BANK LEVIES IN THE SLOVAK REPUBLIC - IMPACT ON BUDGET REVENUES AND BANKS' PROFITABILITY

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Abstract

Following the global financial crisis, several European countries introduced taxes on banks' balance sheet items, commonly referred to as bank levies. These measures were designed both to recover public expenditures associated with bank bailouts and to strengthen the stability of the banking sector. This paper investigates the fiscal significance of bank levies as well as their impact on the profitability of Slovak banks, measured by return on assets (ROA). Employing panel data for the largest Slovak and Czech banks over the period 2010-2024, we apply a difference-in-differences approach, with Slovak banks forming the treatment group and Czech banks serving as the control group. The findings indicate that, while bank levies constitute a meaningful source of public revenue, their introduction in Slovakia was associated with a statistically significant decline in banks' profitability. These results highlight a potential trade-off for policymakers between generating fiscal revenues and maintaining the profitability, credit supply, and long-term resilience of the banking sector. Despite the relatively limited dataset, this study contributes novel empirical evidence to the literature on bank levies in small open EU economies and represents, to the best of our knowledge, the first study focused specifically on the Slovak Republic.

Keywords: Bank levy, Bank taxation, Tax revenues, Bank profitability, Return on assets, Slovakia

Introduction

In the aftermath of the global financial crisis, the International Monetary Fund and the European Commission called for additional taxation of the financial sector. The reason was that during the crisis, governments spent billions of Euros to bail-out banks. In the following period, numerous governments introduced taxes targeting the banking sector, specifically. Those taxes, known as bank levies are based on selected balance sheet items, such as assets and liabilities, rather than profits. The main objectives of such levies include covering the cost of bank bail-outs and enhancing their financial stability by adjusting their balance sheets.

To begin with, we need to clarify our definition of bank levy, since there is a potential ambiguity in the terminology among both authors and institutions. For the purpose of this paper, we define bank levy as a tax using bank balance sheet items as a tax base. The OECD in its categorization (ESA, 2010) considers bank levies to be taxes. Similarly, various authors (such as Dec and Masiukiewicz, 2011 or Devereux et al., 2019) use the terms bank tax and bank levy as synonyms, while others (Capelle-Blanchard, Havrylchyk, 2017 or Borsuk et al., 2020) consider bank levies to be a subset of bank taxes. Considering the above, we use both terms, bank tax and bank levy, interchangeably in order to describe a tax using a bank's balance sheet items as a tax base.

While taxing banks generates additional revenue for the budget, the objective of bank levies is not just to cover the cost of past bank bail-outs, but to prepare for future .crises Bank levies should serve as a Pigouvian tax, targeting certain items of a balance sheet that pose excessive risk. Thus, in theory, properly set levies should lower the systemic risk of the banking sector by influencing the banks' behavior, complementing capital regulations such as the Basels

Accords. However, given the importance of the banking sector to the whole economy, understanding how bank levies affect profitability is crucial. A reduction of profitability due to taxation is not only a concern for the bank and its shareholders. Bank profitability is an indicator of the health and resilience of the financial sector. Profitability could be linked to the volume of credit provided to the economy. According to Borsuk et al. (2020) bank levies in Poland caused an increase in interest margins and a decrease in credit supply. According to Puławska (2021a), bank levies negatively impacted loan activity in Germany. Decreasing profit could therefore lead to a reduction in loan activity, threatening healthy economic growth.

Paradoxically, bank levies could negatively affect banking sector risk, as additional taxation could present an unwanted effect on capitalization of banks as lower profit might impair capital formation and therefore creation of capital buffers. Moreover, according to Devereux et al. (2019), banks tend to increase the riskiness of their portfolios to offset decreasing profits. Therefore, a decline in profitability could represent a threat to stability by lowering the banks' ability to build proper capital buffers and by increasing their propensity to take risks in order to compensate for the lost profit.

For those reasons, policy makers should take great interest in examining the impact of bank levies not only on tax revenues, but also on the credit supply and the systemic risk in the banking sector. The question of how bank levies affect profitability remains highly relevant, especially as new forms of bank taxation continue to be debated by both academics and policy makers. In addition, empirical evidence on the effects of bank levies is mixed and further investigation is needed. As bank levies in Slovakia have not yet been systematically analyzed, this paper contributes to filling the gap in the literature.

Literature Review

In the first part of this section, we clarify our terminology regarding bank levies. We subsequently provide a brief overview of the heterogeneity of bank levies within the European Union. The third part examines bank levies in relation to budgetary revenues, while the final part specifies the theoretical framework regarding the impact of bank levies on bank profitability.

Terminology

As we mentioned in the introduction, a bank levy is a tax imposed on banks' balance sheet items. Although it represents additional taxation for banks, not every bank tax (i.e. tax paid by banks) is a bank levy. In the following section we define exactly what we consider to be bank levies and what are not.

