Leverage, Competitiveness and Systemic Risk in Banking[1]

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Summary: Corporate income taxation and prudential regulation are complementary instruments for public policy in banking markets. The common deductibility of interest payments induces debt bias and causes banks to be excessively levered. A reduction in debt-bias can achieve two goals at the same time: It enhances resiliency by lowering the cost of equity and it enhances the global competitiveness of banks by strengthening their capital structure. Moreover, even reforms that are fiscally neutral in the short run will reduce the fiscal burden on bank rescue operations in the long-run.

Zusammenfassung: Die Steuerbefreiung von Fremdkapitalzinsen verschafft Fremdkapital einen erheblichen Finanzierungsvorteil gegenüber Eigenkapital. Dieser Steuervorteil bewirkt, dass insbesondere Banken mit extreme Schuldenhebel arbeiten und somit große Überschuldungsrisiken eingehen. Diese Steuerbefreiung von Fremdkapitalzinsen widerspricht somit den Zielen der prudenziellen Eigenkapitalregulierung, die zum Zwecke der Stabilität und Sicherheit des Bankensystems eine hinreichende Mindestausstattung sicherstellen möchte. Eine Reduktion der impliziten Subventionierung von Fremdfinanzierung ist dagegen ein komplementäres Instrument zur Eigenkapitalregulierung. Sie erhöht einerseits die Krisenfestigkeit der Banken und fördert andererseits deren Wettbewerbsfähigkeit im internationalen Wettbewerb. Reformen zur Reduktion oder gar Umkehrung des Steuervorteils, die in der kurzen Frist fiskalisch neutral sind, sparen langfristig erhebliche Kosten der Bankenrettung ein.

→ JEL classification: E63, G21, G28, H25
→ Keywords: cost of equity, debt bias, competitiveness, resilience, systemic risk

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1 Introduction

The turbulences of March 2023 provide a stark reminder that the banking systems on both sides of the Atlantic continue to cause serious drains on public finances. These events occurred despite all the repair operations that had taken place in the aftermath of the Great Financial Crisis (GFC). The rescue of the Californian Silicon Valley Bank, Signature Bank, and of First Republic Bank required liquidity guarantees for $ 25 billion by US tax payers and the takeover of Credit Suisse (CS) by Union Bank of Switzerland (UBS) necessitated guarantees by the Swiss taxpayer of CHF 109 billion. These are huge numbers and they did materialize despite the vows of politicians and supervisors immediately after the GFC that similar crises, and drains on public funds, should never occur again.

In order to resolve the GFC the US taxpayer had already had to invest $ 434 billion during the TARP program, which originally had been authorized even up to $ 700 billion. In 2008 the Swiss taxpayer had already had to re-capitalize UBS with a CHF 60 billion financial support package just to learn in 2023 that the much larger amount of CHF 109 billion for guarantees was needed to enable the rescue of CS by UBS, the very bank that had already been saved with public funds in 2008. Moreover, by not honoring the seniority of bond holders the Swiss supervisor did generate havoc in the market for additional tier-I bank capital in Europe, which consists of convertible bonds that convert into equity, when certain capitalization triggers are reached. As will be explained below, these instruments had turned out as the preferred way of recapitalizing European banks after the GFC.

While similarly to the GFC the stress in the banking system has been caused by rising interest rates[2], the particular problems of the large US regional banks and Credit Suisse were quite different. The former problems are caused by their relatively large investments in sovereign bonds with long maturity that turn particularly illiquid when interest rates are rising[3], while CS suffered sustained losses in their investment banking activities (Admati and Hellwig 2023). But in all cases, insolvency loomed because of extensive leverage and because of lack of capital. So how could this happen after all the post-crisis reforms that were put into place both in Europe and in the USA?

I will argue that it is especially debt bias that effectively counteracts most of the reforms that were implemented to strengthen bank capitalization. Debt bias even fundamentally counteracts the goal of the Basel process of capital regulation. While the Basel process aims at providing a minimal capitalization compatible with a safe and sound banking system, debt bias incentivizes banks to increase leverage and to manipulate risk weights below the level of true economic risk. Debt bias even affects global competitiveness of banks since higher leverage typically is associated with lower stock valuations.

