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Tax Planning by European Banks

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Abstract

This paper explores profit shifting behaviour by European banks through a newly available data source. Financial institutions as of 2014 started disclosing their activity on a country-by-country level following the CRDIV EU Directive. The country-by-country reporting (CbCR) requires European banks to file their revenues, profits, number of employees and taxes paid in all countries where they operate including tax haven countries. In this paper, I construct the database for bank CbCR from the banks filings and annual reports. The database includes 51 European banks headquartered in 18 different European countries between 2014 and 2020. I use the database to study profit shifting arising from international tax differences between countries. I find that the banks' profits are sensitive to the tax rate suggesting that banks lower their tax burden through their affiliates. The size of banks seems to have an effect, the larger the bank group, the more it might engage in tax planning. Profit shifting is estimated by using the tax differential methodology. The findings show that profit shifting by the top European banks is around 4-3% percent of the total profits booked abroad. This implies tax revenue losses of up to 3-2%. The introduction of a global minimum tax of 15% would generate between 300 to 2 billion euros depending on the final rules implemented.

Keywords: Profit shifting, Tax planning, Banks, country-by-country reporting

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1. Introduction

Tax havens are a well-known and ongoing concern of many governments. In the past ten years, many scandals have occurred shedding light on schemes related to tax avoidance and evasion. The Swiss bank UBS was accused of providing technical assistance to its US customers to hide $20 billion abroad; subsequently, Germany and France launched similar investigations. In 2015, the leaks exposed the HSBC banking group, suspected of tax evasion and money laundering. In 2016, the Panama papers revealed the activity of international banks in tax havens. The leaks showed that banks play a role in setting up front companies, foundations and trusts to facilitate tax evasion and money laundering for the benefit of their clients. However, little research focus on the profit shifting of the banks. That can be due to the fact that banks have a special business model. In a globalized world, opportunities for profit shifting may arise due to tax rates differences among countries. That may explain why the corporate tax rates are declining. The United States cut its tax rate from 35 percent to 21 percent in 2018 most probably to maintain its attractiveness in facing profit shifting. In this context, banks might be willing as other multinationals to benefit from low tax rates and engage in tax planning.

Corporate tax base erosion due to profit shifting is a large and consequential problem that may cause lower governments spending, budget deficits and new forms of indirect or direct taxes to compensate the diminishing corporate tax revenues. In this context, estimating the size of the profit shifting is of a great deal. Quantifying profit shifting gives an idea about the revenues escaping the tax system. It is as well of a great importance to check which countries are benefiting from profit shifting and which countries are suffering from its drawbacks. This can give more clarity on the direction of profit shifting among countries, which will help in the identification of the loopholes in the text laws. Big multinationals should also be assessed to check if some are more tax aggressive than some others in engaging in profit shifting. Most of prior studies focus on profit shifting by non-financial multinationals.

When it comes to estimating profit shifting, the main challenge is the access to data. Many researchers use the corporate financial and balance sheet micro-data from Orbis. It has been shown that these data suffer from many limitations because not all the profits are recorded (most of the profits in tax havens are missing). The data used in this paper do not suffer from these limitations, as the banks must report their activity in each country where they operate. As of 2014, the financial institutions in Europe started disclosing their activity on a country by-country level, following an EU directive (Directive 2013/36/EU). The disclosures include the net banking income, the earnings before tax, the amount of taxes paid and the number of full-time employees for each country were the bank has an affiliate. The data were hand collected and cover 51 European banking groups between 2014 and 2020 plus a number of foreign banks that operate in the EU. This novel data permits to answer some very important questions: Do banks choose to have affiliates in low tax locations? If all countries had the same corporate tax rate, which would gain or lose profits? What are the tax revenue losses? There are few studies that analyzed the Country-by-Country Reporting that was imposed on European banks. Jansky (2020) document misalignments of locations of profits and economic activity without estimating the profit shifting by the banks. The authors in Bouvatier et al. (2019) try to assess profit shifting by European banks by using a gravity model for the years 2015 and 2016 and

base their estimations on the banks' net income. Fatica & Gregori (2020) estimate profit shifting to be around EUR 9 billion with a sample of 27 European banks from 2014 to 2016.

In this paper, I implement the tax differential approach to estimate profit shifting. It is a widely used method in the literature (Hines & Rice, 1994 and Huizinga & Laeven, 2008). This approach consists of estimating the tax semi-elasticity of profits. Then this elasticity is used to compute the true profits, in each country were the bank operates, absent tax differences between the foreign country and the home country of the bank. The findings suggest that banks engage in tax planning and that profit shifting by the top European banks is estimated to be around 5% percent of the profits booked abroad. The tax revenue losses are estimated to be around 5% percent of the total tax revenues from banks.

2. Literature Review

In many countries, policy makers have raised increasing concerns about profit shifting and the implied corporate tax base losses. The empirical identification of the existence and magnitude of profit shifting is not straightforward. Most existing studies are using an indirect identification method that measures the impact of changes in corporate tax rates on the profits of multinational subsidiaries. Huizinga and Laeven (2008) use the weighted tax rate differential with all other subsidiaries. They find significant evidence of profit shifting between subsidiaries and their parent firms as well as among the subsidiaries themselves. Johannesen et al. (2019) implement the unweighted tax rate differential with other subsidiaries. They provide evidence that European MNEs shift profits to lower-tax rate countries and that large MNEs also exploit mismatches between tax systems and preferential tax treatments to reduce their tax burden. Lohse and Riedel (2013) use the simple corporate tax rate. They test for profit shifting behavior by assessing the hypothesis that the host country's corporate tax rate exerts a negative impact on the affiliate's reported profits. They also reassess the profit shifting hypothesis by testing for a negative effect of the affliates' corporate tax rate difference with all other majority-owned entities within the multinational group (unweighted average) on reported operating profitability.