After the Global Financial Crisis, two major proposals for bank taxation were proposed - the Financial Activity Tax (FAT) and the Financial Transaction Tax (FTT). FAT was proposed by the International Monetary Fund in 2010 and was designed to be levied on the profits or revenues of financial institutions, resembling a value-added tax from which banks are generally exempt (Dec & Masiukiewicz, 2012). Such tax was subsequently introduced in Slovakia, namely by Act No. 530/2023 Coll. Although this measure is sometimes referred to in Slovak as *bankový odvod* (literally "bank levy"), we do not classify it as a bank levy in the strict sense, as its tax base is not derived from balance sheet items.

Similarly, various forms of withholding and windfall taxation cannot be regarded as bank levies when their assessment is not based directly on balance sheet items. The OECD, in the European System of Accounts (ESA, 2010), explicitly classifies the taxation of income and

profits under category 1210, whereas bank levies come under category 6000 - "other taxes." Accordingly, we do not consider withholding or windfall taxes to be bank levies.

The same reasoning applies to Financial Transaction Tax. Although this tax was also proposed by the European Commission (2011) in the post-crisis context and was often justified on grounds similar to those underlying bank levies (such as the reduction of systemic risk or the recovery of crisis-related costs), its tax base differs fundamentally. In our definition, the purpose of the tax is not the determining factor. Rather, the decisive element is whether the tax is assessed on the basis of banking sector balance sheet items. For this reason, Financial Transaction Tax cannot be considered a bank levy.

A considerable ambiguity arises from the official designation of the tax. If the legislation of a given country labels the payment as a levy, yet the tax base is not derived from items on the bank's balance sheet, we do not consider such payment a bank levy. An illustrative case is provided in a document issued by the Irish Ministry of Finance (2023), which employs the term bank levy and even compares it to bank levies in other European countries. Nevertheless, we do not classify it as a bank levy, as its amount is not calculated directly from balance sheet items, but rather from deposit interest. The official designation is also not decisive in situations where the instrument is referred to as a contribution or a special tax. As long as the tax base is items of the bank's balance sheet, we classify such payment as a bank levy, regardless of whether the term *levy* is explicitly used or not.

Bank levies in the European Union

Most European Union countries decided to impose a tax on bank balance sheet items. However, the bank levies introduced across countries differ substantially, suggesting that no single

universally applicable model exists. In the next section, we briefly highlight the differences in bank levies among EU member states and define bank levies in Slovakia

The major difference can be observed in the tax base. While in most cases banks' liabilities are taxed, some countries (Finland, Hungary, Poland, and Slovenia) opted to tax assets. Yet even among those taxing the liabilities side of the balance sheet, the group is not homogeneous, as individual countries exempt different items from the base. Slovakia (like Portugal) reduces the tax base by the amount of a bank' equity. Belgium, the Netherlands, Germany, and the United Kingdom exclude that part of capital from the base. Spain and Cyprus narrow the base to deposits only, whereas other governments reduce the base by a certain portion of deposits - specifically those covered by national deposit guarantee schemes.

Slovakia was among the countries with the highest tax rate (0.4%), exceeded only by Hungary for banks with assets above 50 billion forints (approximately EUR 183 million at the time of the introduction of the bank levy). Other countries apply marginally lower rates, usually only a few hundredths of a percentage point. The exact ranking cannot be established, however, as in many cases banks are taxed progressively. Thus, the marginal rate differs even among banks within a single country. Another factor complicating simple comparison of rates is time. Rates are not fixed. For example, Sweden, which introduced levies as early as 2009, doubled its rate from 0.018% to 0.036% in 2011. Latvia and France likewise doubled their rates from 2012 and 2013, respectively. Cyprus slightly increased its rate in 2013. The United Kingdom underwent five rate changes between January 2011 and January 2014, resulting in six different rates. Slovakia reduced its rate from 0.4% to 0.2% in 2017. Selected countries introduced different rates for different balance sheet items. The Netherlands and the United Kingdom applied a rate on short-term liabilities (with maturity of up to one year) that was double the rate

of long-term liabilities (with maturity exceeding one year). Germany, Portugal, and Austria taxed financial derivatives separately.

In the years following the introduction of bank levies, their parameters underwent various changes in individual countries. Although we have sought to capture some of the more significant changes above, a detailed description of their evolution and the motivations behind them lies beyond the scope of this paper. It should be noted, however, that four countries (Finland, Latvia, Romania, and Slovakia) abolished bank levies some years after their introduction.