Section 2 briefly and selectively reviews the prudential reforms implemented since the GFC with a particular emphasis on the differential effects on bank capital structure between the EU and the US.

2 The real estate bubble fueled by the securitization of subprime loans in the US ultimately burst during the GFC after significant increases in interest rates. Also the business model of Northern Rock with extensive maturity transformation fell victim to interest rates rises in 2007. As in 2023 the specific reasons for the failures of Northern Rock and Lehman Brothers during the GFC were quite different as well.

3 Berk und Rauh (2023) argue that SVB fell victim to a beginners' mistake that could have been avoided by learning from earlier crises about the risks of (extensive) maturity transformation. In fact, the SVB case resembles closely the failure of Northern Rock in 2008.

Section 3 compares the banking systems across the Atlantic on the dimensions of systemic risk and global competitiveness. Section 4 presents debt bias and preliminary empirical evidence on eliminating debt bias in the Austrian, Belgian and Italian banking sector. Section 5 highlights the complementarity between elimination of debt bias and prudential capital regulation in banking. Section 6 concludes with comments on the political economy of tax reform in the banking sector.

2 Post-GFC Reforms

The responses after the GFC have been quite different across the Atlantic.[4] Most notably, while the US recapitalized all banks via its $ 700 billion Troubled-Asset-Relief-Program (TARP), the re-capitalization of European banks was restricted to those who had run into insolvency problems, such as Northern Rock, Union Bank of Switzerland (UBS) and Royal Bank of Scotland (RBS). To prevent stigma, in the US all banks were effectively forced to participate in TARP mandatorily. European banks could choose for themselves whether to apply for public support. Due to expected stigmatization, essentially the largest European banks tried to outgrow the crisis without government support. Private re-capitalizations did not take place either in Europe because of depressed stock prices with market valuations well below book value in the post-GFC period. The observed resistance of banks to recapitalization is in accordance with the operation of a *leverage ratchet effect* (Admati et al. 2017) that predicts that incumbent stock-owners oppose the issuance of new equity because of fear of dilution. Forced re-capitalization in the US after the GFC has overcome the leverage ratchet effect since the treasury sold its stakes back to the market by April 2015 after markets had been stabilized.

A second notable difference in the response to the GFC did emerge in the process of finalizing Basel III reform. While the US never had officially implemented the Basel II agreement of 2006 which yielded wide-ranging self-regulatory powers to banks allowing them to calculate their own risk estimates for their assets position on the basis of internal models, it tried to ban internal credit risk models all together after the GFC. Considerable opposition did emerge from European supervisors not willing to impose higher capital burdens on their global systemically important banks and tolerating higher leverage. Ultimately, transatlantic negotiations on finalizing Basel III led to the compromise (BCBS, 2017) of an output floor according to which internal credit risk models can reduce regulatory capital to at most to 72.5 % of the level of required capital under the statutory standard approach.

This transatlantic discord reflects a more soft-handed approach of European supervisors with respect to its most systemically important institutions. In consequence systemic risk exposure has receded less in Europe. This can be seen when tracing the capital shortfall measure SRISK[5] over time (Gehrig et al. 2021). This systemic risk measure calculates the conditional costs of recapitalizing a bank at current market conditions after a shock to assets has occurred of similar size as in the GFC. Figure 1 illustrates that in the aftermath of the GFC aggregate capital shortfall has declined to some extent but until the start of the Covid pandemic in 2020 has never reached pre-

4 This is an eclectic and by no means exhaustive overview of the most important transatlantic differences in terms of leverage and bank capital structure.

5 For details on the construction of the conditional capital shortfall measure of systemic risk SRISK see Brownlees, Engle (2017).

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crisis levels again. This illustrates that overall, and unlike the United States, the capital shortfall of the GFC had never been completely rebuilt for the most systemic banks in Europe.

Figure 1: Evolution of SRISK for European banks (source: Gehrig et al. 2021).