Using the BEA data, Clausing (2016) finds that taxable income is very sensitive to corporate tax rates. Estimates of tax sensitivity are used together with data on reported foreign income to calculate how much "extra" income is booked in low-tax countries due to profit shifting. Then the author estimates what the tax base would be in the United States without profit shifting. According to her estimates, profit shifting cost the US between $77 billion to $111 billion in 2012. Dyreng et al. (2013) focus on Delaware and find that US companies with Delaware subsidiaries reduce their tax burden by 15 to 24 percent. By using data about manufacturing plants in Europe, Egger et al. (2010) find that multinationals earn significantly higher profits than comparable domestic units in low-tax countries but significantly lower ones in high-tax countries. Using macro data on foreign affiliates, Tørsløv et al. (2018) estimate profit shifting by comparing the profitability of local companies to those of the foreign ones. They find that nearly 40 percent of the profits of multinationals are transferred each year to tax havens worldwide (more than 600 billion euros in 2015). Countries of the European Union seem to be the main losers of this evolution.

The literature dealing with profit shifting focus on multinational companies with no particular focus on financial firms. Little work sheds the light on the financial or banking sector. This might be due to the special business model of banks. However, Banks play a fundamental role in tax havens, which is hardly a surprise. Demirguc-Kunt and Huizinga (2001) check the determinants of bank profitability while distinguishing between local and foreign banks. Using data on the taxation of domestic and foreign banks over the period 1988-1995 in 80 countries, including several well-known tax havens (Hong Kong, Luxembourg, Panama, etc.); they find that taxes paid by foreign banks rise relatively little with the local statutory tax. This evidence supports the hypothesis that foreign banks engage in relatively extensive profit shifting. More recently, Merz and Overesch (2016) use the Bankscope database and show that banks practice profit shifting themselves, even more than non- financial multinational frms. While profit shifting activities are often associated with intangible assets and manipulation of transfer prices for firm specific goods, profit shifting activities of banks rely on manipulating intra-firm transactions (interest margin or services fees) and allocating certain functions and risks (credit management, investments analysis and the underwriting function). The authors find that reported earnings of multinational bank's subsidiaries significantly respond to host country tax incentives. Based on regulatory data from the German central bank, Langenmayr and Reiter (2017) confirm that banks that are present in OFCs can easily optimize their tax bills. Chernykh and Mityakov (2017) establish a strong link between the extraterritorial activities of banks and the tax evasion of companies that do business with these banks, based on a unique Russian data set. They find that offshore active banks facilitate the transfer of funds abroad for tax evading companies. Based on BIS locational database, Barake et al. (2018) show that banks have higher intra-group activity in tax havens than non-havens. This might suggest that banks shift some of their activities offshore.

There is as well a recent growing literature that deals with the Country-by-Country reporting (CbCR). Murphy (2016) argue that country-by-country reporting is needed so that tax authorities would be able to undertake risk assessments on the corporate tax returns they receive to determine which ones they wish to investigate. Overesch and Wolf (2017) find that European multinational banks increased their tax expenses relative to unaffected other banks after Country-by-Country Reporting became mandatory. In another work, Jansky (2020) explore the misalignment of location of profits and economic activity as well as the use of tax havens and present these findings as indirect evidence of profit shifting by European banks. Based on the individual country-by-country reporting published by the 37 largest European banks, Bouvatier et al.(2019) implement a gravity model to estimate profit shifting. They find that the tax savings for EU banks is estimated between 1 and 3.6 billion euros. The study by Fatica and Gregori (2020) is also closely related to this work. The authors try to assess profit shifting by European banks. However, the sample used in their work comprise 27 banks headquartered in 8 different EU countries while the data constructed for this study incorporates 51 European banks headquartered in 18 different European countries. Adding to that, their sample is based on 2 years while this study time frame covers 7 years from 2014 to 2020. New research is being introduced thanks to the publication of the OECD macro CbCR data and micro CbCR data. Fuest et al (2022) estimate profit shifting by multinationals by using micro CbCR data for German multinationals. Their findings are similar to the ones of this paper regarding the magnitude of profit shifting. The OECD macro CbCR data is publicly available and has

been recently used as well to determine profit shifting (Garcia-Bernardo & Jansky, 2022). This paper presents semi-tax elasticity coefficients, estimates profit shifting and tax revenue losses for European banks. Moreover, in this work, potential revenue gains from the introduction of a global minimum tax are computed.

3. Empirical Approach

The methodology employed in this paper follows a widely used approach in the literature to estimate profit shifting. The analysis is based on the theoretical model developed by Huizinga & Laeven (2008) which extends the work by Hines & Rice (1994). According to their model, the observed profits can be expressed as the sum of the true profits and profits shifted into the a jurisdiction i minus the cost of profit shifting. In order to estimate profit shifting, the authors compute the level of true profits by using the estimated tax elasticities in order to obtain profits without the effect of taxes. Once the level of true profits is determined, it would be possible to assess profit shifting. Most economists use an indirect method that is based on the tax differences among countries (Clausing, 2016; Johansson et al., 2017, Garcia-Bernardo & Jansky, 2022; Fuest et al 2022). Therefore, the analysis consists first of regressions that relate affiliates' profits to tax rates which serve to obtain tax semi-elasticities of affiliates' profits. A negative relationship between profits and the level of taxation in a country would suggest profit shifting. The baseline specification is as follows:

$$\text{Log}(\pi_{ikt}) = \beta_0 + \beta_1 \text{Tax}_{it} + \beta_2 \text{Firm}_{kt} + \beta_4 \text{Country}_{it} + \varphi_i + \gamma_k + \theta_t + e_{ikt.} \quad (1)$$

where π_{ikt} are the profits before tax reported by each bank k in the jurisdictions i where it has an affiliate in year t. Firm_{ikt} includes two variables describing the bank activities. These variables are the number of employees reported by each bank k in the jurisdictions i where it has an affiliate in year t and the total assets for each bank in year t. Country_{it} includes the log of GDP, the log of GDP per capita, the log of distance between the affiliate and the headquarter country and an indicator for the governance constructed from the Worldwide Governance Indicator by the World Bank. The equation contains as well a set of fixed effects: country fixed effects φ_i that control for unobserved time-invariant differences among jurisdictions, group dummies γ_k to account for the structure of each bank and year dummies θ_t. Since the profits before tax variable comprise several observations with zero values, the value of one is added for every observation in order to use the log specification while preserving the sample size. The same is done for the variable of number of employees.

