements have been made, a number of issues remain open. For a critical survey on the most recent empirical literature on capital structure see Graham and Leary (2011).

should concentrate on eliminating the favourable treatment. This policy shift would be helpful because the current distortion partly undermines the regulatory objectives of increasing (regulatory) capital.

The tax effect measured here is lower than in other studies. In a meta study on the capital structure of non-financial corporations, Feld, Heckemeyer, and Overesch (2013) find a long-run marginal tax effect of 0.27. A similar average marginal value is found for non-financial firms in a meta study by de Mooij (2011). Keen and de Mooij (2012) confirm this value for financial companies. Their estimates suggest that a 10 pp increase in the tax rate leads to a short-run increase in leverage of 1.8 pp, which is more than double the size of the tax effect calculated in this paper for the first three years after a tax reform. Our results suggest a short-run marginal tax effect of 1.04 pp. These differences could be attributable to the use of a wider data set[8] in our estimations. Nevertheless, despite these divergences, the tax effect remains important. Proportionately to the average equity ratio our estimates indicate a sizeable decrease of 9.7% of equity.

The rest of the paper is structured as follows. Section 2 briefly outlines the theoretical background and the hypothesis. Section 3 presents the data. The estimation approach is discussed in section 4, while section 5 examines the results of the different estimations. Section 6 concludes with some policy lessons.

2. Theoretical background

The relation between taxation and financing decisions has long been disputed topic among scholars. Following on from the irrelevance theorem of Modigliani and Miller (1958), researchers have tried to explore how deviations from the strong assumptions made by in their paper affect companies' financing decisions. These assumptions relate to the notion of efficient markets, the zero costs of financial distress, no asymmetry of information and, most notably for the analysis here, the absence of taxation.[9]

In most jurisdictions around the world, proceeds on debt and equity investments are taxed differently. Whereas dividends are taxed as profit at the corporate level and then taxed again at the personal level (either at a reduced rate or by applying a tax imputation system[10]), interest payments can usually be deducted at the corporate level and are taxed on the personal level of the investor only.[11] This different tax treatment usually leads to different tax loads of debt and equity investments and violations of the neutrality of financing Schreiber (2008).[12] At the corporate level debt financing is usually preferred, as interest can be deducted for tax purposes whereas dividends cannot.

The trade-off theory uses this tax shield advantage of debt Modigliani and Miller (1963) and the opposing costs of financial distress as key arguments for the existence of an optimal level of debt DeAngelo and Masulis (1980). In this context a reduction of the tax burden should reduce the benefits of debt. Given that the costs of financial distress remain constant, this would result in a new optimal leverage below the old one. As many researchers initially had difficulty in finding an empirical link between leverage ratios and tax rates Myers (1984), some contested the trade-off theory by suggesting

[8] We look at broader sample over a longer time period and use about twice the number of observations.
[9] For comprehensive surveys on the literature following Modigliani and Miller see for example Myers (2001) Harris and Raviv (1991) and Frank and Goyal (2009).
[10] Over the last decades, there has been a wide trend from full imputation systems to shareholder relief systems
[11] In international settings withholding taxes might apply but are usually reduced or totally omitted by international tax treaties. Within the scope the EU-Savings Directive interest payments received abroad can be subject to national taxation.
[12] For other recent papers on this distortion see de Mooij (2011) and Fatica, Hemmelgarn, and Nicodème (2012).

that corporate tax discrimination would be offset or even reversed by personal taxes and tax clienteles Miller (1977) or by proposing the pecking-order-behaviour based on asymmetric information between management and investors as the true driver of capital structure (Myers (1984); Myers and Majluf (1984)). However, recent research has made indisputable progress in finding empirical links between taxation and capital structure choices. MacKie-Mason (1990) found a substantial tax effect regarding the decision to issue public debt vs. public equity when applying a discrete choice model. Givoly et al. (1992) provided evidence that firms react differently to a change in the tax regime depending on their tax status. Graham (2000) argued that there is a substantial benefit of using debt. Alworth and Arachi (2001) provided strong evidence for the cross sectional impact of both personal and corporate taxes on companies debt decisions in Italy. Gropp (2002) concluded that local taxes significantly influence the capital structure choice of firms in Germany. By analysing a sample with companies from 23 European countries, Overesch and Voeller (2010) find that the different taxation of debt and equity on the corporate and personal level has a significant effect on the leverage ratio. The results in Hartmann-Wendels, Stein, and Stöter (2012) suggest that a 10% increase in the marginal tax benefit of debt at the corporate level (investor level) causes a 1.5% (1.6%) increase in the debt ratio, ceteris paribus.[13]

For banks the impact of taxes on financing decisions has been even more controversial. Banks and other financial institutions have often been excluded from general analyses of capital structure choices since researchers believed they behaved differently from companies in other industrial sectors. Many researchers hold the view that the capital regulation of banks is binding and dictates the capital structure Mishkin (2009). In their opinion, the optimal leverage of banks, namely the leverage they would adopt in the absence of regulation, is considerably higher than what is allowed. As a consequence, moderate changes of the theoretical optimal level of debt should not change the actual level prescribed by regulation.

But this view does not explain why in reality banks have heterogeneous debt levels that often significantly exceed regulatory requirements (Berger et al. (2008); Flannery and Rangan (2008)). Moreover, recent research has presented sound empirical evidence that bank capital ratios respond similarly to those of other companies' to factors beyond regulatory capital limits Gropp and Heider (2009) and even confirmed an impact of corporate taxes (Keen and de Mooij (2012)).

This could either mean that capital regulation is not binding or that banks hold excess reserves above the regulatory limit as falling below the limit is costly and recapitalisation is often only possible with some delay (Keen and de Mooij (2012); Peura and Keppo (2006)). In both cases, the change of the tax rate should change the optimal level of leverage or the level of the buffer above the regulatory minimum as it has an impact on the relative costs of debt compared to equity and therefore affects the weighting rationale.

We therefore state our first hypothesis:
Hypothesis 1: A reduction of the corporate tax burden that a bank faces results in a reduction of its leverage in subsequent periods.

[13] It should be noted that there is also a large body of literature on the international dimension of capital structure, for example the impact of profit shifting on capital structure. For example, Desai, Foley, and Hines (2004) analyse the capital structures and internal capital markets of US multinationals' subsidiaries. They find that 10% higher local tax rates result in 2.8% higher debt-asset ratios. This literature is surveyed in Feld, Heckemeyer, and Overesch (2013). However, this multinational dimension is not the focus here since we do not study the multinational dimension of the banks in the sample, but rather the domestic effects of domestic tax reforms.

Banks have different instruments to adjust their capital structure over time. They can repay or take out loans, retire or issue bonds, issue equity, and adjust the distributions of retained earnings or capital to shareholders. In accordance with the theory that changes in the tax burden affect the optimal capital structure we should expect to observe that banks actively use one or more of these instruments to adapt themselves to the new optimum after a tax reform. Indeed, MacKie-Mason (1990) found a substantial tax effect regarding the decision to issue public debt vs. public equity.[14] In case of a reduction of the tax burden the repayment of bank loans or bonds would help, ceteris paribus, to reduce the leverage ratio. However, this would imply a contraction of the business volume. Therefore, we expect that banks in such a situation would instead try to raise their equity capital. As the adjustment of dividend distributions seems to be associated with less transaction costs compared to issuing new capital in a seasoned equity offering, we expect that banks especially use this tool to adjust their leverage, and we therefore formulate the following hypothesis:

Hypothesis 2: A reduction of the corporate tax burden should reduce the distribution of dividends to shareholders in the in subsequent periods.

Furthermore, we expect that corporate tax reforms that change the corporate tax burden do induce earnings management behaviour. As earnings are subject to different taxation before and after the reform, companies have a strong incentive to shift earnings to the period with the lower tax rate. In case of a tax reduction that would mean to defer earnings. On the other hand it would be advantageous to shift losses or tax credits to the period with higher taxation as taxable deductions provide a higher tax shield value the higher the tax rate. Scholes, Wilson, and Wolfson (1990) found empirical evidence for such behaviour by banks around the time of the introduction of the Tax Reform Act of 1986 in the United States, Beatty, Chamberlain, and Magliolo (1995) confirmed their results with a different empirical model, and Maydew (1997) extended the analyses to firms with net operating loss carry-backs. Guenther (1994) also provided evidence of management of financial statement income in response to a large decrease in the statutory corporate tax rate. Warfield and Linsmeier (1992) hypothesised that tax minimisation is an important incentive for realising securities transactions gains and losses. Ahmed, Takeda, and Thomas (1999) found strong support for the hypothesis that loan loss provisions are used for capital management but did not find evidence of earnings management via loan loss provisions.

Hypothesis 3: A reduction of the tax burden should induce earnings management behaviour in the period around the change, namely, losses should be brought forward to utilise them before the reduction of the tax burden and earnings should be postponed to periods after the reduction of the tax load.

With regard to the extent of the estimated adjustments induced by tax reforms, we expect that different groups of banks react differently. Firstly, banks that are facing higher effective tax rates[15] should react more strongly, as taxes should play a more significant role in their value optimisation considerations. Secondly, banks that have a greater leeway with regard to their capital should also react more strongly as they should be less restricted by regulatory minimum capital requirements. Gropp and Heider (2009) found that the capital structure of banks close to the regulatory minimum is less sensitive to bank characteristics. Keen and de Mooij (2012) provided additional empirical evidence for the stronger sensitivity of capital abundant banks to factors influencing capital structure and confirmed this for taxes.

[14] Other surveys based on meta-analysis find also tax effects on the choice between debt and equity. See for example the meta studies by Feld, Heckemeyer, and Overesch (2013) and de Mooij (2011).