Interestingly, also the idea of bail-in instruments has been pushed strongly by European banks and supervisors, but less so in the US. Effectively, these instruments are convertible bonds that automatically convert into equity under pre-defined trigger levels of financial stress. These instruments enjoy the fiscal advantage of tax deductibility of interest as long as they don't convert, and automatically convert into equity in situations of stress. Moreover, these instruments are treated as tier-1 capital in the Basel III agreement at the same rank as common equity. As such it appears as a cheaper way of providing bank equity since convertible bonds are subject to the tax burden only in case they convert into equity; otherwise they enjoy the privileges of debt bias.

Overall, this preference for debt-like instruments for recapitalizing banks in the aftermath of the GFC has direct consequences for the global competitiveness of European banks. Figure 2 illustrates that after 2010 actual aggregate market values of Euro area banks never exceeded again aggregate book values, while US banks consistently exceed book levels up to market-to-book valuations of 1.5 in 2019 (ECB, 2019). In short, since the GFC markets consistently value Euro area stocks below book values while US banks are consistently valued above book values. Moreover, the differential in actual valuation between Euro area banks and US banks is increasing over time suggesting an increasing loss in competitiveness for European banks.

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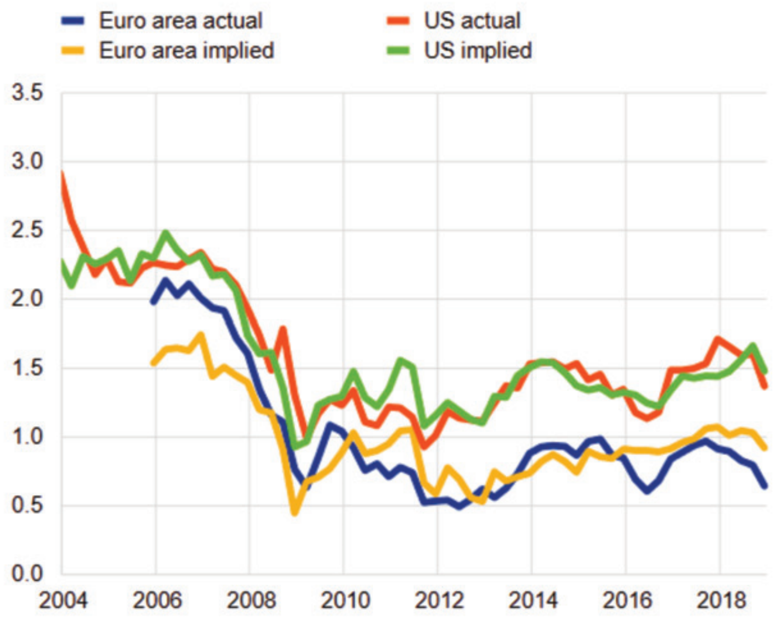
Figure 2: Recent developments in banks' market-to-book ratios



Source: ECB (2019), Financial Stability Report, Box 5.

Based on Figure 2 the US banking system seems to have regained well strength and global competitiveness. It does not come as a surprise, therefore, that US banks together with banks from China dominate the global rankings according to market value.

3 Transatlantic Comparison

Let us now compare the largest systemically important banks across the Atlantic in this section as of April 2023. Specifically, we will compare 15 GSIBs from the North America (Table 1a) with 15 GSIBs from Europe (Table 1b) according to measures of systemic riskiness as well as leverage. We do not present results on regulatory tier-I capital ratios, or liquidity ratios, since those are roughly the same for all banks under consideration.[6]

Bank	Nation	SRISK (bill $)	SRISK/GDP	Leverage
Citigroup	US	135,575	0.50 %	25.19
Bank of America	US	113,040	0.42 %	13.02
Wells Fargo	US	53,783	0.20 %	12.38
Toronto Dominion	CA	50,783	2.43 %	13.45

6 Due to the different supervisory approaches in determining risk weights, tier-I capital ratios are not really informative about the underlying differences in systemic risk exposure and competitiveness of the respective banking systems.