The variable of interest is Tax_{it} which reflects the level of taxation in country i. In this work, several variables are used as a proxy for the level of taxation: the statutory tax rate, the effective tax rate and tax rate differentials. The statutory tax rate is obtained from KPMG. The effective tax rate is calculated based on the bank CbCR data as the sum of taxes paid by all foreign affiliates in country i divided by the sum of profits before tax of affiliates in that same country. To circumvent endogeneity problems, effective average tax rates are computed only for countries in which at least two banks have affiliates in our sample. The statutory tax rate is used instead for countries where it is not possible to calculate an effective tax rate. Adding to that,

two tax rate differentials are constructed. The first one consists of the unweighted average of the bilateral tax differentials between country i and all other affiliates of the bank group k using the effective tax rate. The second one is the same but using statutory tax rates instead of effective tax rates. The tax differential calculations incorporate the headquarter country's tax rate along with the bank group affiliates.

The different tax variables are all tested in the baseline regression. Equation 1 is then modified by adding the squared realization of the tax variable to check whether the tax-sensitivity of profits varies across high and low-tax countries. Different sub-samples are also used in order to check how profit shifting varies across the type of bank, the size and level of intangibles. For these specifications, the effective tax rate is used, which is the preferred measure in this study. The disadvantage of this tax measure is that it could be affected by loss carry-forwards. However, the ETR is still a better proxy than the statutory tax rate as it reflects the true level of taxation as it is what the bank had to pay. Many countries have high statutory tax rates but introduces several exemptions which makes the real level of taxation disconnected from the official rate.

4. Data

4.1. Bank CbCR Data

The dataset in this study is based on different sources; the main one is the Country-by- Country Reporting data (CbCR). The CbCR reporting started recently in 2014 following the Article 89 of the CRD IV Directive 2013/36/EU. Banks that operate in the EU became obliged to disclose annually, for each country in which they have an establishment, the following items: turnover (net banking income), number of employees (on a full-time basis), profit or loss before tax, tax on profit or loss and the public subsidies received. I hand collected the data of CbCR from the banks' annual reports for the years 2014-2020. The empirical analysis includes all 37 of the largest and systemically relevant international banks based in Europe. The European Banking Authority (EBA) publish each year a list of systemic banks. I include the largest European banks that are listed as systemic by the EBA. The sample includes other non-systemic banks that are also headquartered in the EU.

Overall, I gather data on 37 multinationals systemic banks headquartered in 11 European countries (i.e. Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the United Kingdom), and operating in 90 jurisdictions worldwide. Adding to that, the sample also contains data on 14 European non-systemic banks headquartered in 10 European countries (i.e. Austria, Bulgaria, Luxembourg, Cyprus, Belgium, Denmark, Finland, Greece, Hungary and Ireland). The full list is reported in Table A1 in Appendix A. In the sample, some banks operate in as many as 79 countries while others have operations in only one country other than their domestic market. Some banks do not operate in countries listed as tax havens[2], while some banks are implemented in 18 different tax haven countries. According

[2] This work use the list of tax havens by Tørsløv et (2018) : Bahamas, Andora, Aruba, Anguilla, Antigua and barbuda, Bermuda, Bahrain , Barbados, Belgium, Belize, Antilles, british virgin islands, cayman islands, curacao, isle of man, Jersey, Guernsey, Gibraltar, Grenada, Cyprus, Hong Kong, Ireland, Lebanon, Liechtsenstein, Luxembourg, Macao, Malta, Marshall islands, Monaco, Mauritius, Netherlands, Panama, Puerto rico, Seychelles,

to this sample, it can be said that 25 percent of the countries where the European banks locate themselves are tax haven countries. Among the top ten countries with the highest foreign profits, we can find three well documented tax havens: Hong Kong, Luxembourg and Belgium (Figure A1). The US and the UK are as well in the top locations with foreign profit. They are considered as possible tax havens according to the Tax Justice Network. On average, around 60% of profits of European banks are booked abroad, with 40% booked domestically. The profits in tax havens are around 16% (Figure A.2). For more details about the construction of the database, please see Appendix D.

The data on CbCR is obtained either from the bank's annual report or from a separate report filed by the bank under "capital requirements" or "country-by-country reporting". For each bank and for each year, the report must be found, and the following variables are retrieved: Net Banking Income, Earnings before Tax, Taxes Paid, and the Number of Full- Time Staff. Generally, the reporting is homogeneous among the different banks. However, some banks report the business segments of their activities while others do not. A limited number of banks reports the assets by country. For the taxes paid, certain banks report total taxes paid, current taxes paid and deferred taxes. The current taxes paid are used in this work. As for the other variables, they are gathered from various sources. The GDP is taken from the World Bank. The GDP per capita is found in the CIA World Factbook. For the statutory tax rate, the KPMG database on corporate tax rate is used. The effective tax rate (ETR) is calculated by using the CbCR data.

