

Short economic and financial analyses

Ad Hoc Bank Taxation and Credit Supply

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This paper studies the introduction of new temporary taxation on banks and its effects on banks' lending decisions. Focusing on a unique policy experiment in Slovenia in 2011, where the government imposed a 0.1% tax on banks' total assets, I find that the introduction of the tax resulted in lower credit supply of loans to corporates. In particular, for each percentage point increase in the share of tax in capital, banks charge on average 8 basis points higher lending rate and decrease their lending amount by 0.5%. The findings of this research carry strong policy implications for countries contemplating or having already implemented windfall or other temporary taxes on banks. The introduction of the tax might lead to a reduction in lending beyond what would be warranted from the standpoint of monetary or other policies.

1 Introduction

Policy rate hikes have significantly boosted banks' profits.

The surge in inflation and the subsequent policy rate hikes in 2022 and 2023 have significantly boosted banks' profits, due to almost instantaneous pass-through to lending rates, while banks have shown reluctance to raise deposit rates, largely attributed to large liquidity holdings resulting from previous accommodative monetary policy (see Volk, 2023). In response to that, several European countries have started imposing windfall or other temporary taxation measures on banks from 2022 on.

Spain and Italy have emerged as the two largest European economies that have already imposed windfall taxes on banks. Similar measures have been adopted by governments in Hungary, the Czech Republic, and Lithuania, all aimed at taxing the profits of lenders driven by rising interest rates. Further, the Slovenian government introduced a temporary tax on banks' total assets, prompted by the severe floods that hit Slovenia in August 2023.

Introduction of new ad hoc bank taxation can have potential unintended effects.

While the governments' motivations behind the introduction of windfall taxes on banks are rather clear, the potential unintended consequences remain largely uncertain. The European Central Bank (ECB) has issued warnings to the governments of Spain, Italy, and Slovenia, highlighting potential side effects associated with the proposed temporary taxation on banks (see ECB, 2022, 2023a and 2023b). Although the ECB's concerns are tailored to the specific circumstances of each country and their proposed taxation, a shared apprehension is the possible adverse impact on bank solvency, financial stability, and the risk of a disproportionate reduction in credit activity - exceeding what would be warranted from a monetary policy perspective.

The paper studies the impact of tax on banks' total assets introduced by the Slovenian government in 2011.

This paper studies the impact of an ad hoc introduction of new bank taxation on bank credit supply. In August 2011, the Slovenian government introduced a temporary taxation measure targeting banks, imposing a 0.1% levy on their total assets. The policy was in place until 2015 and included several deduction schemes intended to encourage banks to increase lending to corporates who struggled to obtain external funding during the severe banking crisis in Slovenia. Despite the government's intentions, the proposal faced criticism from various institutions, including the Bank of Slovenia and the ECB. Both entities expressed concerns about the potential impact on financial stability, cautioning that the tax burden on banks might lead to adverse effects, such as increased borrowing costs for businesses.

The results show that the introduction of the tax caused a reduction in the availability of loans to firms.

Leveraging on detailed credit register data, the results indicate that the introduction of the tax on banks' assets in 2011 caused a reduction in the availability of loans, leading to higher lending rates and diminished loan volumes. In particular, I find that with every percentage point rise in exposure to the tax, banks, on average, raise their lending rates by 8 basis points and decrease lending amounts by 0.5% within five months following the policy introduction. These robust results hold true even over longer periods, extending up to one year. Moreover, I find that the effect is more pronounced for banks with above-median share of non-performing loans (NPLs). This comes with not surprise, as the predominant challenge for banks during the banking crisis was the rapidly increasing burden of NPLs.

2

Tax on banks' total assets

In 2011 the Slovenian government introduced a new bank taxation that was designed to incentivise banks to lend to corporates.

In August 2011, the Slovenian government introduced a temporary taxation measure targeting banks, imposing a 0.1% levy on their total assets (Uradni list no 59, 2011). This initiative was part of a comprehensive package designed to address the repercussions of the economic and financial crisis. The primary objective of the new law was twofold: firstly, to serve as compensation to the government for providing crucial systemic support to the banking sector during the financial downturn, and secondly, to incentivize banks to contribute to the economy by increasing their provision of loans in a more substantial and structurally appropriate manner. Despite these intentions, the tax was discontinued in 2015 due to its inefficacy in achieving its intended goals.