[15] The effective rate is not just determined by the statutory rate but also by the current tax status regarding profitability, the existence of loss carry-forwards and other tax credits as well as the effectiveness of tax planning.

Furthermore, they showed that the leverage of smaller banks is more strongly influenced by tax rates than the leverage of larger banks. The reason for the lower responsiveness of large banks might be a smaller exposure to local tax rates due to the ability to use complex international tax planning schemes.

Hypothesis 4: Firms that face a higher effective tax rate, smaller firms, as well as capital abundant firms react more strongly to tax reforms.

Taxation is obviously not the only factor determining capital structure. As a consequence, when revealing the effect of tax reforms we also have to consider non-tax factors in order to control for potential confounding effects and to increase the efficiency of our estimation.

Firstly, one needs to consider the regulatory environment. If minimum capital requirements are binding, changes in those requirements should have direct impact on the capital structure choices. It is important to note here that capital buffers above the regulatory minimum do not necessarily mean that the regulation is not binding but might simply reflect the fact that falling below the minimum is costly and that recapitalisation in case of a negative shock comes with a delay (Keen and de Mooij (2012); Peura and Keppo (2006)). The effectiveness of regulatory enforcement, along with the quality of the local institutions per se might be an important factor too. It seems intuitively plausible that weaker public institutions may lower the effective burden of capital requirements but may also reducer the effective tax load of banks in a specific jurisdiction.

Previous literature (for example Frank and Goyal (2009); Gropp and Heider (2009); Keen and de Mooij (2012)) has determined some additional factors that have to be controlled for. One is risk, which should influence leverage since less risky companies should be able to maintain higher levels of debt financing. Related to this, size seems to be an important determinant of capital structure. In general, larger, more mature companies might be more stable and less risky and therefore might be able to obtain higher leverage. In the special case of banks, large banks might be subject to explicit or implicit government guarantees as they might be perceived as "too big to fail". Again, this would reduce risk for debt investors and improve debt financing conditions and therefore might increase leverage. In general, assets growth could be funded through additional debt if internal financing sources are not sufficient. With regard to dividends, growing companies with additional investment opportunities should be less likely to distribute profits to their shareholders but should reinvest them instead.

Profitability is also likely to have a negative impact on leverage as very profitable firms can more easily use retained earnings to finance their business activity. At the same time companies might have more leeway to distribute profits to shareholders after an increase in their profitability.

Furthermore, the financial structure of banks might be influenced by the overall macroeconomic environment. The expected effect of economic growth is not clear. Higher growth might have a positive impact on leverage as banks have more business opportunities and the risk perceived by investors might be lower. On the other hand, the effect on leverage might be negative as in a positive economic environment fewer write-offs should hit capital. For inflation we expect a negative effect on leverage as in times of higher inflation debt financing conditions become more difficult.

Lastly, for non-financial companies, the tangibility and the collateral value of assets have been found to influence leverage positively as those factors reduce the risk of debt investors.

3. Data

Our data sample contains statutory corporate income tax rates, bank financials, economic indicators, and country-specific capital stringency and governance indices for the sample period 1997 to 2011.

To identify tax rate changes, we collected and combined information from three different sources to build a comprehensive database on statutory corporate income tax (CIT) rates by country.[16] For the countries in the EU27, and for the seven most relevant OECD countries and Russia, we used data compiled by the Directorate-General for Taxation and Customs Union of the European Commission. For emerging countries we obtain statutory tax rates from the "Database on Effective Corporate Income Tax Rates in Emerging Economies" of the Fiscal Affairs Department (FAD) of the International Monetary Fund (Ali Abbas et al. (2012)). Remaining gaps have been filled with information from different issues of KPMG's Corporate and Indirect Tax Survey[17].

All bank specific financial information came from the BankScope database. To our knowledge, BankScope is the only database that provides such information for a broad range of banks worldwide. As corporate entities and business operations are subject to taxation at the national level and not at the group level, we use the information from unconsolidated financial statements. Due to the very limited availability of quarterly information, the analysis is based solely on data from annual financial statements.[18]

All variables regarding country-specific banking regulation were based on the Banking Regulation and Supervision Database of the World Bank which contains results from four surveys conducted between 1998 and 2012 (Barth, Caprio, and Levine (2001); Barth, Caprio, and Levine (2008); Barth, Caprio, and Levine (2012)). The database covers the years 1999, 2002, 2005, and 2010. Similarly to other studies (for example Gu, de Mooij, and Poghosyan (2012)), we matched the most suitable data point available to the years not covered. For a detailed description please refer to Table 2.

The Governance Efficiency Index was taken from the "Worldwide Governance Indicators" (WGI) Kaufmann, Kraay, and Mastruzzi (2007) made available through the World Bank.

As economic indicators we employed the gross domestic product (GDP) as well as the Consumer Price Index (CPI). Both are obtained as country-specific time-series from the World Bank.

All financial values were denominated in Euro and deflated based on the harmonised Consumer Price Index for the Euro Area as published by the OECD.

The starting point was a dataset containing all observations of unconsolidated financials from BankScope (Updates No. 1262 and No. 1268) for banks from 87 countries (see Table 1) for the period between 1997 and 2011. Following Keen and de Mooij (2012) we eliminate all bank-year observations for which the activity status is not "active", as banks in liquidation are not the focus of our analysis and could bias our results. We only kept observations for Commercial, Cooperative, and Savings Banks excluding other financial institutions. Next we dropped all observations for which values for Total Assets, Equity or

[16] We are grateful to Alexander Klemm for providing CIT tax reform data from emerging and developing economies taken from his work. See Ali Abbas et al. (2012).
[17] This report also has been the primary source for statutory tax rates in previous research, for example in Keen and de Mooij (2012) and Gu, de Mooij, and Poghosyan (2012)
[18] We are aware of the fact that unconsolidated balance sheets reported by companies are not necessarily identical with those submitted for tax purposes, but we regard them as the best available proxy.

Leverage were missing or below zero or for which no statutory corporate tax rate is available. Finally we eliminated potential outliers with year-on-year assets growth of more (less) than +50% (-50%), leverage growth of more (less) than +30% (-30%), and a return on assets of more (less) than +20% (-20%). We ended up with a sample of 134,841 bank-year observations from 87 countries. As we incorporated up to four lags of the tax rate change variable, we could effectively use around 112,000 observations from 2002 onwards in our regressions.

For the analysis of the impact of tax rate changes on the dividend pay-out policy, we further restricted the sample to observations where the item dividends paid was not missing and not below zero. We excluded observations where the dividends to total equity ratio was above one. When analysing the effect of tax rate changes on the propensity to pay a dividend we excluded all banks that did not change their payment behaviour throughout the sample period, namely those that always paid a dividend or that never paid a dividend. For analysing the propensity to cut the dividend pay-out ratio as a reaction to tax rate changes we only included observations where the bank has changed the absolute dividend payment compared to the previous period as only in those cases could we plausibly assume an active decision regarding the dividend payment.

- Insert Table 1 here -

In the data sample we observed 203 reductions and 44 increases of the statutory CIT, with reductions on average significantly higher than increases. Between 1998 and 2011 the average statutory CIT was decreasing from about 45% to 35%. Within the same period the average leverage of the banks in the sample decreased by 3.4 pp to 88.8 pp in 2011. An overview of the descriptive statistics for the sample is provided in Table 3.

- Insert Table 2 here -

- Insert Table 3 here -

4. Estimation approach

4.1 Tax effect on capital structure

The goal was to identify short-run effects of reforms of corporate income taxation that are associated with changes in the tax burden on the capital structure of banks. More specifically, we try to measure whether banks that face a change of the statutory CIT rate, adjust their capital structure significantly differently from all other banks that have not faced such a change and whether banks react more strongly the higher the tax rate change. To do this, we exploited the high number of tax rate changes in our sample which are distributed rather evenly across years and countries. We first estimated the following linear regression model.

$$
\begin{aligned}
\Delta\,(Capital\ Structure)_{it} &= \Delta Tax\ Rate_{ct} + \Delta Tax\ rate_{ct-1} + \Delta Tax\ Rate_{ct-2} + \Delta Tax\ Rate_{ct-3} \\
&+ \Delta Tax\ Rate_{ct-4} + \Delta \log(Total\ Assets)_{it} + \Delta(\log(Total\ Assets))^2{}_{it} \\
&+ \Delta Pretax\ ROA_{it} + \Delta \log(GDP)_{ct} + \Delta CPI_{ct} + \Delta(Minimum\ Capital\ Requirement)_{ct} \\
&+ \Delta(Capital\ Stringency\ Index)_{ct} + \Delta(Existence\ of\ Deposit\ Insurance)_{ct} \\
&+ \Delta(Government\ \ Effectiveness\ Index)_{ct} + \delta_i + \delta_t + \varepsilon_{it}
\end{aligned}
$$

The dependent variable is the year-on-year change of the capital structure of bank *i* in country *c* in year *t*.[19] The capital structure is measured by the leverage ratio[20]. It is defined as the book value of liabilities to total assets, multiplied by 100 to obtain pp. We only use book values to calculate leverage as market-based values were not available for the majority of banks in our sample on the level of unconsolidated entities. This approach is justified given that Gropp and Heider (2009) have shown that market and book based values yield comparable results.

As we also used first-differences for all further independent variables, we measured the immediate impact of changes in the explanatory variables on changes in the capital structure.