4.2. Sample Analysis

Table 1. Descriptive Statistics

	Baseline				**Non-havens**				**Tax havens**			
Variable	Mean	Std. dev.	min		Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Effective tax rate	19.6%	9.7%	0%	64.8%	21.5%	9.2%	0	40.8%	13.7%	8.5%	0	64.8%
Statutory tax rate	22.9%	8.9%	0%	64.8%	24.4%	7.7%	0	55.0%	18.1%	10.5%	0	64.8%
Income	343.9	1,064	-549	19,926	360.1	998.8	-13.1	14,145	293.6	1,246	-549	19,926
Profits before tax	122.3	427	0	11,287	118.5	308.2	0	5,343	134.3	674.9	0	11,287
Taxes	24.7	79.2	-463	1,321	27.1	78.5	-463.3	1,321	17.1	81.3	-36	1,252
Staff	1,547	4,096	0	45,245	1,829	4,423	0	45,245	661	2,640	0	31,537
Nb. of Obs.		5,271				4,000				1,271		

This table shows the descriptive statistics of the main variables in this study. The baseline is restricted to the positive sample without the headquarter country. The sample is split into tax havens and non-havens to highlight some of the differences between the two. The observations of all variables are similar except for the variable "income", for which we have 5221 total observations (3950 in non-havens and 1271 in tax havens).

Table 1 presents the CbCR data used in this work. The Baseline sample is restricted to observations related to positive profits made abroad. The profits that are made by the banks in their headquarters countries are dropped to focus on the activity of banks abroad at first. The descriptive statistics show clear discrepancies between tax havens and non-havens. On average, the profits before tax in tax havens are EUR 118.5 billion slightly less than those generated in tax havens EUR 134.3 billion. The number of employees in tax havens is 661, much lower than the 1,829 in non-havens. The data shows that the banks manage to have high profits in tax havens with a small number of employees. This highlights the differences in productivity levels of employees in tax havens and non-havens which can reflect profit shifting. Figure A.4 in the Appendix A shows that the productivity is much higher in tax havens (around 200 thousand

Singapore, St kits and Nevis, Sint Maarten, St Vincent and the grenadines, St lucia, Switzerlands and Turcs and Caicos.

euros per employee) than in non-havens and in the headquarter country (around 50 to 70 thousand euros per employee). Another interesting variable is the amount of taxes paid. In tax haven countries, the taxes paid are EUR 17.1 billion much lower than the taxes paid in non-havens EUR 27.1 billion. The statutory tax rate is as expected lower in tax havens (18.1 percent) than in non-havens locations (24.4 percent). Similarly, the effective tax rate is 13.7 percent in tax havens against 21.5 percent in the other countries. A negative relation is expected between the level of profits and tax rates.

5. Results

5.1. Baseline analysis

The results of our baseline specification of equation (1) are presented in Table 1. Columns (1) and (2) show the results when using the tax variable effective tax rate or the statutory tax rate, Columns (3) and (4) when using tax rate differentials of country i with all other affiliates. The results show a negative and statistically significant association between profits and the level of taxation with the ETR specifications. With the statutory tax rate specifications, the coefficient is negative but not significant. Holding other factors fixed, an increase in the tax rate is associated with a decrease in profits. This suggests that tax differences among countries have an effect on the profit allocation and that banks reduce their tax burden by operating abroad. The semi tax elasticity of -0.8 estimated in this paper with the ETR is in line with the literature. Beer et al. (2020) find an average tax semi-elasticity of corporate profits of –1, Heckemeyer and Overesch (2017) of –0.8. Fuest et al (2022) finds semi tax elasticity with German micro CbCR data of -0.5. Fatica & Gregori (2020) finds higher tax elasticities ranging from -2 to -5 using bank CbCR data, closer to the estimates of Clausing (2016) with US MNEs data.

Table 2. Results for the baseline specification

Variables	(1)	(2)	(3)	(4)
Effective tax rate	-0.835***			
	(0.263)			
Statutory tax rate		-0.024		
		(0.666)		
Tax diff ETR			-0.861***	
			(0.251)	
Tax diff Statutory				-0.689
				(0.576)
Log (Staff)	0.604***	0.604***	0.604***	0.604***
	(0.010)	(0.010)	(0.010)	(0.010)
Log (GDP)	0.706***	0.726***	0.709***	0.709**
	(0.296)	(0.295)	(0.296)	(0.295)
Log (GDP per capita)	0.072	0.059	0.069	0.062
	(0.142)	(0.141)	(0.142)	(0.140)
Governance index	0.164	0.174	0.158	0.182
	(0.234)	(0.236)	(0.235)	(0.235)
Log (Distance)	-0.140***	-0.139***	-0.138***	-0.137***
	(0.043)	(0.043)	(0.043)	(0.043)
Log (Total assets)	0.681***	0.677***	0.679***	0.671***
	(0.186)	(0.187)	(0.188)	(0.188)
Country FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Nb of Obs.	5,271	5,271	5,264	5,264
R-sq	0.7085	0.7079	0.7085	0.7078

This table reports estimated coefficients from linear regressions, in which the dependent variable is the log of profits before tax. The main explanatory variable is the tax rate. The different specifications use two different measures for tax rates: the effective tax rate (ETR), the statutory tax rate and tax differences between the host and all bank locations.

In another specification, the baseline equation is modified and the square of tax is added. The sign for the coefficient of ETR is negative and then changes sign with the ETR squared. This suggest that the lower the level of taxation, the more sensitive profits are to tax rate differences. However, the results obtained with the quadratic specification are not significant (see Table B.2 in appendix B).

5.2. Sub-sample analysis

The sample is first split into tax havens and non-havens. The semi-elasticity obtained with the tax havens sub-sample is negative and significant (-1.75). This semi-elasticity is much higher than the one obtained with the non-haven sub-sample of -0.5 which is also significant. This suggest that the profits recorded in low-tax jurisdictions are more sensitive to the local tax burden.