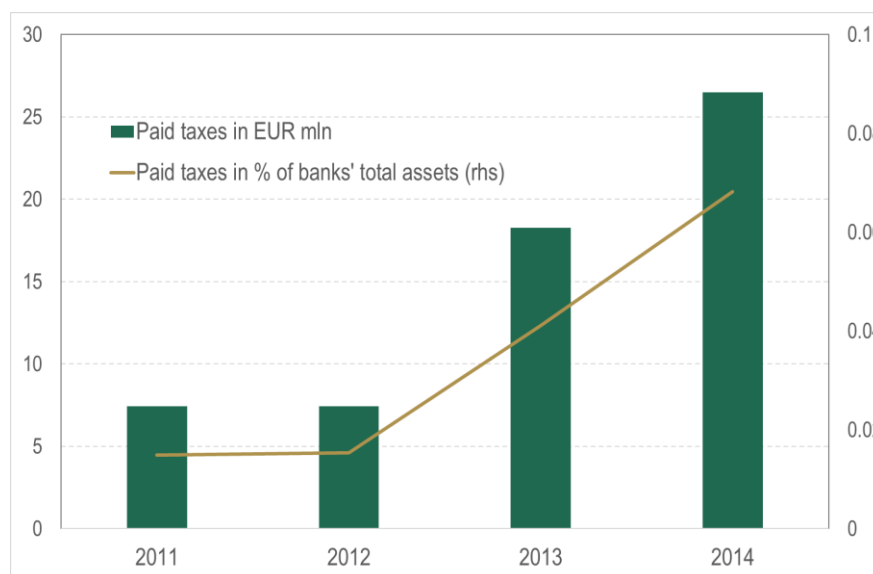
The tax was paid once per year and in total banks contributed 60 EUR mln to the government budget between 2011 and 2014 (Figure 1). Although the tax rate was set at 0.1% of banks' total assets, the actual payments were much lower, 0.03% on average (see Figure 1), as there were several deductions in place. First, the levy was lowered by 0.167% of the bank's outstanding loan amount to firms.¹ Second, banks that increased their lending to firms by the amount that exceed 5% of previous year's total assets were exempted from paying the tax. Third, banks holding less than a 20% share of loans to firms in their total assets were also exempted.

The idea underlying the deductions and exemptions aimed to encourage banks to increase lending to firms during financial crises when obtaining external funding became challenging. However, this approach faced strong criticism from both the Bank of Slovenia and the ECB. Both institutions expressed concerns about the potential threat to financial stability if banks were incentivized to engage in potentially risky lending practices merely to reduce their tax liabilities (see ECB, 2011). Additionally, the Bank of Slovenia cautioned against potential adverse and unintended consequences of the tax, as it could lead to an increase in lending rates.

The tax was introduced in the period characterized with fast-growing non-performing loans.

The tax was introduced in the midst of economic-financial crisis. Following a substantial contraction in 2009, there was a modest recovery in GDP during 2010 and 2011, only to revert to negative growth again in 2012. Concurrently, there was a pronounced decrease in lending, particularly to non-financial corporates. The decline in economic activity, coupled with high levels of corporate indebtedness, resulted in a rapid surge in NPLs. This issue became the primary concern for Slovenian banks, ultimately addressed through substantial government capital injections and the transfer of a portion of NPLs to the Bank Assets Management Company.

Figure 1: The amount of paid taxes on banks' total assets



Source: Banka Slovenije, FURS.

Note: The figure shows the amount of paid taxes on banks' total assets to the government budget, measured in EUR mln and in percent of banks' capital. As the tax was introduced in August 2011, the payment in 2011 reflects 5/12 of the total annual amount.

¹ In 2013, the deduction rate was lowered to 0.1% of outstanding loan amount to firms (Uradni list RS, No. 98, 2012).

Impact on credit supply is estimated in a diff-in-diff setup using detailed loan level data before and after tax introduction.

This section presents the methodology used to estimate the impact of taxation on lending rates and amounts. The analysis focuses on the policy's introduction in August 2011, recognizing the likelihood that the announcement of an additional burden on banks during economic downturns likely carries more significance for their lending decisions than the relatively low actual tax payments (see Figure 1). Moreover, since the legislation was crafted to incentivize increased lending by banks, the outcomes measured at subsequent stages are evidently influenced by endogenous factors.