In Slovak legislation, bank levies are governed by Act No. 384/2011 Coll. on Special Levies on Selected Financial Institutions and on Amendments to Certain Acts, which came into force on 1 January 2012. The tax base for the levy is defined as the amount of a bank's liabilities reduced by the value of its equity, the amount of long-term financial resources provided to a branch of a foreign bank, the value of subordinated debt, and the value of deposits covered by deposit protection. An amendment effective from 1 September 2012 excluded the latter item from deductible components.

The original annual levy rate at its introduction was 0.4%. An amendment in 2016 reduced the rate to 0.2% annually for the years 2017 to 2020, but it was subsequently increased again in 2019 to 0.4% for 2020. Bank levies in the Slovak Republic were abolished as of 1 January 2021 by Act No. 353/2020 Coll.

Additional taxation of banks is regulated by Act No. 530/2023 Coll. on Amendments to Certain Acts in Connection with the Improvement of Public Finances. This act amended the 2012 legislation by including banks among regulated entities. In this case, however, the tax base is determined by accounting profit, not by balance sheet items. For the purposes of this paper, and

in accordance with our earlier definition, the tax introduced by Act No. 530/2023, though sometimes referred to as a bank levy, is not considered as such.

Bank levies and tax revenues

The purpose of bank levies may be considered on two levels. Firstly, it represents an attempt to reduce banks' risk exposure by taxing certain balance sheet items that increase their riskiness. However, bank levies may also serve as an instrument for generating revenue for the state budget. The rationale for introducing a bank levy may therefore be twofold - to decrease banks' risk by influencing their behavior or to secure additional tax revenue. It is important to examine whether bank levies constitute a relevant tool for revenue generation. Most governments introduced them in 2011 and 2012. However, their impact on public finances could not be assessed immediately. Our aim is to determine how bank levies contribute to budget revenue.

Buch et al. (2016) examined the revenue from bank levies in Germany between 2011 and 2016. Due to numerous exemptions and reliefs for smaller banks, the majority of the collected tax came from large banks. Overall, the amount raised from bank levies in Germany was lower than initially expected. Balutel and Voila (2021) investigated the impact of bank levies on budgetary revenue in Central and Eastern European countries. Although the authors emphasize that one of the objectives of bank levies was to support public budgets, they describe the revenue as marginal and statistically insignificant in the long term. Bank levies in relation to budget revenue were also analyzed by Borsuk et al. (2020). While the rationale behind bank levies was partly to reduce risk in the banking sector, the authors point to the case of Poland, where the government's aim was to secure additional resources for financing public expenditure, with no mention of bank levies being intended as a macroprudential policy instrument. The authors further provide examples where bank taxation was meant to finance government spending within

social policy (Latvia, Spain) or defense (Sweden). Sweikhard & Wahrenburg (2013) analyzed the effectiveness of bank levies in Germany, France, and the United Kingdom. They retrospectively calculated the tax that large banks in these countries would have paid between 2007 and 2010 and compared the result with the estimated costs of their potential bailouts. They concluded that the collected funds would not have covered the entire costs and that there would have been no full internalization of the externality.

Karpowicz et al. (2022b) examined, using a sample of thirteen EU countries between 2011 and 2019, the indicators that could potentially influence revenue from bank levies. Among macroeconomic factors, the budget deficit, net household income, and household consumption had the strongest impact. Other important factors include the size of the banking sector and banks' pre-tax profits. According to another study by Karpowicz et al. (2022b), bank taxes are effective, equitable, and associated with low administrative costs due to the limited number of taxpayers. In addition to revenue stability, they therefore fulfill all requirements of optimal taxation, as formulated by Adam Smith. The authors investigated the volatility of revenue from bank taxes and sought to identify which model ensures the most stable revenue for the state budget. They compared fluctuations in revenue from bank levies and also the volatility of other taxes and, although revenue from bank levies are associated with high volatility, they nevertheless support their introduction, due to the positive impact on the budget.

Bank levies and profitability

The theoretical channels through which a bank levy may affect bank profitability can be divided into several channels. First, from a purely accounting perspective, a levy represents an additional cost imposed on banks. If this cost cannot be fully shifted onto customers, it directly reduces net

profits and, consequently, standard measures of profitability such as return on assets (ROA). This "direct cost" channel is consistent with the general literature on the impact of taxation on bank profitability, which shows that higher tax burdens tend to compress after-tax returns unless banks are able to fully pass the tax on to other stakeholders (Demirgüç-Kunt & Huizinga, 1999, 2000; Albertazzi & Gambacorta, 2010).

Second, the incidence of the levy depends on the extent to which banks can adjust prices and balance sheet structure. Banks may attempt to preserve their profitability by increasing lending rates, lowering deposit rates, or raising fees and commissions (Albertazzi & Gambacorta, 2010; Chiorazzo & Milani, 2011). To the extent that such pass-through is feasible, the burden of the levy is partly shifted to borrowers and depositors. However, competitive pressures, regulatory constraints and political considerations may limit the degree of pass-through, especially in concentrated but strongly supervised banking systems. Incomplete pass-through implies that a non-negligible share of the levy is ultimately borne by banks' shareholders in the form of lower profits.