Table 3. Semi-elasticities by Tax havens status

Variables	**Non-Havens**	**Tax Havens**
Dependent variable: log of profits before tax		
Effective tax rate	-0.524**	-1.747***
	(0.282)	(0.616)
Log (staff)	0.615***	0.542***
	(0.011)	(0.024)
Log (GDP)	1.073**	0.201
	(0.460)	(0.476)
Log (GDP per capita)	-0.046	0.149
	(0.335)	(0.149)
Governance Index	-0.179	0.740
	(0.251)	(0.589)
Log (distance)	-0.203***	0.190**
	(0.052)	(0.093)
Log (total assets)	0.823***	0.373
	(0.225)	(0.337)
Country FE	yes	yes
Bank FE	yes	yes
Year FE	yes	yes
Nb of Obs.	4,000	1,271
R-sq	0.7494	0.6280

This Table presents regression results with non-havens and tax havens sub-sample. The explanatory variable of interest is the Effective tax rate. *, **, *** indicates significance at the 10%, 5% and 1% level.

The sample is also split by size to check whether it has an effect on profit shifting. It is possible that size could play a role since engaging in profit shifting might be costly. The sample is split into four sub-samples based on the quartiles of total assets of banks. The empirical model is reestimated for each sub-sample. The semi-tax elasticity is negative with all the specification but is only significant with the 4th quartile. It decreases with the 3rd and 2nd quartile then increases with the 1st but without being significant. These findings show that the size of the group might have a role and that profit shifting takes place within large firms. However, it is still an interesting result that the 1st quartile, reflecting the smallest firms in the sample, have the highest coefficient of semi-tax elasticity. This could be explained by the fact that regardless of the size of the firm, profit shifting could be an individual choice of the firm.

Table 4. Semi-elasticities by firm size

Variables	1st quartile	2nd quartile	3rd quartile	4th quartile
Dependent variable: log of profits before tax				
Effective tax rate	-1.159	-0.056	-0.622	-0.791***
	(1.318)	(1.093)	(0.409)	(0.334)
Log(staff)	0.351***	0.569***	0.665***	0.568***
	(0.094)	(0.047)	(0.019)	(0.014)
Log (GDP)	5.363**	-2.332	1.265***	0.482
	(2.244)	(2.036)	(0.470)	(0.381)
Log (GDP/capita)	0.113	2.624	-0.787**	-0.012
	(0.149)	(1.653)	(0.357)	(0.180)
Governance Index	0.745	0.427	0.283	0.154
	(1.410)	(0.792)	(0.406)	(0.307)
Log(distance)	-0.065	0.050	0.045	-0.170**
	(0.459)	(0.126)	(0.069)	(0.077)
Log (total assets)	0.690	2.368***	0.866*	1.133***
	(0.479)	(0.679)	(0.455)	(0.315)
Country FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Nb of Obs.	257	423	1,500	3,091
R-sq	0.7923	0.8373	0.7633	0.7159

This Table presents regression results by quartile. The sample is split into four quartiles based on the firm size proxied by total assets. The explanatory variable of interest is the Effective tax rate. *, **, *** indicates significance at the 10%, 5% and 1% level.

Similarly, profit shifting could be affected by the level of intangibles of the firm. That is why, the sample is split into four quartiles based on the ratio of intangible assets to total assets. The variable of intangible assets is collected from the annual report for each bank for each year t. The 4th quartile has the largest semi tax elasticity of -1.038. However, the 1st and 3rd quartile have semi-elasticities of -0.9 and -0.87 which are close to each other. The evidence of firms with high intangibles being more tax sensitive is not very strong with our sample.

Table 5. Semi-elasticities by intangible assets

Variables	1st quartile	2nd quartile	3rd quartile	4th quartile
Dependent variable: log of profits before tax				
Effective tax rate	-0.870*	0.226	-0.907**	-1.038**
	(0.494)	(0.803)	(0.386)	(0.438)
Log (Staff)	0.525***	0.506***	0.614***	0.659***
	(0.028)	(0.029)	(0.019)	(0.019)
Log (GDP)	-1.092	1.223	0.743	1.224**
	(0.731)	(0.938)	(0.486)	(0.486)
Log (GDP/capita)	0.348**	0.556	-0.088	-0.502
	(0.158)	(0.426)	(0.212)	(0.372)
Governance Index	-0.103	0.085	0.265	0.276
	(0.489)	(0.615)	(0.370)	(0.414)
Log (Distance)	-0.047	-0.247**	-0.239***	-0.056
	(0.139)	(0.142)	(0.075)	(0.101)
Log (Total assets)	0.941***	-0.307	1.345***	0.820**
	(0.365)	(0.769)	(0.318)	(0.416)
Country FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Nb of Obs.	1,029	728	1,866	1,648
R-sq	0.7643	0.7665	0.7207	0.7643

This Table presents regression results by quartile. The sample is split into four quartiles based on the ratio of intangible assets. This ratio is calculated as intangible assets of bank k divided by the total assets of the bank k. The explanatory variable of interest is the Effective tax rate. *, **, *** indicates significance at the 10%, 5% and 1% level.

6. Estimating profit shifting

In this section, profit shifting estimations are presented. Based on the regression analysis from the previous section, the semi-tax elasticity of -0.8 from the baseline regression results is used to compute the amount of true profits and the semi-tax elasticity of -1.7 is used if the country is a tax haven. The true profits are calculated by dividing the amount of reported profits by 1 plus the coefficient estimate of -0.8 (-1.7 if tax haven) multiplied by the tax differential of country i with the average effective tax rate of 20 percent[3]. This yields the amount of profits we would expect to observe in each jurisdiction absent profit shifting. I assume there is no profit shifting occurring in the headquarter country and in jurisdictions with profitability ratio of employees less than twice the average profitability. The sum of profit shifting is set to be equal to zero among all countries for each banking group. The profit shifting estimates are then reallocated based on the share of employees among all countries that are not involved in profits shifting. The computations suggest that profit shifting is around EUR 3 billion or 3-4% of the total profits of banks abroad. Considering the statutory tax rate of countries with outward profit shifting, the findings suggest that the tax losses are around EUR 700 million. The results of profit shifting for selected countries are presented in Table 6. The profit shifting magnitude is similar to the one found by Fuest et al (2022). Using micro CbCR data for German MNEs, they estimate that 18.3 billion is shifted which corresponds to 3.3% of the MNEs reported profits. Comparing with Fatica and Gregori (2020) that use bank CbCR data, they find that profit shifting is around EUR 9.8 billion or 25%. This estimate is much higher than the one found in this paper. One explanation could be that the semi-tax elasticities estimated in this paper are much lower. It should be also noted that semi-elasticities estimated with micro data tend to be smaller than those estimated with macro data.