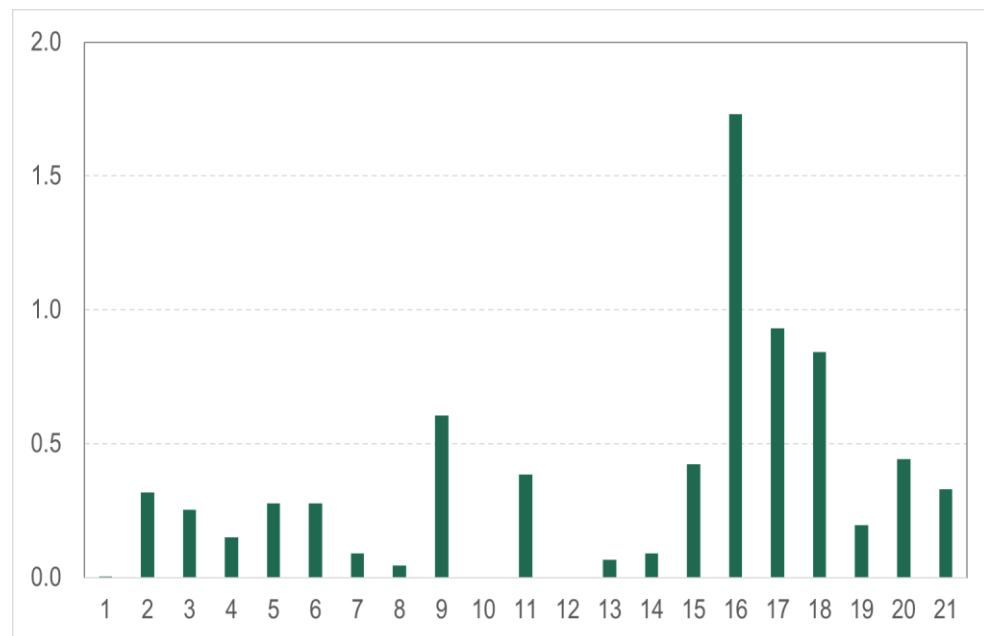
I make use of the diff-in-diff approach, where I look at how the lending rates and amounts changed in a narrow window after the introduction of the policy and how it is related to the exposure of an individual bank to the taxation. The latter is defined as the amount of tax a bank would need to pay in July 2011, which is one month before the official introduction of the new tax to mitigate the endogeneity concerns. For modelling purposes I express the exposure in percent of bank capital, which better resembles the costs for banks in times when capital is very scarce. The so defined exposure varies significantly between banks, from 0% up to 1.7% (see Figure 2).

I estimate the following model specification:

$$Y_{ijt} = \beta \times d(Tax) \times Tax\ exposure_j + \theta X_{ijt} + D_{ILST} + D_j + \varepsilon_{ijt}$$

where Y_{ijt} is the variable of interest that is either lending rate on new loans or the log of outstanding loan amount for firm i , bank j and time t . $d(Tax)$ is a dummy variable that equals to one after the introduction of the policy in August 2011, whereas $Tax\ exposure_j$ is bank's exposure to the tax as defined above. For the identification of

Figure 2: **Banks' exposure to the tax**



Source: Banka Slovenije, own calculations.

Note: The figure reports the exposure of banks to the levy on total assets, calculated as the amount of tax, in % of capital, that banks would need to pay in July 2011, i.e. one month prior to the official introduction of the law.

supply side effects, it is crucial to control for demand for loans and general cycle conditions. For this purpose, I apply the methodology put forward by Degryse et al. (2019), where the demand side is controlled for with industry-location-size-time fixed effects (D_{ILST}).² Further, I include bank fixed effects (D_i) that absorb other time-invariant bank characteristics and control for additional loan characteristics (contained in X_{ijt}) relevant for lending rate estimation: loan maturity, credit rating and collateral.

My baseline estimates are based on data spanning from January to December 2011. This period encompasses seven months preceding the implementation of the policy and five months following it. Recognizing the potential influence of the chosen timeframe on the results, I subsequently explore variations in the horizon. Specifically, I assess the impact over periods extending to six and twelve months after the introduction of the tax. All the estimates use the data for non-financial corporates' lending rate and amount reported in credit register of the Bank of Slovenia.