The year-on-year change of the statutory corporate tax rate was our main independent variable of interest. It is only different from zero in years with a tax reform that changes the statutory rate. This means that banks were assigned to the treatment group in the years where the statutory CIT rate they faced changes (and for subsequent years with regard to the lagged tax rate change variables described below) and were part of the control group in years where their tax rate did not change. The fact that the same banks over time can be in the control and the treatment group with regard to the estimation of the marginal effect of tax rate changes strengthens our underlying assumption that both groups are similar except for the change in the statutory CIT rate.

However, the reaction of the capital structure to changes in corporate taxation might not happen immediately. Therefore, lagged values of the tax rate changes were included in our model. As we were measuring the effect of a tax rate change on the change in leverage, we could assume that the coefficients of the lagged independent variables should eventually converge to zero and the use of a finite distributed lag model was justified. Regarding the number of lags, we found that the fourth lag was the first not to have a statistically significant coefficient. Therefore the first to the fourth lag of the tax rate change variable were included in the estimation. In all cases, the tax rate change variable was calculated by subtracting the respective rate of the previous year from the rate of the specified time period.

A common problem in distributed lag models is potential multicollinearity between the lagged independent variables[21]. Although, in the setting here the problem should have been less severe as the tax rate change variable was not invariant, we also ran the regression including each of the lags separately.

Statutory corporate income tax rates (CIT) served as a proxy for the tax burden of corporate profits.[22] To strengthen our evidence we later divided the sample into groups of banks that were expected to face a higher or lower effective tax load based on observable characteristics.

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[19] Givoly et al. (1992) also use the year-on-year difference of the leverage as the dependent variable.

[20] We also run robustness checks with using the capital buffer, defined as total book value of equity divided by total assets minus the minimum regulatory capital requirement (the minimum capital requirement is taken from Banking Regulation and Supervision Database of The World Bank (Barth, Caprio, and Levine (2001); Barth, Caprio, and Levine (2008); Barth, Caprio, and Levine (2012)) and obtained qualitatively similar results.

[21] See Kennedy (2008), p. 208.

[22] We acknowledge that this proxy does not capture changes in the tax base. However, this is not a major problem in this case since the value of the interest deduction is determined by the statutory tax rate unless interest deductions are limited by other tax rules such as thin-capitalisation rules or interest barriers. The inclusion of taxation on the investor level is difficult, especially in an international setting with cross-border investments, and remains a challenge for future research.

Relying on first differences eliminates any time-invariant country- or bank-specific effects. To control for time effects in the most unrestricted way we also included a full set of time dummies with the dummy for 2011 omitted as the base case to avoid perfect collinearity.

Furthermore, we directly controlled for factors that vary over time and might have an influence on the capital structure by including additional variables. As a proxy for size, the natural logarithm of total assets was used. Since we expected a non-linear relationship we also add the squared value in the model. Profitability was measured by the return on assets before taxes.[23] To control for the economic environment the changes of the natural logarithm of the country-specific consumer price index and the natural logarithm of the real GDP in constant U.S. dollars are included.

To cover changes in the regulatory environment and changes in the effectiveness of institutions, we included the regulatory minimum capital requirement for banks in a specific country, the capital stringency indicator (Ongena, Popov, and Udell (2013)), a dummy variable indicating the existence of a deposit insurance scheme (Gu, de Mooij, and Poghosyan (2012)), and the government efficiency index.

All standard errors were clustered at the country-level to account for potential correlation of errors within clusters and especially for any serial autocorrelation of errors within clusters (see Petersen (2009) for clustering of standard errors).[24]

In addition to time-invariant fixed effects on the firm- or country level for which we controlled through first differencing, a common trend in the changes of the capital structure over time that might be induced by factors other than taxes which are not yet controlled for might be a concern. If the trend was common to all countries in a similar way, we already controlled for it by including year dummies. If there was a non-tax-induced trend of de-levering especially in countries that experience tax rate cuts, we might exaggerate the effect of tax rate changes. To account for such common trends we included bank-level, country-level, or regional-level dummies that were not differenced as robustness checks. The dummies absorbed a constant long-term trend of changes of the dependent variable. Unfortunately, at the same time they were likely to absorb at least some part of the potentially sluggish tax-related adjustments of the capital structure.

A method commonly used in the capital structure literature is the partial adjustment model (Flannery and Rangan (2006); Gropp and Heider (2009); Keen and de Mooij (2012)), where the lagged dependent variable is included on the right side of the model. In this model the coefficient of the independent variables reflects the short-term impact on the banks' capital structure. The coefficient of the lagged dependent variable is equal to (1-λ), where λ is the adjustment rate of the capital structure towards the target level. The long-term effect of the other variables can be calculated by dividing the short-term coefficients by the adjustment rate Flannery and Rangan (2006). As a robustness check we estimated the

[23] We are aware that the profit before taxes might comprise an endogeneity problem because it is affected by the leverage via interest expenses. Furthermore, we think that the profit before interest and taxes is not meaningful in the case of financial institutions. Therefore, we run all regressions without including the profitability variable and obtain similar results.

[24] Keen and de Mooij (2012) also cluster at the country level. Buettner et al. (2012) cluster at the level of country-year cells. However, this clustering does not allow for serial correlation, which is likely in our setting. Therefore, we chose the more robust approach and cluster at the country level. Gropp and Heider (2009) cluster at the bank level. However, as we aim to identify the effect of country-wide shocks caused by the change of statutory tax rates we want to allow correlation of errors at the country level. In this context it should be noticed that clustering on the country level includes clustering at the bank level.

following partial adjustment model with bank and time fixed effects. Standard errors again were clustered on the country level.

$$
\begin{aligned}
Capital\ Structure_{it} &= Capital\ Structure_{it-1} + Tax\ Rate_{ct} + \log(Total\ Assets)_{it} \\
&+ (\log(Total\ Assets))^2{}_{it} + Pretax\ ROA_{it} + GDP\ Growth_{ct} + Inflation_{ct} \\
&+ Minimum\ Capital\ Requirement_{ct} + Capital\ Stringency\ Index_{ct} \\
&+ Existence\ of\ Deposit\ Insurance_{ct} + Government\ Effectiveness\ Index_{ct} + \delta_i \\
&+ \delta_t + \varepsilon_{it}
\end{aligned}
$$

As in such a case a fixed-effect or first-difference OLS suffers from an endogeneity problem Wooldridge (2002)[25], we also estimated the model using a GMM estimator with instruments as originally proposed by Arellano and Bond (1991) and refined by Blundell and Bond (1998)[26]. In line with Gu, de Mooij, and Poghosyan (2012) we found that results were very sensitive to the choice of instruments and model specifications. For this reason, we stuck to the more robust non-endogenous OLS-model discussed above. While this approach only covers the short-term impact of tax rate changes on the leverage, it had the important advantage of not relying on too many technical assumptions to provide unbiased results.

4.2 Tax effect on dividend policy

To estimate the effect of tax rate changes on the dividend policy we first employed a logit model that measured the effect of tax rate changes on the propensity to pay a dividend. The dependent variable was a dummy equalling one in case bank *i* pays a dividend in year t and zero otherwise. As we wanted to reveal active capital management of banks around the tax reform, in addition to the current change of the statutory tax rate, we included the leading value and the lag of that variable. In addition to the year-on-year change of the tax rate we also used a dummy variable equalling one for reductions of the statutory CIT by at least one percentage point. Furthermore, we included controls that have been shown to have an impact on the propensity to pay dividends (Denis and Osobov (2008); Ferris, Sen, and Yui (2006); Renneboog and Trojanowski (2005)), namely the natural logarithm of total assets as a proxy for size, total asset growth as a proxy for profitable internal investment opportunities[27], as well as pre-tax ROA as a proxy for profitability and the change in the pre-tax ROA to capture profitability shocks.[28] In addition, we added the change of the country-specific consumer prices index and the change in the natural logarithm of the country's GDP to control for the economic environment. Lastly, we included changes in our regulatory variables as these might also influence dividend payment policy.

[25] An explanation why an unobserved effects model with lagged dependent variable lacks strict exogeneity can be found on pages 255-256.

[26] Roodman (2009) gives a thorough introduction of performing such an estimation using the *xtabond2* command in Stata.

[27] Other studies (e.g. Fama and French (2001)) also used the market to book ratio or Tobin's Q, but as most of the entities we looked at are not listed total asset growth is the best proxy available

[28] Some studies (e.g. Fenn and Liang (2001); Hu and Kumar (2004); Renneboog and Trojanowski (2005); Sharma (2011)) also used the leverage as an independent variable as a proxy for financial flexibility. However, in our opinion this variable might cause endogeneity problems as dividend payments directly influence the leverage. Therefore, we do not include this variable in our main analyses. As a robustness check we included leverage and the results did not change significantly.

$$
\begin{aligned}
&Dividend\ Payment\ Dummy_{it} \\
&\quad = \Delta\text{Tax Rate}_{\text{ct+1}} + \Delta\text{Tax Rate}_{\text{ct}} + \Delta\text{Tax Rate}_{\text{ct-1}} + \log(Total\ Assets)_{it} \\
&\quad + Total\ Assets\ Growth_{it} + Pretax\ ROA_{it} + \Delta Pretax\ ROA_{it} + \Delta \log(GDP)_{ct} \\
&\quad + \Delta CPI_{ct} + \Delta(Minimum\ Capital\ Requirement)_{ct} \\
&\quad + \Delta(Capital\ Stringency\ Index)_{ct} + \Delta(Existence\ of\ Deposit\ Insurance)_{ct} \\
&\quad + \Delta(Government\ \ Effectiveness\ Index)_{ct} + \delta_c + \delta_t + \varepsilon_{it}
\end{aligned}
$$