Table 6. Profit shifting by selected countries (EUR m)

Country	Reported Profits	Profit shifting	share
EU 27	34,697	-724	-2%
European Tax havens	9,943	576	+6%
Other Tax havens	16,483	1,721	+10%
Rest of the world	48,736.3	-1,573	-3%

This Table presents profit shifting estimations for selected countries in million of euros for the year 2019. True profits are estimated by using the tax differential method based on the semi-tax elasticities of -1.7 for tax haven countries and -0.8 for the rest of countries. The profit shifting estimation is compared with the total reported profits of banks abroad.

The introduction of the proposal of the global minimum tax would have an incidence on the incentives of profit shifting of banks. The proposal requires multinational companies with annual revenues above EUR 750 million to pay a top up tax in countries where their effective tax rate is less than 15%. Based on the CbCR data of the systemic banks, I estimate the revenues from a global minimum tax of 15% in two scenarios: 1) the country of headquarter collects the top up tax; 2) the host country applies the top-up tax. The methodology is taken from Barake et al (2022). In this paper, carve-outs[4] are not accounted for, neither behavioral responses. Table C.1 and C.2 in Appendix C presents the potential revenues. Under the Headquarter scenario,

[3] The average statutory tax rate is 20.87% in the EU, 19% in Europe and 23.7% globally (KPMG).

[4] Substance-based carve-outs allow for a reduction in the tax base in which the top-up tax will apply. It will subtract 8% of the carrying value of tangible assets and 10% of payroll or employee compensation from profits.

the European countries would generate around 1-2 billion euros. These revenues would compensate for the profit shifting tax losses estimated in this work. Under the host country scenario, the revenues decrease to around EUR 300-600 million.

Conclusion

This paper undertakes a comprehensive analysis of tax planning by European banks. Using country-by-country data, we document negative semi-tax elasticities. This suggest that banks engage in tax planning. Profit shifting is computed through the widely used tax differential methodology and is estimated to be around EUR 3 billion or 3-4 percent of the total profits abroad. I find that tax planning is likely costing the EU governments around 3 percent of the tax revenues paid by these banks. The tax losses are estimated to be around EUR700 million annually. These estimates have the advantage of using comprehensive data that include operations in many tax haven countries, unlike many studies that rely on financial data.

Even though the focus in the literature is mainly on profit shifting by multinational companies, however; there is a growing evidence that banks as well avoid taxes for their own account. The negative strong correlation between the profits abroad and the tax rates indicates that European banks can engage in tax planning by going into countries with lower tax rates. Moreover, the excessively high profitability ratios in tax havens are another indicator for the tax planning behaviour of European banks.

The country-by-country reporting is a first step into mapping the activity of banks. More reforms should bring more transparency on the activity of multinationals and financial institutions. Policy action that address problems associated with tax competition and corporate tax base erosion can be very tricky to implement. The OECD/G20 BEPS launched many actions to combat this issue. Still, these actions face many challenges due to the conflict of interest inside of the EU. Some EU countries are affected by profit shifting while others are benefiting. Profits are being redistributed in the EU from the countries with high tax rates to the ones with low tax rates. Reforms should consider worldwide consolidation in an era of globally integrated economies. A harmonization in the fiscal systems of EU countries is as well highly needed in order for tax rates to converge which will reduce the incentives to shift profits from an EU country to another. The global minimum tax initiative might also affect the profit shifting behaviour since it harmonizes the tax rates not only among European countries but with tax havens as well. The minimum tax would generate around 300million up to 2 billion euros for European countries from the sample of European banks depending on the design of rules of the proposal.

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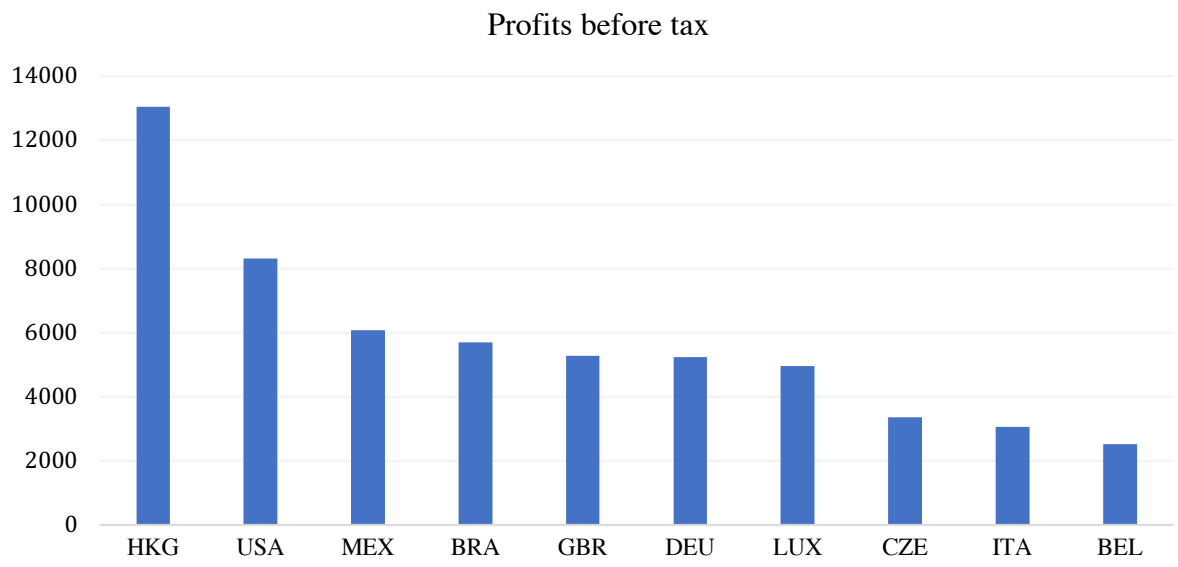
Appendix A. Descriptive statistics