4 Results

In response to the introduction of the tax, banks raised lending rates and reduced lending amount.

This section presents findings on the impact of the newly introduced levy on banks' total assets on lending rates and amounts. In column (1) of Table 1, the results are displayed, incorporating control for demand-side factors through industry-location-size (ILS) fixed effects. The outcomes reveal that following the implementation of the tax, banks on average raised their lending rates and reduced lending amounts (indicated by the coefficient for $d(Tax)$). Moreover, the interaction between $d(Tax)$ and *Tax exposure* indicates that banks with a greater exposure to the tax exhibited a more pronounced tightening of their lending conditions. Specifically, these banks increased lending rates more significantly and decreased lending amounts to a greater extent.

A potential concern arises from the estimates presented in column (1) as they fail to consider the dynamic nature of loan demand and lack controls for business cycle conditions in a more general manner. The tax on banks' assets was implemented during the banking crisis in Slovenia, a period marked by reduced lending activities and a general reluctance among banks to extend loans to corporates. Consequently, the coefficient for $d(Tax)$ likely reflects broader economic conditions rather than solely capturing the impact of the tax itself.

² The advantage of the ILST estimate is that it enables to include also firms with single bank relations, as long as an ILST cluster consists of firms borrowing from more than one bank. ILST clusters in my estimation consists of 22 industries, 13 location districts, 7 size classes and 12 months. For robustness I ran also the estimates with Khwaja and Mian (2008) approach that is more restrictive and can only be applied to firms borrowing from multiple banks. The conclusions are in line with the findings presented in the paper. Results are available upon request.

Table 1: The impact of bank taxation on lending rates and volumes

| | Lending rate | | Lending amount | |
|------------------------|--------------|----------|----------------|----------|
| | (1) | (2) | (1) | (2) |
| d(Tax) | 0.002*** | | -0.021*** | |
| d(Tax) × Tax exposure | 0.072** | 0.080*** | -0.518** | -0.505** |
| Firm controls | ILS | ILST | ILS | ILST |
| Bank fixed effects | Yes | Yes | Yes | Yes |
| Number of observations | 32,669 | 32,669 | 588,203 | 588,203 |
| R-square | 0.572 | 0.650 | 0.375 | 0.377 |

Source: Banka Slovenije, own estimates.

Note: The table reports the estimated coefficients of the impact of bank taxation on lending rates and lending volumes. The dependent variable is either lending rate for new loans or outstanding lending volume expressed in log terms. d(Tax) equals to one from August 2011 onwards. Tax exposure is the amount of tax (in % of bank capital) calculated based on July 2011 data, i.e. one month before the introduction of the policy. The estimation sample is January 2011 - December 2011. Significance: * (p<0.10), ** (p<0.05), *** (p<0.01). Standard errors are clustered at bank level.

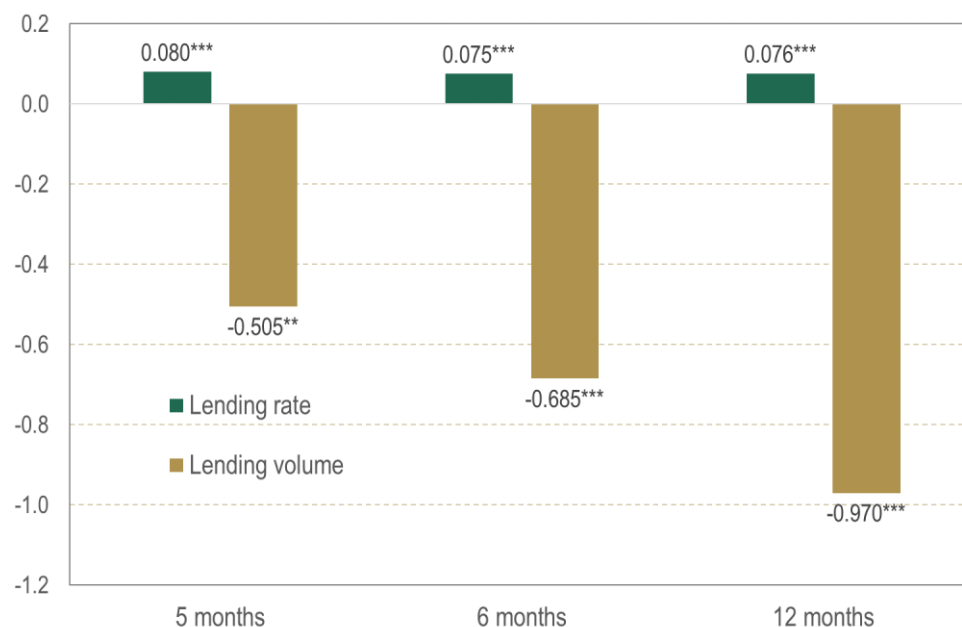
The main interest lies in the post-levy sensitivity to the tax exposure, which appears unaffected by the absence of controls for varying demand over time. Moving to column (2) in Table 1, where industry-location-size-time (ILST) fixed effects are introduced, the coefficient for the interaction term remains nearly unchanged compared to specification (1). It tells that for each percentage point increase in the exposure to the tax, banks charge on average 8 basis points higher lending rate and decrease their lending amount by 0.5%. This implies that a bank at the 90th percentile in the distribution of tax exposure, with 0.84% exposure in its capital, charges on average 7bp higher lending rate to firms and decreases credit amount by 0.42%, compared to a bank at the 10th percentile, which has close to zero exposure to the taxation.