To analyse the adjustments of dividend paying banks, we made use of a second logit model that estimated the propensity to decrease dividends in response to a tax rate change. The dependent variable was a dividend pay-out reduction dummy equalling one if the ratio of the dividends paid divided to net income of the same period (dividend pay-out ratio, Gwilym et al. (2006); Jagannathan, Stephens, and Weisbach (2000)) was smaller than in the previous year. All independent variables remained the same. As noted in the data section, for this analysis we only consider observations where the bank had actively adjusted their absolute dividend payments compared to the previous period.

$$
\begin{aligned}
&Dividend\ Payout\ Reduction\ Dummy_{it} \\
&\quad = \Delta\text{Tax Rate}_{\text{ct+1}} + \Delta\text{Tax Rate}_{\text{ct}} + \Delta\text{Tax Rate}_{\text{ct-1}} + \log(Total\ Assets)_{it} \\
&\quad + Total\ Assets\ Growth_{it} + Pretax\ ROA_{it} + \Delta Pretax\ ROA_{it} + \Delta \log(GDP)_{ct} \\
&\quad + \Delta CPI_{ct} + \Delta(Minimum\ Capital\ Requirement)_{ct} \\
&\quad + \Delta(Capital\ Stringency\ Index)_{ct} + \Delta(Existence\ of\ Deposit\ Insurance)_{ct} \\
&\quad + \Delta(Government\ \ Effectiveness\ Index)_{ct} + \delta_c + \delta_t + \varepsilon_{it}
\end{aligned}
$$

In all cases we accounted for country and year fixed affects and cluster at the country level. As robustness checks we ran the regressions with firm fixed effects instead of country fixed effects as well as without fixed effects.

Like for models analysing changes in the capital structure, some researchers have proposed to include a lagged dependent variable in the model (e.g. Fama and Harvey (1968); Lintner (1956)) also for models explaining dividend pay-outs . This might also have improved the predictive power in our model. However, models that include lagged dependent variables and account for fixed effects do not usually fulfil the strict exogeneity conditions required to justify the use of standard logit estimators[29] resulting in a potential bias. As described above, potentially unbiased GMM estimators are very sensitive to the choice of instruments and model specifications. Therefore, we decided not to include lagged dependent variables.

4.3 Tax effect on loan loss reserve

The last regression model we ran was also similar to our initial capital structure model. This time the dependent variable was the year-on-year change of the natural logarithm of the loan loss reserve divided by total assets is. We used this measure as a proxy for earnings management.[30] In this model we omitted

[29] See for example Wooldridge (2002) p. 489

[30] Of course, tax induced management of loan-loss reserves can only be expected in case those loan loss reserves are allowed for tax purposes. The tax treatment seems to differ significantly across countries but the loan loss reserves

the profitability variable due to severe concerns about endogeneity between changes of the loan loss reserve and profits.

$$\begin{aligned}\Delta\,(\log(\text{Loan Loss Reserve/Total Assets}))_{it} \\ = \Delta\text{Tax Rate}_{ct+1} + \Delta\text{Tax Rate}_{ct} + \Delta\text{Tax Rate}_{ct-1} + \Delta\log(\text{Total Assets})_{it} \\ + \Delta\log(\text{GDP})_{ct} + \Delta\text{CPI}_{ct} + \Delta(\text{Minimum Capital Requirement})_{ct} \\ + \Delta(\text{Capital Stringency Index})_{ct} + \Delta(\text{Existence of Deposit Insurance})_{ct} \\ + \Delta(\text{Government Effectiveness Index})_{ct} + \delta_i + \delta_t + \varepsilon_{it}\end{aligned}$$

A detailed overview of the variable definition can be found in Table 2.

5 Results

5.1 The Effect of Tax Rate Changes on Capital Structure

- Insert Table 4 here -

In Table 4 we report our results for the impact of tax rate changes on the adjustment of the capital structure. In all model specifications the year-on-year change of the total leverage ratio was the dependent variable.

In column I we only included the changes of the statutory tax rate as the independent variable. As described earlier, we expected a sluggish adjustment of the capital structure and therefore included up to four lags of the tax rate change variable.

The results show that the adjusted R-squared of the tax variable alone is very low. This is in line with the general perception that capital structures are affected by a variety of non-tax factors and that taxes play a limited role only. Given the high noise from other factors not accounted for in this initial model, it is not surprising that we could not identify a systematic significant impact of the tax rate changes.

To increase the efficiency of our model in column II we added the growth of total assets and its squared value. We now found a significant impact of the tax rate changes with the expected sign for the first to the third lag. In the three years after a tax rate raise a bank increases its leverage. The coefficient for the fourth lag was small and statistically insignificant supporting our assumption that the coefficient of the tax rate change was converging to zero over time.

The change of the natural logarithm of total assets accounted for a substantial part of the variability in the change of the leverage ratio as it increased the adjusted R-squared to 0.133 and had the expected positive coefficient. This confirmed our expectation that growing banks increase their leverage. Given the negative sign on the squared term this effect seemed to be non-linear.
In our next model specifications, we added additional controls for the macroeconomic environment as well as for the quality of financial regulation and government efficiency in the respective countries.

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have at least some tax effect in most countries. Sunley (2003) gives a good overview of the tax treatment of loan loss reserves around the world.

Our main results remained robust. We still found a significant adjustment of the leverage for three years after a tax rate change. A tax rate increase of 10 pp would result in an increase of leverage of 1.04 pp.[31] Proportionately to the average leverage ratio of the banks in our sample this would mean a relative increase in leverage of about 1.17%, but in relation to the equity ratio it would mean a notable relative decrease of 9.7% of equity.

An increase in profitability led to a significant reduction of the leverage. Profitable banks do not distribute their profits to shareholders immediately and might prefer to conveniently use their internal refinancing potential instead of issuing debt[32]. In times of decreasing profitability (crisis) leverage might go up significantly as dividends are not cut or new equity is not issued immediately. Economic growth had a negative but not significant effect on leverage, reflecting two contrary potential effects. In good economic conditions banks' capital is less strained by revaluation losses etc., on the other hand investors usually provide debt financing much more easily in those times. In bad economic times equity is stressed by losses from revaluations but investors force banks to de-lever and repair their balance sheets. Inflation had a significantly negative short-term effect on leverage. This was in line with our hypothesis that higher inflation leads to insecurity and less favourable conditions in the debt markets. The controls for changes in the regulatory environment did not show a significant short-term impact on leverage.

To account for potential problems due to multicollinearity between the lagged values of our tax reform variable we also included each of them separately (columns IV to VIII)[33]. Our results still held.

In some regressions the variable reflecting the change of the capital stringency index showed a weakly significant positive effect, implying that leverage increases when capital stringency in a country increases. This seems spurious but might be explained by the fact that the variable has not much within variation over time and that in countries with improving banking regulation debt investors might become more confident and start to accept higher levels of leverage.

In some regressions, the coefficient of the deposit insurance dummy had a weakly significant negative effect on leverage. This probably reflects the fact that the provider of deposit insurance usually requires and enforces more comfortable capitalisation levels.

Finally, we included variables that captured potential long-term trends of the capital structure development at the country level (column IX) and the individual bank level (column X). These trend variables should capture at least part of the sluggish reaction of the capital structure to tax reforms. Looking at our tax reform variables the effect measured became smaller but still remained statistically significant.

- Insert Table 5 -

The results of the partial adjustment model largely confirm the signs the effects previously identified. In columns I and II the magnitude of the tax effect were considerably lower. However, we have to take into account that both models might suffer problems. Not taking into account the lagged dependent variable

[31] We calculated the long-run propensity by adding up the coefficients on current and lagged variables as described by Wooldridge (2008).
[32] This can be interpreted in line with the pecking-order-theory of corporate financing decisions Myers (1984).
[33] Since the effective sample period would change depending on which lags we included, in all regression in Table 4 and Table 5 we chose 2002 as the start of the sample, the first period for which we could include the four lags of our initial model specification.

in column I might result in an omitted variable bias, whereas an estimation of the partial adjustment model with bank fixed effects potentially suffers from endogeneity. The estimation of the partial adjustment model with the GMM estimator, although susceptible to changes in the actual specification of the estimation parameters[34], largely confirmed the magnitude of our previous findings. According to the coefficients, a tax rate increase of 10 pp that would result in an increase of leverage of 0.27 pp in the short-run and of 1.04 pp in the long-run, with a theoretical adjustment period 3.85 years. We thereby conclude that our base model is good in capturing most of the effect of tax rate changes on the banks' capital structure.

We found significant tax effects but it should to be noted that our results were considerably lower than those in previous studies. Keen and de Mooij (2012) found that a 10 pp increase in the tax rate leads to an increase in leverage of about 1.8 pp in the short run and about 2.7 pp in the long run. This difference might be due to the fact that we looked at a longer time horizon and used about twice the number of observations. Gu, de Mooij, and Poghosyan (2012) found that a 10 pp increase in the tax rate led to an increase in leverage of about 2.5 pp.[35] As they used only about 4000 observations our bigger sample might again be the reason for the diverging results.

- Insert Table 6 -

We made hypotheses that different groups of banks should react differently with regard to adjusting their capital structure after a tax reform. To test these we included an interaction term of the tax reform variable with different group dummies that separated different kinds of banks. As our previous analyses have shown that the most significant effect of a tax rate change could be observed one year after that change we simply interacted the lagged tax rate change variable so as to avoid too much complexity.