Continued

Bank	Nation	SRISK (bill $)	SRISK/GDP	Leverage
JP Morgan	US	43,376	0.18%	9.60
B Nova Scotia	US	34,066	0.17%	17.58
Canadian Imperial	CA	32,072	1.63%	18.41
Royal B of Canada	CA	30,494	1.53%	11.09
Bank of Montreal	CA	29,744	1.46%	13.70
Prudential	US	28,359	0.11%	18.64
US Bancorp	US	28,359	0.11%	13.49
Capital One	US	19,576	0.07%	13.73
Lincoln Nat. Corp.	US	18,477	0.07%	75.51
Power Corp. Canada	CA	17,994	0.87%	22.00
Morgan Stanley	US	17,984	0.07%	8.16

Table 1a: Canada and USA, own calculations. Source V-Lab, accessed on May 5th, 2023.

By normalizing the capital shortfall of a bank by GDP of the home country we find a capital shortfall from .07 (Morgan Stanley) to .5% (JP Morgan) of GDP for the largest US banks and .87 (Power Corp. Canada) to 2.43% (Toronto Dominion Bank) for Canadian banks. With the exception of Lincoln Bank (75.51), Citigroup (25.19) and Equitable Holdings (28.81) leverage is well below 20. Leverage for Morgan Stanley (8.16) and JP Morgan (9.6) even reaches single digits.

Bank	Nation	SRISK (bill €)	SRISK/GDP	Leverage
BNP Paribas	F	118,682	3.94%	34.96
Credit Agricole	F	105,488	3.50%	61.68
Barclays	UK	82,179	2.60%	56.63
Banco Santander	E	77,077	5.55%	30.38
Soc. Generale	F	76,255	2.53%	78.23
HSBC	UK	69,015	2.18%	20.30
Deutsche Bank	GE	66,347	1.65%	62.34
Lloyds	UK	33,374	1.06%	25.99
ING	NL	32,563	3.01%	20.59
Standard Chartered	UK	31,713	0.99%	35.58
UBS	CH	30,721	3.65%	15.81
Unicredito	I	29,311	1.35%	22.29
Natwest	UK	29,143	0.92%	26.55
Intesa San Paolo	I	27,829	1.82%	19.98
Commerzbank	GE	19,761	0.49%	33.98

Table 1b: Europe, own calculations. Source: V-Lab, accessed at May 5th, 2023.

In contrast for European banks we find normalized systemic risk exposures in the range from .49% (Commerzbank) to 5.55% (Banco Santander), with the ratios of the largest banks between 2.53–5.55%, well above the respective numbers of US competitors. Also leverage between 15.81 (UBS) and 78.23 (Societe Generale) is significantly higher than for the US counterparts.

By way of summing up, the European GSIBs and their supervisors enjoy a significantly higher preference for risky debt finance and, correspondingly, tolerate much higher systemic risk exposures. At the same time aggregate market values in the US and Canada exceed book values substantially, while the opposite holds for European banking stocks reflecting a higher degree of competitiveness of US banks in international markets in 2023.

4 Debt Bias

The empirical evidence so far suggests that debt bias (de Mooji, 2011, Luca, Tieman, 2019) is far more pronounced in Europe than the US. Debt bias arises due to the tax deductibility of interest rates, while dividends in most countries do not enjoy this tax advantage. This discrepancy in tax treatments generates a preference for risky debt financing over solid equity financing and is one of the reasons, why bankers and regulators alike view equity costly. Equity is burdened by a tax disadvantage even though it enhances the stability of the underlying corporation.[7] This tax advantage amounts to a subsidy on risky debt, that becomes particularly troublesome in the banking industry, which intrinsically is highly levered due to its typical business models that involve deposit taking.

As viewed from the tax payer, a tax reduction is granted for issuing risky debt, which reduces tax revenues. At the same time, since debt is defaultable, the subsidy increases the necessity of future bailout payments in case systemically important banks turn insolvent. So, the effective costs of the tax subsidy should include some shadow cost of future bank bailouts.

The phenomenon of debt bias has generated political concerns about potentially excessive debt accumulation both in the financial as well as in the non-financial sector. Therefore, the EC (2021) has formally recorded debt bias in corporate financing from 2010 to 2020 for its member countries.

7 This burden is reflected by the common claim of bankers and supervisors alike that "equity is costly". See also Admati and Hellwig (2023) for a detailed discussion of this statement.