Table A.1. List of banks in the sample and their affiliates

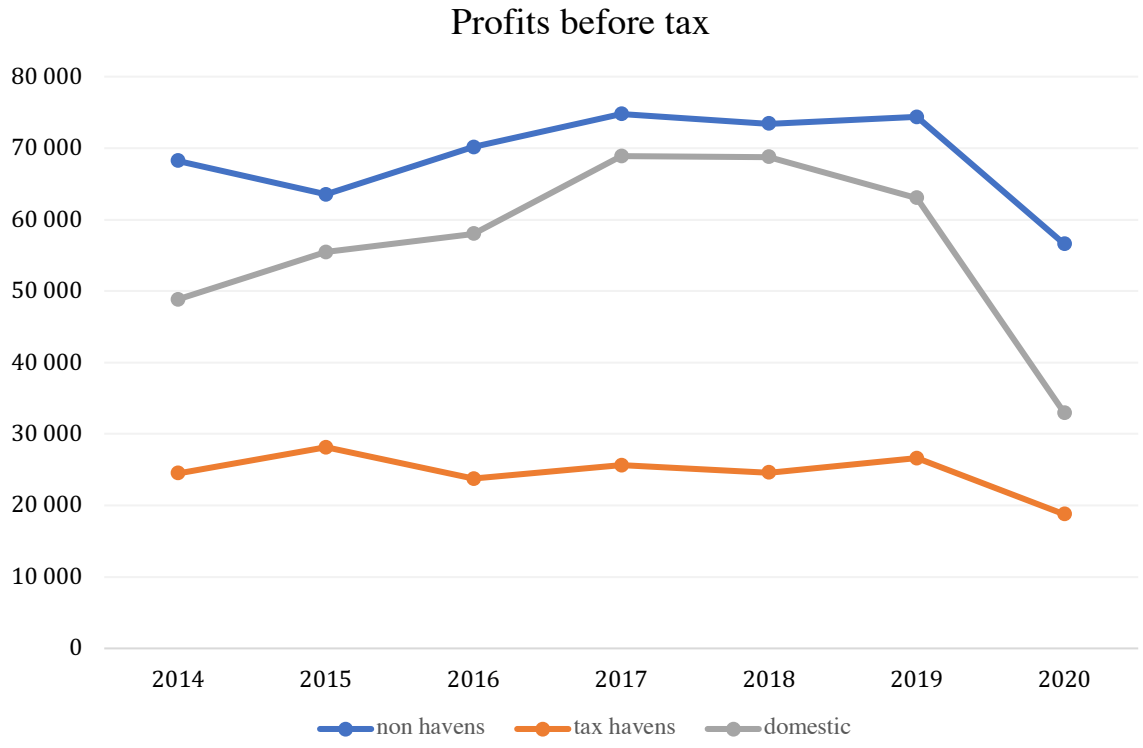
HQ	Bank Name	2014	2015	2016	2017	2018	2019	2020
Austria	ERSTE	8	8	8	8	8	8	8
	Raiffeisen bank international	21	21	20	16	16	16	16
Belgium	KBC Bank	26	19	18	18	19	19	19
	Belfius	5	3	3	3	3	3	3
Bulgaria	Central cooperative bank	1	3	2	2	2	2	2
Cyprus	Bank of Cyprus group	8	7	7	6	6	5	5
	RCB bank	2	2	2	2	2	2	.
Denmark	Danske Bank	15	15	15	15	16	16	16
	Nykredit Realkredit	6	3	3	3	2	2	1
	Jyske	6	5	5	5	4	3	3
	Sydbank	3	3	3	3	2	2	2
Finland	Aland bank	2	2	2	2	2	2	2
France	BNP Paribas	69	65	66	66	69	69	71
	BPCE	38	61	62	62	62	64	52
	Banque Postale	2	2	2	2	2	2	11
	Crédit Agricole	47	44	43	48	48	47	49
	Crédit Mutuel	22	18	21	23	23	23	22
	Société Générale	80	80	81	80	79	80	73
Germany	Bayern LB	8	6	6	6	5	5	7
	Commerzbank	12	12	12	12	12	12	12
	DZ Bank	19	21	20	23	23	19	18
	Deutsche Bank	32	58	61	60	60	51	48
	Helaba	7	7	7	9	10	9	9
	LBBW	12	9	8	9	10	10	10
	Nord LB	6	6	6	6	6	6	6
Greece	Alpha bank	9	9	10	9	9	9	10
	National bank of Greece	15	14	15	14	13	11	9
Hungary	OTP bank	10	10	10	10	10	12	12
Ireland	AIB	3	3	3	3	3	3	3
	Bank of Ireland group	6	6	5	5	5	5	6
Italy	Intesa Sanpaolo	30	30	31	29	30	31	31
	Monte dei Paschi	11	9	8	16	16	15	11
	Unicredit	33	33	34	36	32	35	30
Luxembourg	Banque international du Luxembourg	8	8	6	6	5	6	6
Netherlands	Abn Amro	17	17	18	18	18	15	15
	ING	37	37	39	39	40	40	40
	Rabobank	40	41	41	38	40	40	39
Spain	BBVA	22	23	35	35	35	32	32
	Banco Sabadell	3	4	4	4	4	5	6
	Banco Santander	35	36	38	36	36	34	33
	Bankia BFA	4	4	4	4	2	2	2
Sweden	Handelsbanken	7	18	18	18	16	16	16
	Nordea	17	17	17	20	20	20	22
	SEB Bank	18	18	18	18	19	19	19
	Swedbank	7	7	7	7	7	7	11
UK	Barclays	30	39	37	37	30	30	30
	HSBC	64	60	62	63	63	62	63
	Lloyds Banking Group	9	8	8	8	9	8	8
	Nationwide	4	4	4	4	2	1	1
	RBS/NatWest	48	48	42	38	28	28	27
	Standard Chartered	59	62	58	59	57	57	57