The results in Table 5 to a large extend confirmed our hypotheses. Banks with a loss carry-forward and banks in countries with lower average effective tax rates react less on tax reforms. The individual value of their debt tax shields might be less affected by changes in the statutory tax rate as those banks can use alternative non-debt tax shields (in particular the loss carry-forwards or alternative tax planning schemes). Smaller banks react more strongly than larger banks as the latter might be able benefit more heavily from international tax planning schemes not affecting the capital structure and therefore might be less sensitive to domestic tax rates. Capital tight banks are less sensitive to tax rate changes which in line with the notion that they have less leeway with regard to their financial decisions. The capital requirement does not seem to have a significant impact on the sensitivity of the capital structure to tax rate changes. Columns 6 and 7 show that banks in countries with higher government effectiveness and higher capital stringency react more strongly to tax rate changes. At first sight, that might seem spurious as one would expect that the higher government effectiveness and higher capital stringency would limit the adjustment of the capital structure as capital regulation should be more binding. However, in countries with better institutions the enforcement of the tax payments might be stronger so that taxes are more relevant and as most of the tax reforms in our sample involve tax rate reductions in most cases the adjustment is a decrease of leverage that is not restricted by tighter capital regulation. Furthermore, in countries with better institutions it might be more costly for banks to fall below the capital level

[34] As the Arellano-Bond test for autocorrelation Arellano and Bond (1991) indicates autocorrelation with the first lag we use the second to the fourth lags as instruments.

[35] This result is referring to their model specification with country controls but without including a variable for international tax rate differences. Including a variable measuring the international tax rate difference, they find for an increase of the tax rate by 10 pp a domestic effect on leverage of 1.6 pp and an international spillover effect of 1.8 pp holding the tax rates in all other countries constant.

required by the regulator. As a consequence banks in those countries might hold higher capital buffers[36], which react more strongly to changes in taxation.

5.2 The Effect of Tax Rate Changes on Dividend Policy and Earnings Management

- Insert Table 7 -

Panel A of Table 6 shows the analysis of the impact of tax reforms on the propensity to pay dividends. The results confirm our hypothesis that banks actively manage their capital structure in response to tax reforms. The more the tax rate is reduced in a reform the less likely it is for banks to pay a dividend in the period around the tax rate change. The results become even more significant as we replace the tax rate differential by a dummy that indicates a tax rate reduction of at least one percentage point compared with the previous period. Banks seem to adjust distributions to shareholders to achieve a new optimal level of leverage that has been shifted by the change of the tax burden.[37] The remaining coefficients have the expected sign. Ceteris paribus banks with more profitable internal investment opportunities (higher growth and a higher profitability level) are less like to pay dividends and banks that face a positive earnings shock are more likely to pay a dividend. An increase of government effectiveness seemed to have a negative impact on the propensity to pay dividends. Other regulatory changes as well as the economic conditions did not show a statistically significant impact.

The changes in the propensity to cut the dividend payout ratio are reported Panel B. Again, the results confirm our previous evidence that banks actively adjust their capital structure after a tax reform. Our regression showed that in the period after a reform the propensity to cut the payout ratio significantly increased if the tax rate has been reduced and decreased if the rate went up.

We run all logit regressions including firm fixed effects instead of country fixed effects and also without fixed effects. In both cases the results did not change significantly.

- Insert Table 8 -

Table 7 reports the results of the analyses of the impact of tax reforms on the loan loss reserve as a proxy for earnings management. As data on those reserves are only available for a limited number of banks the number of observations drops significantly. Nevertheless, the regressions suggest that banks actively manage their earnings around changes in the statutory tax rate. The effects are in line with the hypothesis that losses are more valuable as tax shields the higher the tax rate. We find evidence that banks significantly increase the loan loss reserves in anticipation of a tax rate cut, presumably to use the last chance to exploit a higher tax rate. After the change of the rate has materialised the effect is reversed. The results are robust to the inclusion of country- or bank-specific trend variables.

[36] Brewer III, Kaufman, and Wall (2008) provide empirical evidence that banks in countries that prompt corrective actions more actively, have more stringent capital requirements, and have more effective corporate governance structure hold higher capital buffers.

[37] Note that we do not account for changes in treatment of dividend taxation at the shareholder level. This will be the subject of future research.

6. Conclusion

This paper analysed the immediate reactions of leverage, dividend pay-outs and earnings management of banks to changes in the domestic statutory corporate income tax rate. We observe that banks react on CIT reforms by adjusting their debt equity ratio and dividend pay-outs after reforms, and by increasing loan loss reserves in anticipation of a tax rate decreases. These results suggest that reforms focusing on tax rate changes can have a significant impact on the financial decisions of banks in the short-run.

Different tax policy lessons can be drawn from the results above. The results suggest that the unequal treatment of debt and equity in the calculation of the corporate income tax base creates a tax advantage of debt which value depends on the level of the statutory tax rate. Therefore, when devising tax reforms, the focus should be on how the tax base is designed and how debt and equity are dealt with to avoid unequal treatment. An Allowance for Corporate Equity or a move towards a Comprehensive Business Income Tax could be considered as tax base reforms addressing the issue. Our results suggest that a reduction in the preferential treatment of debt would lead to a significant decrease in bank leverage. While tax rate changes are more visible, and for this reason can be politically more attractive in some cases, their effects on the financing structure of banks (and also of non-financial companies) should be given close attention in the absence of finance neutrality of the tax base. More generally, the issue of the debt bias should be addressed for all sectors given the potential welfare costs of high leverage in general. This issue is even more important in the regulated financial sector.

These results can also be interpreted with regard to the regulation regime within which the financial sector is operating. Regulatory capital requirements in the banking sector alone do not seem to determine the financial structure. This could be a concern for the following reason. If regulation created binding conditions for banks, the debt bias in the CIT would be very limited. However, the analysis here shows that banks capital structure reacts to taxes. This might indicate either that capital regulations have no impact or, more likely, that there exist tax-sensitive capital buffers above the regulatory level. In both cases the effect of taxation conflicts with the thrust of current regulatory reform, namely the increase in equity in the context of Basel III. While regulation tries to increase equity, tax systems at least partly counteract this measure. Our results suggest that regulators and tax authorities should not act independently, but should align their policies to meet the goal of higher equity ratios in the financial industry. Further research is necessary to better understand the interaction between taxes and regulation as well as other determinants of banks' financial decision. Future work should also address certain limitations of our paper, namely the missing information on the role of different CIT bases, the missing link to the taxation at the shareholder and household level, as well as cross-country spill-over effects of domestic tax-rate changes.

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Table 1: List of Countries covered in the Sample

Albania	Costa Rica	Hungary	Malta	Portugal	Tanzania
Australia	Croatia	Iceland	Mexico	Qatar	Thailand
Austria	Cyprus	India	Montenegro	Republic of Korea	Tunisia
Bahrain	Czech Republic	Indonesia	Mozambique	Romania	Turkey
Bangladesh	Denmark	Ireland	Netherlands	Russian Federation	Ukraine
Belarus	Ecuador	Israel	New Zealand	Serbia	United Arab Emirates
Belgium	Egypt	Italy	Nigeria	Singapore	United Kingdom
Bolivia	Estonia	Japan	Norway	Slovakia	United States of America
Botswana	Finland	Kazakhstan	Oman	Slovenia	Uruguay
Brazil	France	Kuwait	Pakistan	South Africa	Venezuela
Bulgaria	Germany	Latvia	Panama	Spain	Vietnam
Canada	Greece	Lithuania	Paraguay	Sri Lanka	Zambia
Chile	Guatemala	Luxembourg	Peru	Sweden	
China	Honduras	Macedonia	Philippines	Switzerland	
Colombia	Hong Kong	Malaysia	Poland	Taiwan	

Table 2: Description of Variables

Item	Unit	Description	Source
Tax Reform Variables			
Tax Rate	%	Statutory corporate tax rate	Tax rate information of the European Commission; Database on Effective Corporate Income Tax Rates in Emerging Economies, various issues of the KPMG's Corporate and Indirect Tax Survey
Tax Rate Reduction Dummy	Dummy	Dummy equal one if statutory tax rate decreased by at least one percentage point compared to last period	
Bank Financial Variables			
Leverage Ratio	%	(Total Liabilities / Total Assets) *100, winsorised at the 1st and 99th percentile	Bankscope
Log(Total Assets)	log(million €)	Natural logarithm of Total Assets. As all values are denominated in Euro they have been deflated based on the harmonised Consumer Price Index for the Euro Area obtained from the OECD, winsorised at the 1st and 99th percentile	Bankscope, OECD
Total Assest Growth	%	(Total Assets current period - Total Assets previous period)/Total Assets previous period, as all underlying values are denominated in Euro they have been deflated based on the harmonised Consumer Price Index for the Euro Area obtained from the OECD, winsorised at the 1st and 99th percentile	Bankscope, OECD
Pre-tax ROA	%	Pretax Operating Profit / Total Assets Gropp and Heider (2009) add back interest expenses as it depends on leverage), winsorised at the 1st and 99th percentile	Bankscope
Capital Buffer	%	((Total Equity / Total Assets) / Total Assets) - Minimum Capital Requirement) following Gu, de Mooij, and Poghosyan (2012); Keen and de Mooij (2012) use risk-weighted assets instead of total assets but that would change the sample significantly due to limited data availability, winsorised at the 1st and 99th percentile	Bankscope, Barth et al. database
Loan Loss Reserve	%	Loan Loss Reserve to Total Assets Ratio, winsorised at the 1st and 99th percentile	Bankscope
Dividend Payout Reduction Dummy	Dummy	Dummy equal one if dividend payout ratio (defined as dividends divided by net income) has been decreased compared to previous period	Bankscope
Dividend Payment Dummy	Dummy	Dummy equal one if bank pays a dividend	Bankscope
Economic Indicators			
Log(Gross Domestic Product (GDP))	Log($)	Constant 2000 US$	World Bank
Gross Domestic Product (GDP) Growth	%	Annual percentage growth rate of GDP at market prices based on constant local currency	World Bank
Consumer Price Index (CPI)	Index	Country-specific Consumer Price Index with 2005 = 100	World Bank
Inflation	%	Annual percentage growth rate of Country-specific Consumer Price Index	World Bank
Capital Regulation Variables			
Minimum Capital Requirement	%	Based on question 3.1 from Banking Regulation and Supervision Database (see Barth, Caprio, and Levine (2008)); The database only has 1999, 2002 and 2005. In our data, 1998-2001 are the same as 1999; 2002-2004 are the same as 2002; and 2005-2011 are the same as 2005 (similar to Gu, de Mooij, and Poghosyan (2012))	Barth et al. database
Capital Stringency Index	Index	Composite Index based on questions 3.1.1, 3.3 3.7, 3.9.1 3.9.2, 3.9.3, 1.5,1.6, 1.7 Banking Regulation and Supervision Database (see Barth, Caprio, and Levine (2001) for methodology, Ongena, Popov, and Udell (2013))	Barth et al. database