Third, bank levies may affect bank behavior through risk-taking incentives. Devereux et al. (2019) show that European banks can respond to the introduction of levies by rebalancing their portfolios towards riskier assets in an attempt to offset the negative impact on profits. Similar patterns are documented or discussed in country-specific studies such as Borsuk et al. (2020) for Poland. If the levy compresses profits and banks cannot fully pass on the cost, they may seek higher-yielding assets, thereby increasing the riskiness of their portfolios. This "risk-shifting" channel implies that, paradoxically, a policy tool intended to internalize systemic risk could, under certain conditions, increase the risk profile of banks.

Fourth, bank levies can influence the banks' ability to accumulate capital and supply credit to the economy. Lower profitability reduces retained earnings, which are an important source of capital formation. A persistent levy may therefore slow the build-up of capital buffers. In addition, if banks respond to the levy by tightening lending or curbing credit growth, the measure may have a counterproductive effect on the real economy (Borsuk et al., 2020; Puławska, 2021a, 2021b). From a macro prudential perspective, these dynamics are important, because bank profitability is not only a private objective of shareholders but also a determinant of the resilience of the financial system.

On the basis of these mechanisms, the expected sign of the impact of a bank levy on profitability is unambiguously negative, at least in the short to medium term. The magnitude of the effect, however, is an empirical question and may differ across countries due to the design of the levy, the structure of the banking sector and macroeconomic conditions. For Slovakia, where the levy rate was relatively high by international standards and applied to a concentrated, mostly foreign-owned banking sector, the direct cost and capital formation channels are likely to be particularly relevant.

This paper focuses on the profitability dimension and, in line with the above discussion, tests the following main hypothesis: H1**:** The introduction of the bank levy in Slovakia is associated with a statistically and economically significant decline in banks' return on assets (ROA), after controlling for macroeconomic conditions and bank-specific characteristics.

The next section presents an empirical analysis designed to isolate the effects of the levy from other determinants of profitability and tests the hypothesis with a difference-in-differences framework using Czech banks as the control group.

Methodology and Data

The empirical analysis consists of two parts. First, we examine the fiscal relevance of the bank levy in Slovakia in a comparative European context. Second, we estimate the impact of the introduction of the levy on bank profitability using a difference-in-differences (DiD) framework.

For the revenue analysis, the primary data source is Eurostat, which reports national tax revenue and, for most of the countries considered, specific categories related to taxes or levies on financial institutions. From Eurostat, we obtain annual total tax revenue and revenue from bank levies for the selected countries. Information on government expenditure associated with the rescue of financial institutions during the global financial crisis is taken from Millaruelo & Del-Río (2017). We consider direct fiscal costs, such as capital injections and other cash expenditure, and exclude guarantees and approved but undisbursed amounts. This allows us to compare, in a stylized way, the cumulative revenue from bank levies with the fiscal costs of crisis-related interventions.

To assess the effect of the bank levy on bank profitability, we estimate a panel regression model using the difference-in-differences (DiD) methodology with bank fixed effects. DiD is widely used to evaluate the impact of policy changes, such as taxes and levies imposed on banks (Buch et al., 2016; Capelle-Blancard & Havrylchyk, 2017). The basic idea is to compare the change of a dependent variable - in our case ROA - between a treated group and a control group before and after the introduction of the policy. Under the assumption of parallel trends, any systematic divergence in outcomes after the introduction of the levy can be attributed to the treatment.

In our setting, Slovak banks constitute the treated group, as they were subject to the bank levy introduced in 2012. Czech banks serve as the control group because the Czech Republic did

not introduce such a levy during the period. The choice of Czech banks as a control group is justified by several structural similarities between the two countries and their banking sectors. Both Slovakia and the Czech Republic are small, open economies in Central Europe that underwent a transition from centrally planned to market economies, including comprehensive reform of their financial sectors. In both countries, the banking system is highly concentrated and dominated by foreign-owned banks, and banking regulation and supervision are aligned with European Union standards. Although the Czech Republic is not part of the euro area, the two economies are closely integrated and share similar macroeconomic dynamics. These similarities support the plausibility of the parallel trends assumption, namely that in the absence of the levy, profitability in Slovak and Czech banks would have evolved in a comparable way.