Next, I introduce variations in the time horizon following the implementation of the policy. The preceding findings have been based on a specific timeframe, encompassing seven months before the tax initiation and five months thereafter. To assess the robustness of the results, I extend the post-treatment horizon to 6 and 12 months. The outcomes depicted in Figure 3 illustrate the estimated coefficients for the interaction between *d(Tax)* and *Tax exposure*, employing the most stringent ILST demand controls (as in column (2) of Table 1). Notably, the results for both lending rates and amounts exhibit robustness across extended time horizons. While the impact on lending rates appears relatively constant, the estimates reveal a progressive decline in lending volumes over prolonged durations. Specifically, the findings indicate a nearly 1% reduction in lending amounts after 12 months for every percentage point increase in a bank's exposure to the tax.

The impact on lending rates and volumes is larger for banks with higher burden of non-performing loans.

Last, in Table 2 I present the results of the heterogeneous impact of bank taxation on credit supply, depending on bank characteristics. For this purpose I interact the tax treatment with indicator variable for bank's capitalisation (leverage ratio) and share of non-performing loans (NPL).

Figure 3: The impact of bank taxation across different horizons after the introduction of the policy



Source: Banka Slovenije, own estimates.

Note: The figure reports the estimated coefficients of the impact of bank taxation on lending rates and lending volumes across different horizons after the policy change. Baseline results for 5 months after the introduction of the tax are the same as in Table 1.

The indicator equals one if a bank-specific value of the variable of interest lies above the median. The heterogeneous impact that appears statistically significant and consistent for both outcomes is the one for share of NPLs. I find a significant impact also for the interaction with leverage ratio, but only for lending rates, whereas it is insignificant and with inconsistent sign for volumes.

Column (2) in Table 2 shows that the impact of taxation is significantly higher for banks with higher NPL burden. This is not surprising as fast-increasing share of NPLs was the main challenge for banks in that period, with large differences between banks. During this period, banks with a below-median share of NPLs responded to each percentage point increase in tax exposure by raising their lending rates by 5 basis points. In contrast, banks with an above-median share of NPLs exhibited a more substantial impact, with an increase of over 20 basis points. This disparity underscores the differentiated responses of banks based on their NPL burdens. A similar pattern emerges when examining lending volumes. Banks with a high share of NPLs contract their lending by 1.2 percentage points more than banks with low NPLs for each percentage point increase in tax exposure.