Existence of Deposit Insurance	Dummy	Based on questions 8.1 and 8.5 from Banking Regulation and Supervision Database (see Gu, de Mooij, and Poghosyan (2012)); The database only has 1999, 2002 and 2005. In our data, 1998-2001 are the same as 1999; 2002-2004 are the same as 2002; and 2005-2011 are the same as 2005 (similar to Gu, de Mooij, and Poghosyan (2012))	Barth et al. database
Government Efficiency Index	Index	Taken from Worldwide Governance Indicators Kaufmann, Kraay, and Mastruzzi (2007)	Worldwide Governance Indicators
Group Dummies			
Banks with Loss Carry Forward	Dummy	Dummy equal one if Tax Expense in previous period negative	
Countries with higher effective tax rate	Dummy	Dummy equal one if average country-specific effective tax rate ETR over all years above median. The ETR is measured as Tax Expenses divided by Pre-tax Profit	
Small Banks	Dummy	Dummy equal one if Total Assets below median value	
Capital Tight Banks	Dummy	Dummy equal one if Capital Buffer below median value	
Higher Minimum Capital Requirement	Dummy	Dummy equal one if Minimum Capital Requirement above 8%	
Lower Government Effectiveness	Dummy	Dummy equal one if Government Effectiveness Index below median	
Higher Capital Stringency	Dummy	Dummy equal one if Capital Stringency Index above 6	

Table 3: Descriptive Statistics

Panel A: Observations	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Obs.	2,211	2,338	8,899	9,213	9,817	9,955	10,033	9,766	11,545	11,925	12,075	12,580	12,566	11,918
Panel B: Tax Rate Changes	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Number of tax rate decreases	10.00	14.00	15.00	10.00	16.00	11.00	18.00	20.00	16.00	16.00	18.00	15.00	14.00	10.00
Number of tax rate increases	0.00	2.00	4.00	2.00	1.00	9.00	3.00	5.00	4.00	2.00	4.00	1.00	4.00	3.00
Average tax decrease (%)	-3.87	-3.64	-5.66	-3.24	-3.75	-3.54	-2.78	-3.67	-3.49	-3.38	-5.34	-2.57	-3.92	-1.53
Average tax increase (%)	-	0.36	1.24	0.71	0.06	3.40	0.36	0.55	0.69	0.16	1.68	0.33	1.25	1.22
Panel C: Variables	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Leverage (%)	92.14 (7.54)	91.87 (7.95)	90.05 (6.12)	89.99 (6.55)	89.71 (6.80)	89.65 (7.06)	89.60 (7.13)	89.75 (6.90)	89.33 (7.23)	89.11 (7.27)	89.26 (7.30)	89.07 (7.66)	88.99 (7.65)	88.77 (7.78)
Tax Rate (%)	44.97 (11.95)	42.71 (10.16)	40.06 (5.58)	38.16 (3.71)	37.82 (4.20)	37.80 (4.47)	37.44 (4.57)	37.09 (5.35)	36.70 (5.52)	36.41 (5.83)	34.69 (6.40)	34.28 (6.96)	34.29 (7.00)	34.72 (6.84)
Total Assets (million €)	3,375 (7,890)	3,570 (8,322)	1,391 (5,194)	1,439 (5,287)	1,322 (4,988)	1,251 (4,781)	1,284 (4,899)	1,436 (5,265)	1,532 (5,591)	1,585 (5,745)	1,658 (5,861)	1,710 (6,002)	1,835 (6,295)	1,953 (6,594)
Natural Log of Total Assets	6.67 (1.66)	6.67 (1.70)	5.34 (1.66)	5.43 (1.64)	5.32 (1.66)	5.21 (1.69)	5.21 (1.71)	5.36 (1.70)	5.34 (1.74)	5.31 (1.79)	5.38 (1.79)	5.39 (1.80)	5.47 (1.80)	5.51 (1.81)
Pre-tax ROA (%)	0.90 (1.56)	0.85 (1.51)	1.23 (1.12)	1.10 (1.12)	1.15 (1.19)	1.17 (1.17)	1.20 (1.13)	1.24 (1.10)	1.21 (1.14)	1.13 (1.18)	0.78 (1.38)	0.54 (1.56)	0.65 (1.42)	0.74 (1.32)
Natural Log of deflated GDP	27.20 (1.62)	27.26 (1.63)	29.15 (1.46)	29.10 (1.56)	29.06 (1.64)	29.04 (1.68)	29.03 (1.71)	29.06 (1.67)	28.90 (1.71)	28.90 (1.70)	28.84 (1.73)	28.78 (1.75)	28.83 (1.74)	28.97 (1.67)
CPI	86.53 (12.00)	87.97 (10.66)	89.20 (5.87)	91.38 (4.99)	92.77 (4.03)	94.72 (2.77)	97.08 (1.62)	100.00 (0.00)	102.93 (1.69)	106.03 (3.72)	111.04 (7.73)	112.54 (12.15)	114.98 (14.76)	118.78 (17.49)
Delta Minimum Capital Requirement (%)	8.16 (0.66)	8.16 (0.64)	8.05 (0.36)	8.06 (0.40)	8.08 (0.72)	8.08 (0.72)	8.08 (0.71)	8.09 (0.47)	8.12 (0.55)	8.15 (0.59)	8.19 (0.66)	8.20 (0.65)	8.21 (0.73)	8.20 (0.70)
Delta Capital Stringency Index	6.03 (0.95)	6.03 (0.93)	6.05 (0.55)	6.04 (0.58)	5.99 (0.77)	5.99 (0.77)	6.00 (0.78)	6.15 (0.71)	6.11 (0.92)	6.13 (0.95)	6.15 (0.98)	6.18 (1.00)	6.18 (0.99)	6.18 (0.93)
Introduction of Deposit Insurance	0.89 (0.32)	0.89 (0.31)	0.97 (0.18)	0.96 (0.20)	0.97 (0.16)	0.97 (0.17)	0.97 (0.17)	0.98 (0.13)	0.98 (0.15)	0.98 (0.15)	0.97 (0.16)	0.98 (0.14)	0.98 (0.13)	0.98 (0.13)
Delta Government Efficiency Index	1.46 (0.81)	1.47 (0.80)	1.70 (0.48)	1.69 (0.50)	1.55 (0.50)	1.46 (0.47)	1.63 (0.53)	1.48 (0.43)	1.40 (0.54)	1.39 (0.60)	1.31 (0.61)	1.22 (0.59)	1.25 (0.59)	1.23 (0.57)