Formally, the DiD specification can be written as:

$$ROA_{it}=\alpha+\beta Levy_{it}+\gamma' X_{it}+\mu_i+\lambda_t+\varepsilon_{it}$$

Where ROA_{it} denotes the return on assets after tax of bank i in the year t, $Levy_{it}$ is a treatment indicator that takes the value of 1 for Slovak banks during the years in which the bank levy was in force (2012-2020), and 0 otherwise, X_{it} is a set of control variables, μ_i captures unobserved time-invariant bank-specific effects and λ_t are year dummies capturing common shocks. The coefficient of interest, β, measures the average effect of the bank levy on bank profitability.

The data set underlying the DiD estimation covers eight banks - four of the largest Slovak banks and four of the largest Czech banks - over the period 2010-2024. We exclude the year 2009 from the sample because it was still heavily influenced by the global financial crisis. Banks' behavior and profitability in that year were characterized by unusually high volatility and do not represent typical conditions. Dropping 2009 improves the stability of the estimates and

reduces the risk that the results are driven by crisis-specific dynamics rather than the introduction of the levy.

The dependent variable is return on assets after tax, calculated as net profit after tax divided by average total assets. ROA is a standard measure of bank profitability and is commonly used in the literature on bank taxation and levies (Buch et al., 2016; Devereux et al., 2019). To account for macroeconomic conditions, we include the real GDP growth rate and the main policy interest rate of the respective central bank (the National Bank of Slovakia and the Czech National Bank). Stronger economic activity is expected to increase loan demand and improve asset quality, thereby supporting higher profitability, while changes in monetary policy influence net interest margins and therefore ROA.

We further control for a set of bank-specific variables that capture differences in size, efficiency, asset quality and capitalization. The logarithm of total assets is proxy for bank size, as larger banks may benefit from economies of scale, but they can also face more complex regulation and governance challenges. The cost-to-income ratio (CTI) reflects operational efficiency - a lower CTI indicates that a bank is able to generate income with relatively lower costs, which should be associated with higher ROA. The ratio of non-performing loans to total loans (NPL ratio) serves as a measure of asset quality. Higher NPL ratios are typically linked to higher credit risk and provisioning needs, which depress profitability. Finally, the equity ratio, defined as equity divided by total assets, captures capital adequacy. While higher capital provides a buffer against loss and can enhance stability, it also implies lower leverage, which may reduce returns for a given level of assets.

All bank-level data are manually collected from annual balance sheets and financial statements of the selected banks. Macroeconomic variables are obtained from Eurostat, the

National Bank of Slovakia and the Czech National Bank. The use of bank fixed effects μ_i allows us to control for time-invariant characteristics of each institution, such as business model, risk appetite or managerial quality, which could otherwise bias the estimates. Year dummies λ_t absorb shocks common to all banks in a given year, including changes in EU regulation, international financial conditions or regional business cycles. To address potential serial correlation and heteroskedasticity within banks over time, we compute robust standard errors clustered at the bank level.

The credibility of the DiD approach relies on the assumption that, in the absence of the levy, profitability in Slovak and Czech banks would have followed comparable trends. Although a formal statistical or graphical pre-trend test is limited by the small number of banks and relatively short pre-treatment period, the institutional context provides strong justification for the assumption. Slovakia and the Czech Republic share a closely aligned historical, regulatory and macroeconomic environment, with banking sectors that are similarly structured, highly concentrated and dominated by foreign-owned institutions. Both countries operate under harmonized EU regulatory frameworks and exhibit comparable cyclical patterns in credit growth and monetary conditions. These structural similarities support the view that Slovak and Czech banks would have evolved along parallel profitability trajectories in the absence of the levy, lending credibility to our identification strategy.

Results and Discussion

The first part of this section examines the contribution of bank levies to total tax revenue in Slovakia and compares these findings to selected countries of the European Union. The second

part employs a difference-in-differences regression framework to assess the impact of the introduction of bank levies on the profitability of Slovak banks.

Tax revenue from bank levies

Over a nine-year period, Slovakia collected approximately EUR 1.3 billion through bank levies. Throughout their duration, these levies accounted for nearly one percent of total tax revenue. Slovakia is compared with the two other V4 countries that introduced such levies, Hungary and Poland, while the Czech Republic did not implement a bank levy. For comparative purposes, the analysis also includes three small, developed Western European economies that may serve as potential benchmarks for Slovakia as a converging economy. In addition, the two largest EU economies, Germany and France, are incorporated into the comparison.