5

Conclusion

This paper provides empirical evidence on the impact of an ad hoc introduction of new banks' taxation on their loan supply decisions. The study delves into a unique policy experiment wherein the Slovenian government, in 2011, imposed an extra tax on banks, set at 0.1% of their total assets. Various deduction schemes were introduced to encourage banks to increase lending to corporates who struggled to obtain external funding sources. Despite the government's intentions, the proposal faced

Table 2: **Bank heterogeneity**

| | Lending rate | | Lending amount | |
|-------------------------------------|--------------|----------|----------------|---------|
| | (1) | (2) | (1) | (2) |
| d(Tax) × Tax exposure | 0.107*** | 0.055** | -0.423* | -0.453* |
| d(Tax) × Tax exposure × I(Leverage) | -0.175*** | | -0.519 | |
| d(Tax) × Tax exposure × I(NPL) | | 0.163*** | | -1.244* |
| Firm controls | ILST | ILST | ILST | ILST |
| Bank fixed effects | Yes | Yes | Yes | Yes |
| Number of observations | 32,669 | 32,669 | 588,203 | 588,203 |
| R-square | 0.650 | 0.650 | 0.378 | 0.378 |

Source: Banka Slovenije, own estimates.

Note: The table reports the estimated coefficients of the impact of bank taxation on lending rates and lending volumes. The dependent variable is either lending rate for new loans or outstanding lending volume expressed in log terms. d(Tax) equals to one from August 2011 onwards. Tax exposure is the amount of tax (in % of bank capital) calculated based on July 2011 data, i.e. one month before the introduction of the policy. I() denotes indicator variables that equal one when a bank-specific value for the variable in brackets is above the median. The estimation sample is January 2011 - December 2011. Significance: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$). Standard errors are clustered at bank level.

criticism from various institutions, including the Bank of Slovenia and the ECB. Both entities expressed concerns about the potential impact on financial stability, cautioning that the additional burden on banks might lead to adverse effects, such as increased borrowing costs for businesses.

The results show that the introduction of the tax indeed led to a contraction in loan supply, resulting in higher lending rates and lower volumes. I find that for each percentage point increase in the exposure to the tax, banks charged on average 8 basis points higher lending rate and decreased their lending amount by 0.5% in five months after the introduction of the policy. Robust results are confirmed also on longer horizons of up to one year. Further, I find that the impact is larger for banks with above-median share of NPLs.

The conclusions drawn in my paper carry important implications for policymakers.

I show that the imposition of new taxes is likely to prompt banks to contract their lending supply, which could intersect and potentially clash with other policy measures, such as monetary and macroprudential policies. For example, the implementation of a similar tax in the current economic environment could amplify credit contraction beyond those stemming from an elevated policy rate, a scenario that may run counter to the objectives of monetary policy. Therefore, it is crucial for fiscal, monetary, macroprudential, and other pertinent policies to work in a coordinated manner to mitigate the risk of possible unintended impacts.

The Slovenian government is set to reintroduce a temporary tax on the total assets of banks in 2024, as outlined in the Ministry's recent proposal (Ministry of Finance, 2023). This initiative is a response to the significant floods that struck Slovenia in August 2023, and the generated funds from the tax will be allocated to finance the reconstruction efforts in the areas affected by the floods.

According to the Ministry's of Finance proposal, the government aims to impose a 0.2% tax on the total assets of banks over a five-year period, spanning from 2024 to 2028. With Slovenian banks presently holding total assets valued at 52 billion EUR, this would result in an estimated annual tax burden of approximately 100 million EUR.

The actual paid amount may be lower, as the government suggests implementing a cap set at 30% of each bank's total net profits.

The reintroduction of the tax on banks' total assets would, according to the estimates, have a negative, but small, impact on bank credit supply.

Based on my estimates, the current introduction of the tax is anticipated to result in a 14 basis points increase in lending rates to corporates and a 1% reduction in credit availability.³ Several noteworthy points merit attention. Currently, the banking system differs significantly from its state in 2011, having strong capitalization, a minimal share of NPLs, and substantial profits fuelled by rising interest rates. Consequently, one might expect a milder impact in the current economic landscape. However, it is important to note that the exposure to the tax is now more substantial than in 2011. In 2011, a median bank's exposure was merely 0.3% of its capital, while the current expectation is 1.8%, as banks show high profitability and the cap of 30% of profit will likely not apply to any bank in 2024. Additionally, my estimates show only the immediate response of banks to the tax introduction, whereas the 0.2% tax rate will be in place for five years, potentially exerting additional strain on credit supply in subsequent years. In summary, the reintroduction of the tax could exert some pressure on bank lending, as also warned by the ECB (ECB, 2023b).

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³ This calculation is derived from the coefficients in column (2) of Table 1, considering that 100 million EUR of expected annual tax constitutes 1.8% of the current bank capital.