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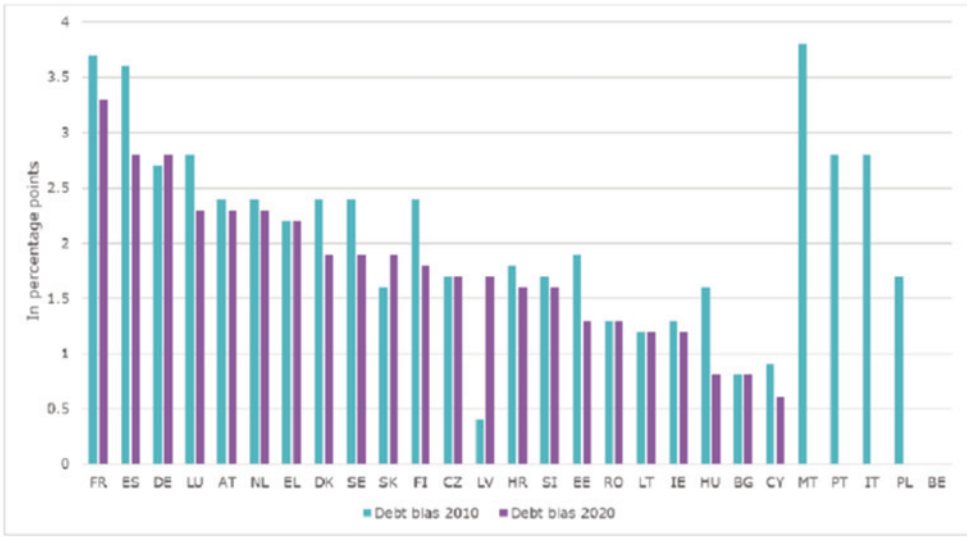
Figure 3: Debt-equity bias in corporate financing 2010 and 2020[26]



Source: Annual Report on Taxation (European Commission 2021)
Notes: (1) The cost of capital measures the required minimum pre-tax return of a real investment (the 'marginal investment') to achieve a 5% after tax real return. (2) To reflect the allowance for corporate equity in Belgium, Cyprus, Italy, Malta, Poland and Portugal, the assumption is that the rates of these allowances equal the market interest rate in the model. For Belgium, the debt-equity bias could be non-zero due to the notional interest rate being relatively low, while the eligible equity only covers the average annual increase over the previous 5 years. For Cyprus, the bias is small, since the allowance does not apply to investments in financial assets.

Figure 3 reports the size of debt bias for the years 2010 and 2020. It can be seen that during that period five countries already introduced reforms to eliminate debt bias. These countries are Malta, Portugal, Italy, Poland and Belgium, where debt bias had reached a level of 1.5%-3.5% in 2010. For all other European countries debt bias still amounts to between .5% in Cyprus and 2.5–3% in France, Germany and Spain. Such debt bias implies a significant advantage for debt financing and partly explains the post-GFCs developments in these countries.

Because of its potentially destabilizing nature concerns about debt bias causing excessive indebtedness a range of proposals have been triggered in the political arena to either neutralize debt bias, or even to revert it (e.g. IFS 1991, Devereux et al. 1991, Mirrlees et al. 2011, de Mooji 2011, IFA 2012, Gehrig 2013, Gehrig 2015, EU 2016, EU 2022) in most OECD countries. It is apparent that the tax subsidy on debt is socially costly. Admati and Hellwig (2023) even dedicate a subchapter on "A Perverse Tax Subsidy" in their 2nd edition claiming that "…the deductibility of payments of interest on debt from taxable income has no justification and is bad policy." In fact, in many countries tax policy runs counter the objectives of prudential regulation.

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5 Complementarity of Taxation and Prudential Regulation in Banking

While political reform is under way to reduce debt bias, the first experiences about the effects on bank capital structure have already been made. Naturally, there are various policy options to reduce debt bias, such as reducing the tax advantage on debt altogether or, alternatively, to extend the tax advantage also to equity by introducing an appropriate allowance also for corporate dividends. Clearly, the impact of a reform will depend on whether overall the reform increases the tax burden, e.g. by eliminating the tax advantage of debt, or whether it reduces tax effective tax payments by extending the deductibility to equity.