Table 1 reports bank levy revenues by year and country, expressed in millions of units of national currency. Figures in parentheses indicate the share of bank levy revenue in total tax revenue. A blank cell denotes that the levy had not yet been introduced in the given year, or had already been abolished

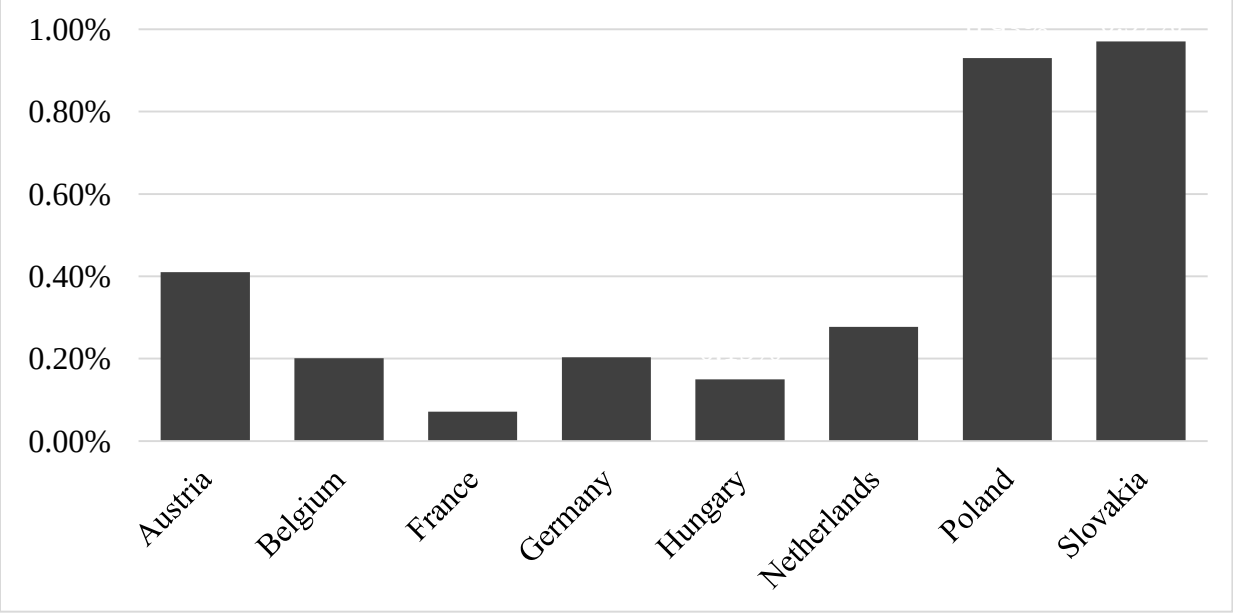
Table 1. Bank Levy Revenue and Their Share in Total Tax Revenue in Selected Countries

	Austria	Belgium	France	Germany	Hungary	Netherlands	Poland	Slovakia
2010					11584 (0.17%)			
2011	510 (0.60%)		495 (0.09%)	590 (0.10%)	11532 (0.17%)			
2012	583 (0.66%)	238 (0.20%)	1026 (0.17%)	690 (0.11%)	10040 (0.14%)	536 (0.39%)		170 (1.41%)
2013	588 (0.64%)	167 (0.13%)	899 (0.15%)	520 (0.08%)	10178 (0.13%)	507 (0.36%)		204 (1.56%)
2014	586 (0.62%)	135 (0.11%)	979 (0.16%)	520 (0.08%)	9121 (0.11%)	448 (0.30%)		153 (1.10%)
2015	554 (0.56%)	380 (0.29%)	591 (0.09%)	1578 (0.22%)	9780 (0.11%)	478 (0.30%)		110 (0.73%)
2016	572 (0.59%)	278 (0.21%)	529 (0.08%)	1774 (0.24%)	9464 (0.10%)	473 (0.28%)	3875 (1.00%)	120 (0.78%)
2017	343 (0.34%)	251 (0.18%)	436 (0.06%)	1720 (0.22%)	8663 (0.09%)	478 (0.26%)	4349 (1.03%)	127 (0.78%)
2018	341 (0.32%)	285 (0.20%)	285 (0.04%)	1997 (0.25%)	7439 (0.07%)	447 (0.23%)	4524 (0.97%)	134 (0.78%)
2019	348 (0.32%)	271 (0.19%)	29 (0.00%)	2011 (0.24%)	8362 (0.07%)	449 (0.21%)	4816 (0.96%)	143 (0.78%)
2020	357 (0.35%)	302 (0.22%)	28 (0.00%)	2251 (0.29%)	8881 (0.07%)	447 (0.21%)	4731 (0.92%)	149 (0.82%)
2021	95 (0.08%)	347 (0.23%)	28 (0.00%)	2520 (0.28%)	5578 (0.04%)	699 (0.31%)	5352 (0.86%)	
2022	124 (0.10%)	448 (0.27%)	28 (0.00%)	3406 (0.35%)	8729 (0.05%)	472 (0.19%)	6122 (0.92%)	
2023	152 (0.11%)	330 (0.19%)	28 (0.00%)	2664 (0.27%)	132474 (0.70%)	458 (0.16%)	5901 (0.80%)	