Table 4 Effect of Tax Reforms on Leverage

	Delta Total Liabilities / Total Assets									
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
Tax Reform Variables										
Delta Tax Rate	0.041*	0.026	0.006	0.003					-0.013	-0.009
	(1.673)	(0.992)	(0.359)	(0.161)					(-0.597)	(-0.371)
First Lag of Delta Tax Rate	0.017*	0.036***	0.034***		0.035***				0.018***	0.018***
	(1.688)	(4.228)	(4.957)		(4.142)				(2.922)	(2.770)
Second Lag of Delta Tax Rate	0.004	0.030**	0.031**			0.029**			0.013	0.016*
	(0.336)	(2.373)	(2.154)			(2.078)			(1.217)	(1.740)
Third Lag of Delta Tax Rate	0.011	0.019***	0.027***				0.028***		0.015*	0.018**
	(1.208)	(2.645)	(3.107)				(3.370)		(1.919)	(2.284)
Fourth Lag of Delta Tax Rate	0.014**	-0.002	0.006					0.010	-0.007	-0.005
	(2.175)	(-0.117)	(0.496)					(0.909)	(-0.434)	(-0.353)
Bank Financial Variables										
Delta Natural Log of Total Assets		10.126***	10.502***	10.359***	10.407***	10.436***	10.403***	10.359***	10.509***	9.753***
		(5.239)	(5.198)	(5.125)	(5.115)	(5.125)	(5.114)	(5.062)	(5.115)	(5.121)
Delta Squared Natural Log of Total Assets		-0.443***	-0.449***	-0.443***	-0.444***	-0.447***	-0.445***	-0.443***	-0.441***	-0.381***
		(-3.764)	(-3.638)	(-3.633)	(-3.580)	(-3.625)	(-3.614)	(-3.576)	(-3.529)	(-3.106)
Delta Pre-tax ROA			-0.390***	-0.389***	-0.389***	-0.390***	-0.390***	-0.389***	-0.392***	-0.393***
			(-7.991)	(-7.974)	(-7.879)	(-7.974)	(-7.950)	(-7.932)	(-7.808)	(-9.462)
Economic Indicators										
Delta Natural Log of deflated GDP			-2.177	-1.405	-1.730	-1.626	-1.565	-1.533	1.652	1.773
			(-0.978)	(-0.578)	(-0.744)	(-0.691)	(-0.672)	(-0.629)	(0.590)	(0.632)
Delta Consumer Price Index			-0.060***	-0.061***	-0.060***	-0.060***	-0.062***	-0.061***	-0.042*	-0.049**
			(-3.048)	(-3.051)	(-2.943)	(-3.064)	(-3.021)	(-3.008)	(-1.922)	(-2.313)
Capital Regulation Variables										
Delta Minimum Capital Requirement			0.106	0.105	0.089	0.118	0.111	0.104	0.041	0.051
			(1.473)	(1.533)	(1.294)	(1.619)	(1.646)	(1.499)	(0.534)	(0.601)
Delta Capital Stringency Index			0.152	0.159*	0.160*	0.153*	0.157*	0.169*	0.190*	0.182*
			(1.609)	(1.775)	(1.776)	(1.678)	(1.777)	(1.778)	(1.818)	(1.834)
Introduction of Deposit Insurance			-0.294	-0.287*	-0.318*	-0.257	-0.292*	-0.299*	-0.169	-0.195
			(-1.628)	(-1.674)	(-1.777)	(-1.533)	(-1.664)	(-1.704)	(-0.912)	(-1.048)
Delta Government Efficiency Index			-0.023	0.036	0.122	-0.135	0.057	0.064	0.223	0.208
			(-0.083)	(0.090)	(0.296)	(-0.446)	(0.147)	(0.162)	(0.769)	(0.757)
Constant	-0.023	-0.028	0.161***	0.104	0.124**	0.115*	0.124**	0.111	-0.966***	0.043
	(-0.807)	(-0.522)	(3.496)	(1.470)	(2.033)	(1.880)	(2.079)	(1.546)	(-4.508)	(0.559)
Adjusted R-Squared	0.006	0.133	0.184	0.181	0.182	0.182	0.182	0.181	0.191	0.184
Observations	110,833	110,833	110,833	110,833	110,833	110,833	110,833	110,833	110,833	110,833
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Trend Fixed Effects	No	No	No	No	No	No	No	No	Yes	No
Bank Trend Fixed Effects	No	No	No	No	No	No	No	No	No	Yes
Clustered by	Country	Country	Country	Country	Country	Country	Country	Country	Country	Country

Table 5 Effect of Tax Reforms on Leverage (Partial Adjustment Model)

	Total Liabilities / Total Assets		
	I.	II.	III.
	OLS	OLS	GMM
Lagged Dependent Variable			
First Lag of (Total Liabilities / Total Assets)		0.710***	0.740***
		(39.242)	(8.715)
Tax Variable			
Tax Rate	0.038***	0.015**	0.027**
	(3.176)	(2.503)	(1.991)
Bank Financial Variables			
Natural Log of Total Assets	6.317***	2.139***	1.233**
	(4.801)	(3.091)	(2.500)
Squared Natural Log of Total Assets	-0.311***	-0.100***	-0.077**
	(-4.488)	(-2.647)	(-2.451)
Pre-tax ROA	-0.554***	-0.476***	-1.374***
	(-6.873)	(-10.435)	(-3.983)
Economic Indicators			
GDP Growth	0.005	0.040	0.093***
	(0.134)	(1.089)	(2.755)
Inflation	-0.008	-0.016	0.019
	(-0.183)	(-0.712)	(0.607)
Capital Regulation Variables			
Minimum Capital Requirement	-0.168	-0.007	0.106
	(-0.929)	(-0.080)	(1.003)
Capital Stringency Index	0.000	-0.010	0.016
	(0.002)	(-0.377)	(0.353)
Deposit Insurance Dummy	0.641	-0.018	-0.096
	(1.486)	(-0.129)	(-0.451)
Government Efficiency Index	0.317	0.238	0.300
	(0.553)	(0.795)	(1.488)
Constant	65.911***	17.617***	17.755***
	(13.158)	(9.433)	(3.163)
Adjusted R-Squared	0.145	0.623	-
Observations	133,252	133,252	133,252
Time Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Clustered by	Country	Country	Country
Arellano-Bond test for autocorrelation (1)			0.000
Arellano-Bond test for autocorrelation (2)			0.316
Arellano-Bond test for autocorrelation (3)			0.948
Arellano-Bond test for autocorrelation (4)			0.690
Hansen-p			0.620
Long-run impact of Tax Rate		0.051	0.104
Clustered by	Country	Country	Country

Table 6 Effect of Tax on different Groups of Banks

	Delta Total Liabilities / Total Assets						
	I.	II.	III.	IV.	V.	VI.	VII.
	Dummy= Banks with Loss Carry Forward	Dummy= Countries with higher effective tax rate	Dummy= Small Banks	Dummy= Capital Tight Banks	Dummy= Higher Minimum Capital Requirement	Dummy= Lower Government Effectiveness	Dummy= Higher Capital Stringency
Tax Reform Variables							
First Lag of Delta Tax Rate	0.034***	-0.009	0.034***	0.096***	0.035***	0.044***	0.033***
	(4.693)	(-0.447)	(3.958)	(5.824)	(3.989)	(4.855)	(4.482)
First Lag of Delta Tax Rate x Group Dummy	-0.016**	0.047**	0.004**	-0.075***	0.004	-0.025***	0.012**
	(-2.178)	(2.061)	(2.312)	(-4.378)	(0.306)	(-3.006)	(2.510)
Delta Group Dummy (if it has variation)	0.730**			4.095***		0.827***	
	(2.519)			(6.353)		(2.818)	
Bank Financial Variables							
Delta Natural Log of Total Assets	9.458***	10.417***	10.438***	9.679***	10.406***	10.470***	10.499***
	(4.531)	(5.110)	(5.093)	(4.687)	(5.127)	(5.112)	(5.138)
Delta Squared Natural Log of Total Assets	-0.386***	-0.445***	-0.444***	-0.431***	-0.444***	-0.446***	-0.450***
	(-3.016)	(-3.577)	(-3.569)	(-3.353)	(-3.588)	(-3.601)	(-3.607)
Delta Pre-tax ROA	-0.397***	-0.389***	-0.389***	-0.339***	-0.389***	-0.389***	-0.390***
	(-9.491)	(-7.869)	(-7.876)	(-6.376)	(-7.875)	(-7.912)	(-7.856)
Economic Indicators							
Delta Natural Log of deflated GDP	-0.586	-1.994	-1.749	-1.137	-1.743	-2.189	-1.567
	(-0.217)	(-0.848)	(-0.752)	(-0.515)	(-0.743)	(-0.963)	(-0.653)
Delta Consumer Price Index	-0.061***	-0.060***	-0.060***	-0.055***	-0.060***	-0.060***	-0.060***
	(-3.243)	(-2.927)	(-2.948)	(-3.044)	(-2.883)	(-2.886)	(-2.971)
Capital Regulation Variables							
Delta Minimum Capital Requirement	0.105	0.092	0.089	-0.105		0.091	0.102
	(1.492)	(1.346)	(1.290)	(-1.516)		(1.332)	(1.561)
Delta Capital Stringency Index	0.175*	0.160*	0.160*	0.141	0.161*	0.163*	
	(1.981)	(1.777)	(1.773)	(1.645)	(1.774)	(1.754)	
Introduction of Deposit Insurance	-0.180	-0.319*	-0.320*	-0.287*	-0.320*	-0.306*	-0.230
	(-0.980)	(-1.770)	(-1.783)	(-1.678)	(-1.797)	(-1.757)	(-1.630)
Delta Government Efficiency Index	0.116	0.117	0.122	0.142	0.119		0.062
	(0.251)	(0.282)	(0.296)	(0.369)	(0.289)		(0.164)
Constant	0.105**	0.127**	0.125**	0.120**	0.123**	0.137*	0.118*
	(2.075)	(2.085)	(2.040)	(2.096)	(2.015)	(1.933)	(1.890)
Adjusted R-Squared	0.178	0.182	0.182	0.238	0.182	0.183	0.183
Observations	105,757	110,826	110,833	110,833	110,833	110,833	110,833
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Trend Fixed Effects	No	No	No	No	No	No	No
Bank Trend Fixed Effects	No	No	No	No	No	No	No
Clustered by	Country	Country	Country	Country	Country	Country	Country

Table 7 Effect of Tax Reforms on Dividend Payout Policy

Panel A:

	LOGIT : Dividend Payment Dummy (=1 if dividend has been paid out in the current period)							
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Tax Reform Variables								
Leading Delta Tax Rate	0.151**	0.072						
	(2.332)	(1.303)						
Current Period Delta Tax Rate	0.199***		0.164**					
	(3.462)		(2.349)					
First Lag of Delta Tax Rate	0.246*			0.237				
	(1.734)			(1.318)				
Leading Tax Rate Reduction Dummy					-1.266**	-0.604		
					(-2.487)	(-1.390)		
Tax Rate Reduction Dummy					-1.168***		-0.857***	
					(-3.933)		(-4.296)	
First Lag of Tax Rate Reduction Dummy					-1.590***			-1.201***
					(-2.843)			(-2.930)
Bank Financial Variables								
Natural Log of Total Assets	-0.020	-0.021	-0.022	-0.020	-0.018	-0.021	-0.021	-0.020
	(-0.430)	(-0.464)	(-0.507)	(-0.438)	(-0.367)	(-0.460)	(-0.469)	(-0.429)
Total Assets Growth	-0.020***	-0.021***	-0.019***	-0.022***	-0.021***	-0.020***	-0.019***	-0.022***
	(-6.116)	(-6.331)	(-4.179)	(-7.853)	(-7.263)	(-6.140)	(-4.256)	(-9.062)
Pre-tax ROA	0.898***	0.903***	0.900***	0.905***	0.897***	0.901***	0.899***	0.909***
	(29.628)	(25.787)	(28.065)	(26.910)	(30.813)	(27.652)	(29.079)	(22.835)
Delta Pre-tax ROA	-0.414***	-0.413***	-0.415***	-0.413***	-0.412***	-0.412***	-0.413***	-0.415***
	(-11.408)	(-11.192)	(-11.866)	(-11.055)	(-11.049)	(-10.899)	(-11.487)	(-11.769)
Economic Indicators								
GDP Growth	10.415	19.929	19.229	11.812	-2.374	20.680	15.577	5.609
	(0.985)	(1.108)	(1.382)	(0.760)	(-0.288)	(1.033)	(1.091)	(0.533)
Inflation	0.225	0.484	0.418	0.278	0.157	0.500	0.439	0.234
	(1.328)	(1.119)	(1.214)	(1.299)	(1.008)	(1.063)	(1.133)	(1.229)
Capital Regulation Variables								
Delta Minimum Capital Requirement	-0.367	-0.189	0.133	-0.560	-0.328	-0.029	0.258	-0.301
	(-0.371)	(-0.178)	(0.107)	(-0.577)	(-0.406)	(-0.030)	(0.254)	(-0.364)
Delta Capital Stringency Index	0.970	0.882	0.921	0.959	1.349	0.904	1.042	1.028
	(1.288)	(1.409)	(1.412)	(1.360)	(1.310)	(1.401)	(1.429)	(1.311)
Introduction of Deposit Insurance	-2.094	-2.762	-2.531	-2.538	-2.280	-2.809	-2.520	-2.584
	(-0.999)	(-1.127)	(-1.112)	(-1.162)	(-0.703)	(-1.038)	(-0.988)	(-0.975)
Delta Government Efficiency Index	-4.458***	-4.107***	-4.386***	-4.653***	-3.838***	-3.756***	-5.019***	-4.120***
	(-3.005)	(-7.126)	(-5.453)	(-2.848)	(-3.302)	(-6.862)	(-4.556)	(-3.098)
Constant	-4.369**	-7.598	-6.901	-4.940*	-2.785	-7.847	-6.763	-4.125*
	(-2.113)	(-1.444)	(-1.644)	(-1.933)	(-1.586)	(-1.352)	(-1.488)	(-1.781)
Pseudo-R-Squared	0.126	0.118	0.120	0.123	0.126	0.119	0.120	0.122
Observations	33,435	33,435	33,435	33,435	33,435	33,435	33,435	33,435
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	No	No	No	No	No	No	No	No
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered by	Country	Country	Country	Country	Country	Country	Country	Country

Panel B:

	LOGIT : Dividend Payout Reduction Dummy (=1 if dividend payout ratio has been decreased compared to previous period)							
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Tax Reform Variables								
Leading Delta Tax Rate	0.004	0.011						
	(0.204)	(0.608)						
Current Period Delta Tax Rate	-0.006		0.002					
	(-0.227)		(0.071)					
First Lag of Delta Tax Rate	-0.049**			-0.048**				
	(-2.392)			(-2.506)				
Leading Tax Rate Reduction Dummy					-0.021	-0.060		
					(-0.307)	(-0.815)		
Tax Rate Reduction Dummy					0.146		0.119	
					(1.299)		(0.867)	
First Lag of Tax Rate Reduction Dummy					0.303***			0.291***
					(2.977)			(2.806)
Bank Financial Variables								
Natural Log of Total Assets	0.008	0.008	0.008	0.008	0.007	0.008	0.008	0.007
	(0.652)	(0.642)	(0.642)	(0.640)	(0.610)	(0.637)	(0.637)	(0.614)
Total Assets Growth	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***
	(2.860)	(2.741)	(2.727)	(2.875)	(3.104)	(2.744)	(2.697)	(3.124)
Pre-tax ROA	-0.046***	-0.047***	-0.047***	-0.046***	-0.045***	-0.047***	-0.046***	-0.046***
	(-2.731)	(-2.853)	(-2.850)	(-2.748)	(-2.667)	(-2.857)	(-2.777)	(-2.749)
Delta Pre-tax ROA	0.978***	0.979***	0.979***	0.978***	0.978***	0.979***	0.979***	0.978***
	(10.916)	(10.966)	(10.943)	(10.902)	(10.939)	(10.971)	(11.006)	(10.883)
Economic Indicators								
GDP Growth	330%	242%	245%	337%	3.523	2.405	2.444	3.455
	-80%	-55%	-58%	-79%	(0.717)	(0.534)	(0.525)	(0.723)
Inflation	-0.071**	-0.072**	-0.072**	-0.071**	-0.066**	-0.073**	-0.071**	-0.067**
	(-2.425)	(-2.151)	(-2.153)	(-2.372)	(-2.239)	(-2.158)	(-2.119)	(-2.252)
Capital Regulation Variables								
Delta Minimum Capital Requirement	0.180	0.165	0.165	0.182	0.173	0.164	0.158	0.180
	(1.230)	(1.143)	(1.142)	(1.222)	(1.184)	(1.129)	(1.093)	(1.215)
Delta Capital Stringency Index	0.205***	0.193***	0.195***	0.206***	0.215***	0.194***	0.192***	0.218***
	(5.638)	(5.512)	(5.639)	(5.707)	(5.436)	(5.616)	(5.610)	(5.387)
Introduction of Deposit Insurance	0.170	0.174	0.164	0.166	0.187	0.170	0.161	0.187
	(0.487)	(0.487)	(0.463)	(0.484)	(0.551)	(0.480)	(0.456)	(0.553)
Delta Government Efficiency Index	0.450	0.561	0.549	0.446	0.317	0.555	0.561	0.311
	(0.716)	(0.871)	(0.858)	(0.693)	(0.525)	(0.867)	(0.890)	(0.507)
Constant	-12.815***	-13.779***	-13.778***	-12.819***	-12.825***	-13.779***	-13.026***	-13.072***
	(-12.291)	(-13.146)	(-13.187)	(-12.243)	(-12.142)	(-13.123)	(-12.386)	(-12.391)
Pseudo-R-Squared	0.037	0.036	0.036	0.037	0.037	0.036	0.036	0.037
Observations	60,278	60,278	60,278	60,278	60,278	60,278	60,278	60,278
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	No	No	No	No	No	No	No	No
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered by	Country	Country	Country	Country	Country	Country	Country	Country

Table 8 Effect of Tax Reforms on Loan Loss Reserves

	Delta Natural Log of Loan Loss Reserve					
	I.	II.	III.	IV.	V.	VI.
Tax Reform Variables						
Leading Delta Tax Rate	-0.026**	-0.033***			-0.032**	-0.039**
	(-2.235)	(-2.816)			(-2.502)	(-2.557)
Current Period Delta Tax Rate	0.106***		0.107***		0.111***	0.110***
	(5.194)		(5.157)		(5.446)	(5.027)
First Lag of Delta Tax Rate	0.023***			0.030***	0.023***	0.022***
	(4.826)			(3.981)	(5.521)	(7.653)
Bank Financial Variables						
Delta Natural Log of Total Assets	0.550*	0.720***	0.501	0.661***	0.488	1.145
	(1.692)	(2.835)	(1.616)	(2.887)	(1.482)	(1.241)
Delta Squared Natural Log of Total Assets	-0.053**	-0.085***	-0.046**	-0.079***	-0.048**	-0.097**
	(-2.623)	(-2.981)	(-2.564)	(-3.153)	(-2.445)	(-2.175)
Delta Pre-tax ROA						
Economic Indicators						
Delta Natural Log of deflated GDP	2.827**	0.542	2.753*	0.827	4.375**	4.930**
	(2.027)	(0.766)	(1.988)	(1.079)	(2.114)	(2.049)
Delta Consumer Price Index	-0.004	0.010	-0.001	0.010	0.005	0.015
	(-0.403)	(1.254)	(-0.129)	(1.239)	(0.274)	(0.697)
Capital Regulation Variables						
Delta Minimum Capital Requirement	-0.185	-0.036*	-0.157	-0.052**	-0.244*	-0.254
	(-1.412)	(-2.002)	(-1.238)	(-2.076)	(-1.835)	(-1.671)
Delta Capital Stringency Index	0.003	-0.001	0.010	-0.009	-0.001	0.004
	(0.218)	(-0.156)	(0.695)	(-0.962)	(-0.061)	(0.175)
Introduction of Deposit Insurance	0.385***	0.201**	0.375**	0.140	0.596**	0.622**
	(2.844)	(2.423)	(2.693)	(1.637)	(2.503)	(2.342)
Delta Government Efficiency Index	-0.320	-0.265**	-0.260	-0.139	-0.421	-0.516
	(-1.339)	(-2.083)	(-1.190)	(-1.430)	(-1.350)	(-1.549)
Constant	-0.040**	-0.120***	-0.053***	-0.085***	-0.055**	-0.078***
	(-2.311)	(-13.673)	(-3.011)	(-6.209)	(-2.620)	(-2.813)
R-Squared	0.529	0.478	0.523	0.479	0.537	0.549
Observations	15,406	15,406	15,406	15,406	15,406	15,406
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Trend Fixed Effects	No	No	No	No	Yes	No
Bank Trend Fixed Effects	No	No	No	No	No	Yes
Clustered by	Country	Country	Country	Country	Country	Country

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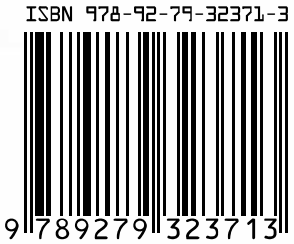

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