Early reforms so far have taken the form of extending the tax deduction to equity by introducing a tax allowance for equity. Examples are Austria (2000), Belgium (2006) and Italy (2011). In all these countries the empirical evidence clearly indicates that the elimination of debt bias significantly affected bank capital structure choice and enhanced capitalization. In the case of Belgium, the reform implied an increase of the capital ratio by 1 percentage point from about 6.5 to 7.5 percent (Schepens, 2016). The effects of introducing allowances for corporate equity in Austria and Italy were similar by effectively inducing strengthening of bank capitalization.

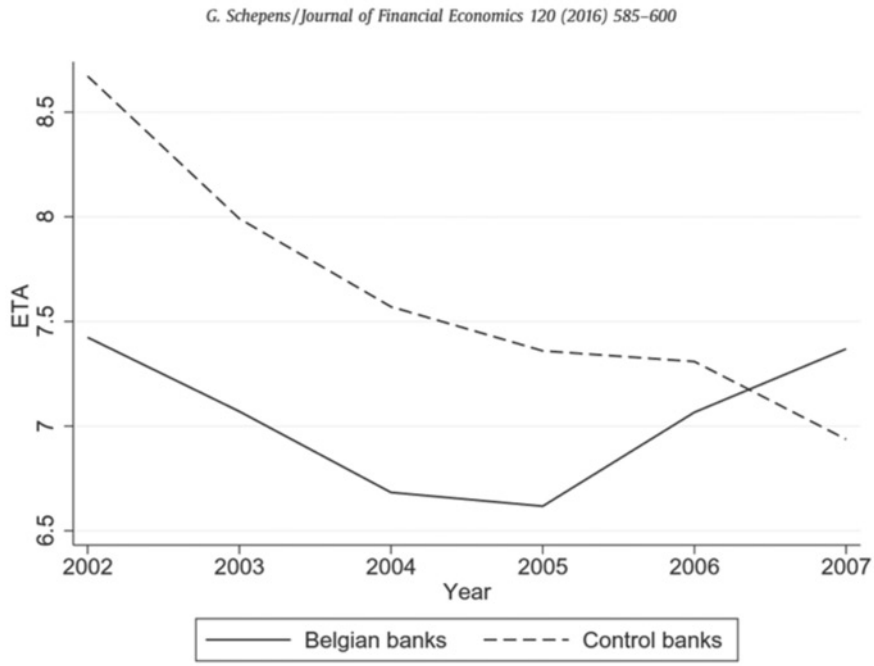

Fig. 1. Evolution of the equity ratio for the Belgian banks and the control group of banks.

Overall the empirical experience with the allowance on equity in the banking sector showcases vividly the complementarity between public policy and prudential regulation in the banking sector.

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Where the whole process of Basel capital regulation aims at strengthening bank capitalization by defining minimum standards, debt bias counteracts these attempts by providing tax incentives to weaken capitalization. As long as debt bias exists it counteracts the goals of prudential regulation. Such inherently contradictory policies are costly for society at large. Among others the need to bailout systemic banks is just one of those costs of such contradictory policies.

A far better way to organize politics and regulation would seem to exploit the inherent complementarities and subsidize stability-enhancing equity finance. This recommendation goes well beyond the mere equalization of the costs of debt and equity funding by extending allowances also on equity. From a social welfare perspective, the proper policy consists of reverting debt bias into a subsidy on equity. Thus, the cost of equity, which effectively is a tax burden relative to debt, can be transformed into a benefit of equity, when the tax burden is shifted on debt. Such a reform can be designed such that it is neutral on a flow basis; the extra tax revenue raised by discontinuing the deductions on interest payments can be used to subsidize dividend payments at zero cost to the tax payer. The long-run gain of such a far-reaching tax reform is the significantly reduced necessity to bail-out systemic banks in the future. Moreover, to the extent that banks reduce (excessive) leverage their competitiveness is likely to increase in global markets which likely increases market-to-book ratios.