Source: Authors‘calculations based on Eurostat data

For Germany and Belgium, bank levy revenue is aggregated with contributions to the Single Resolution Fund, established in 2015, as our data do not allow for these components to be separated. Therefore, we cannot determine with certainty the precise amount of revenue collected from the levy in Germany and Belgium after 2015. The actual figures are likely to be lower than those reported in Table 1 and Chart 1. In France, where the two components can be disentangled, based on the data, a substitution effect is observable. Revenue from the bank levy (*Taxe de risque systémique*) gradually declined in favor of contributions to the Single Resolution Fund. Hungary stands out in the final year of observation. In the summer of 2022, the Hungarian government introduced a withholding tax that is recorded in the dataset as extraordinary taxation of financial institutions, combined with the bank levy (*Pénzintézetek különadója*). This aggregation may have contributed to the sharp increase in reported bank levy revenue in 2023.

Chart 1. Average Contribution of Bank Levies to Tax Revenue



Source: Authors‘calculations based on Eurostat data

The highest average share of bank levy revenue in total tax revenue was recorded in Slovakia and Poland. The Polish government introduced the levy explicitly as a means of generating resources for public expenditure, without presenting it as a macroprudential instrument (Borsuk et al., 2020). The evidence suggests that Poland successfully achieved this fiscal objective, with revenue from the levy also appearing more stable than in most other countries under review. Similarly, Slovakia's bank levy revenue, when measured relative to total tax revenue, was substantially above the cross-country average. Notably, among the eight countries analyzed, Poland and Slovakia are precisely those whose governments, according to Millaruelo and Del-Río (2017), devoted only negligible resources to the rescue of financial institutions, as illustrated in Table 2.

Table 2. Bank Levy Revenue and the Costs of Rescuing the Banking Sector

	Austria	Belgium	France	Germany	Hungary	Netherlands	Poland	Slovakia
Costs	11.8	21.0	25.0	69.0	2.7	53.4	-	-
Revenues	5.2	3.4	5.4	22.2	0.7	5.9	9.0	1.3
Coverage	44.1%	16.2%	21.6%	32.2%	25.9%	11.0%	-	-

Source: Authors'calculations based on Eurostat data and Millaruelo and Del-Río (2017)

Based on the above, we conclude that Slovakia generated a relatively large volume of fiscal resources through bank levies. Over their period of validity, these levies accounted for nearly one percent of total tax revenue. At the same time, it is important to emphasize that the Slovak government's expenditure on rescuing the financial sector during the global financial crisis was negligible. Bank levies thus represented a relevant and non-trivial source of budgetary revenue.

Impact on Profitability

The following part presents the results of DiD regression, examining the impact of bank levies on profitability, measured by return on assets. Using Czech banks as a control group, the model includes robust standard errors clustered at the bank level and controls for macroeconomic conditions, bank-specific characteristics and year fixed effects.

The estimated negative coefficient on the levy indicator is consistent with the theoretical mechanisms outlined in Section 1. The introduction of the levy increased the banks' cost base and, given the relatively high rate and the concentrated structure of the Slovak banking sector, it appears that the tax could not be fully passed on to customers through higher lending rates or lower deposit rates. As a result, a substantial part of the burden was borne by banks in the form of lower profits, which is reflected in the decline of ROA. At the same time, the magnitude of the estimated effect suggests that the levy reduced profitability in an economically meaningful way, rather than merely generating a negligible adjustment. This aligns with the view that bank levies, especially when designed with relatively broad bases and high rates, can affect the banks' ability to generate capital and absorb shocks. Table 3 provides an overview of the dataset.

Table 3. Summary data (all banks, 2010-2024)

Variable	Obs.	Mean	Std. dev.	Min	Max
Return on assets	120	0.0113	0.0033	0.0044	0.0191
GDP growth	120	0.0218	0.0244	-0.0530	0.0680
Interest rate	120	0.0128	0.0190	0.0000	0.0697
Equity ratio	120	0.0919	0.0155	0.0556	0.1278
NPL ratio	120	0.0406	0.0267	0.0117	0.1463
CTI ratio	120	0.5013	0.0758	0.3911	0.7450
Log total assets	120	9.9559	0.7146	8.6554	11.3311

Source: Authors' calculations using data from banks' financial statements

Table 4 shows an estimation of the impact of bank levies on profitability (ROA). Overall R^2 value is 0.8151, indicating that the model explains over 81 % of the variation in bank profitability over time. Bank fixed effects and year dummies are included, but not reported. The standard errors (in parentheses) are robust. Significance levels are * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4. DiD estimation

Variable	Coefficient	Robust SE
Bank levy (0;1)	-0.0012534**	(0.0005068)
GDP growth	-0.0102446	(0.0151471)
Interest rate	0.040615	(0.0268522)
Equity ratio	0.0294126	(0.0231784)
NPL ratio	-0.0076406	(0.0084568)
CTI ratio	-0.029372***	(0.0034920)
Log total assets	0.0006002	(0.0018132)
Constant	0.0195176	(0.0197277)

Source: Authors'calculations using data from banks' financial statements

The estimated coefficient for bank levie is negative, indicating that the introduction of the levy is associated with a reduction in bank profitability, which is consistent with the theory. A coefficient of -0.0012534 suggests that the levy caused a reduction in return on assets by approximately 0.125 percentage points. While this reduction might seem modest, the average ROA of banks in our dataset is 1.133 %. Therefore, the implementation of the bank levy could have reduced the ROA of Slovak banks by approximately 10 %. This represents an economically meaningful adverse effect on profitability of Slovak banks.

These findings are consistent with the theoretical expectation outlined in Section 1, and the estimated negative and significant coefficient provides empirical support for Hypothesis H1, which predicted a decline in profitability following the introduction of the levy.

In the DiD estimation, control variables are included to account for characteristics that may vary across units or over time and could affect profitability. While these controls are not required to be statistically significant, their inclusion improves the precision of the estimated treatment effect. Therefore, even statistically insignificant controls serve an important role in ensuring that estimated causal effects are not driven by systematic differences.

Although the result is statistically significant at 95 %, the sample is quite small for any decisive conclusion to be drawn. The low number of observations is due to the high concentration of banks in Slovakia and Czech Republic, as there are few independent domestic banks in both countries. Moreover, the manual collection, processing and evaluation of the data is quite time-consuming. At the same time, older data are not always standardized, therefore additional calculations and sorting was necessary. For further research, it would be appropriate to expand the list to also include smaller banks. It is worth considering whether to increase not only the number of banks but also the range of years before the implementation of the bank levy.

At the same time, it is possible to expand the control group by including not only Czech banks but also other countries - provided that the assumption of parallel trends is met. While we could expand the control group relatively easily, the treated group (i.e. Slovakia) is more problematic. The design of bank levies shows high heterogeneity across countries, therefore we cannot simply combine data from Slovak banks with, for example, Hungarian or Polish ones, where the design of the levy is fundamentally different.

While the statistical significance of the DiD estimation is weakened due to the low number of banks in the data sample, our results give a general idea about the impact of the levy on bank profitability, one of the key banking characteristics. Decreasing the profitability of banks through the imposition of additional taxation (such as the bank levy) has several adverse effects for the broader economy.

Firstly, diminishing profitability might affect the banks' ability to provide credit to companies and consumers. A reduction of lending activity could slow down the economy. Secondly, profitability serves as a buffer against shocks. While banking regulation made progress in the wake of the great financial crisis, a less profitable banking sector has finer margins to absorb market volatility, raising systemic risk. Therefore, a decrease in profits could negatively affect the whole economy through a tightening of credit supply and decreased financial sector stability.

While the analysis provides indicative results, the size of the dataset limits the generalisation of our findings. Further research should expand the dataset. Adding smaller banks from Slovakia and the Czech Republic while also expanding the control group should enhance the robustness of our results.

Conclusions

The evidence presented indicates that the bank levy generated a relatively large volume of fiscal resources in the case of Slovakia. Over their period of validity, the levies contributed almost one percent of total tax revenue. At the same time, it is important to emphasize that the Slovak government's direct expenditure on the rescue of the financial sector during the global financial crisis was negligible. Bank levies thus represented a non-trivial source of tax revenue. The

Slovak case therefore illustrates how bank levies, while often motivated by macro prudential concerns, can effectively evolve into instruments of general fiscal policy.

On the other hand, the introduction of bank levies caused a decrease in bank profitability. We examined the impact of the bank levy on the profitability of Slovak banks, using difference-in-differences methodology on a panel data of the largest Slovak and Czech banks from 2010 to 2024, where Czech banks were used as the control group. Our model estimation suggests that the introduction of the bank levy is associated with an economically significant reduction in return on assets of Slovak banks. These results point to the important impact of the bank levy, as bank profitability is crucial not only for banks and their shareholders, but also for the economy as a whole. Decreasing profit might inhibit capital creation and therefore increase the systemic risk of banks. Moreover, it might negatively affect credit supply, posing risk to economic growth. Therefore, the study presents an insight for policy makers in the field of taxation and covers an important gap in research on bank levies. The main shortcoming of the examination of banks' profitability lies in the relatively small dataset, which may limit the generalizability of the results and reduce the interpretative power of the estimations. Therefore, our findings should be viewed as indicative rather than definitive. The results might be an important step in understanding the potential effects of bank levies. Further research should be conducted using larger and more comprehensive datasets.

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