6 Political Economy of Tax Reform

The costs of systemic banking crises are known to be significant enough to warrant public interest. E.g. in a global sample of 147 banking crises from 1970–2011 Laeven and Valencia (2013) find that on average the direct costs of systemic banking crises amounts to a fiscal burden equivalent to 7% of gross domestic product and an output loss of 23% relative to long-run production potential. Therefore, in the aftermath of the GFC a reform of prudential regulation within the Basel process has been implemented to take into better account any macro-prudential considerations and prevent further systemic crises (see Freixas et al. 2015). But also on the fiscal side, bank levies have been introduced to accumulate reserves for future bailout funding. In other countries like Italy, on the other hand, tax allowances were introduced to eliminate debt bias as a major contributor to excessive leverage and fragility. However, across the Western world little consensus has been achieved so far about an ideal compromise between taxation of corporate income and banking regulation.

The empirical evidence on tax increases has been rather disappointing generating revenues well below expectations (e. g. Buch et al. 2016 for Germany). More importantly though, the effect of capital levies on bank capital structure choices have been hardly discernible. Buch et al. (2016) conclude for case of the German levy: "...banks did not change their funding structure in any significant way..." (p. 65).

This contrasts with the empirical evidence reported above on tax reductions via an extra allowance on corporate equity. As Schepens (2016), Branzoli et al. (2022) and Petutschnig and Rünger (2022) document for Belgium, Italy and Austria the neutralization of debt bias by extending the allowance to equity did affect banks' capital structure choices. While the exact magnitudes of the fiscal

consequences depend on details of the reform[8], all these reforms have in common that they significantly change funding incentives in favor of stronger capitalization. Accordingly, these reforms have been successful in reducing the cost of equity. However, such reform needs to be financed by the tax payer, who in the short run concedes a reduction in tax income but expects reduced future bailout funding in return. In this case, political implementation of elimination of debt bias involves a trade-off between current and future tax revenues.

From a normative point of view, an even better solution seems possible when considering reforms that are revenue neutral for tax payers in the short run. By turning the tax advantage of debt into a tax advantage of equity in a neutral way, effectively the tax shield on debt will be transformed into a tax shield on equity of the same amount. This generates strong incentives for banks to issue equity because the cost of equity effectively turns negative, i. e. it falls below the cost of debt. Therefore, such a reform reduces, or even outweighs, the leverage-ratchet effect. Such a reform could, and possibly should be concentrated on the banking sector only, in order to exploit maximally the specific complementarity with prudential regulation. Moreover, by targeting the reform on bank income taxation only the demand for corporate and private loans will be least affected by the reform.[9]

Obviously, such a reform should trigger stronger capital structure reactions for banks than the mere annihilation of debt bias. However, since such a reform has not taken place yet anywhere in the world, no empirical evidence exists to date that could guide policy makers in determining the proper parameters of such a far-reaching reform.

Would there be political resistance to this type of reform? Probably mainly by those stakeholders that might be affected by the loss of the tax advantage on their investments, namely the fixed income investors, bondholders, depositors and savers. However, at least in the case of depositors and savers the loss of the tax advantage for the originating bank will be at least partially offset by lower deposit insurance premia due to a more resilient capital structure.

Most realistically, however, since the interests of the tax payer are least well organized and protected it is to be expected that the grand reform for the tax payer will never take place and annihilation of debt bias via allowance for corporate equity is the best that democratic societies can achieve.[10]

On a final note, by eliminating debt bias or by even strengthening bank capitalization beyond financial neutrality also monetary policy will be relieved to some extent from prudential concerns about bank stability. Thus, a reform of reducing debt bias contributes to lowering the spillovers from monetary policy on the stability of the banking system.

8 The reforms differ for example in the extent to which the allowance applies for all equity or whether it is restricted on new equity issuances only.

9 While the available empirical evidence on the effects of general allowances in corporate income taxation on bank capital structure is rather encouraging, it is to be expected that a more targeted approach with bank specific allowances might be even more effective in strengthening bank capitalization, since it would not affect directly the demand for loans.

10 See also Mirrlees et al. (2011) and Roe and Tröge (2018) for similar assessments about the political viability of tax reform.

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