Figure A.1. Top 10 countries with profits (in 2019)



Figures are in EUR m

Figure A.2. Profits by country type and year



Figures are in EUR m

Table A.3. The effective tax rate over time by country type

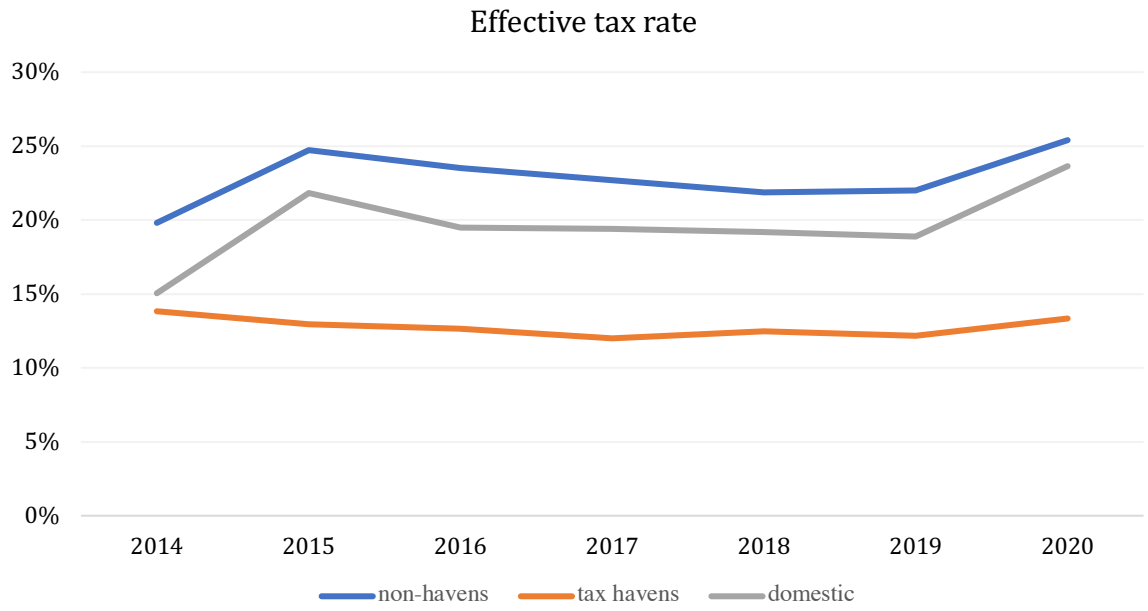
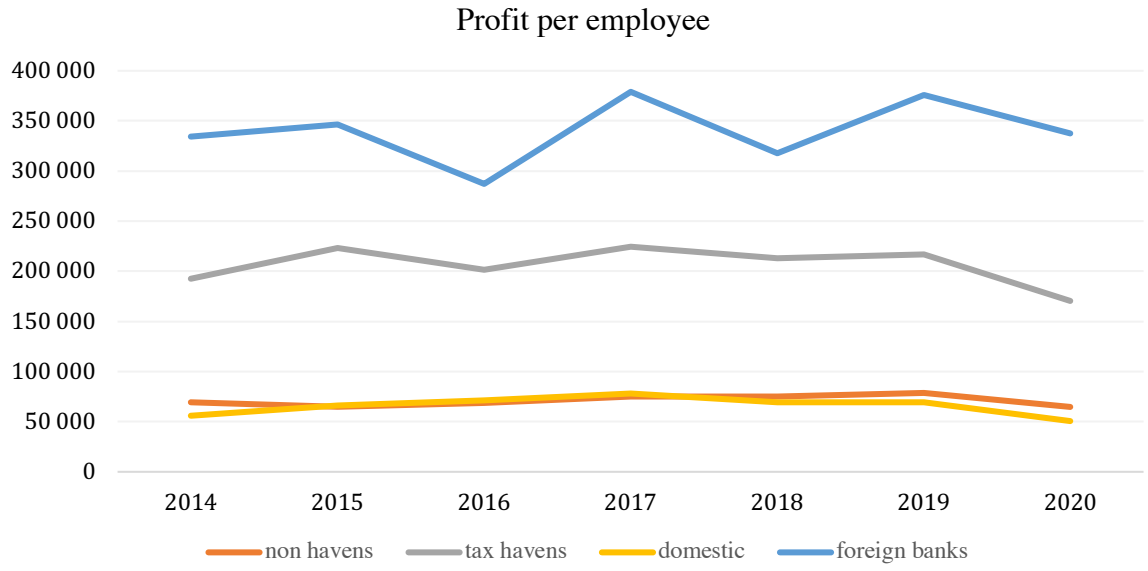


Table A.4. Productivity by country type over years



Figures are in euros

Appendix B. Additional regressions results

Table B.1. Regression results with headquarter country

Variables	**(1)**	**(2)**	**(3)**	**(4)**
Effective tax rate	-0.870***			
	(0.256)			
Statutory tax rate		-0.040		
		(0.662)		
Tax diff ETR			-0.895***	
			(0.243)	
Tax diff Statutory				-0.778
				(0.546)
Log (Staff)	0.617***	0.617***	0.617***	0.617***
	(0.009)	(0.009)	(0.009)	(0.009)
Log (GDP)	0.705***	0.724***	0.697***	0.694**
	(0.293)	(0.292)	(0.293)	(0.292)
Log (GDP per capita)	0.073	0.059	0.068	0.061
	(0.141)	(0.140)	(0.140)	(0.140)
Governance index	0.210	0.226	0.191	0.222
	(0.231)	(0.232)	(0.236)	(0.232)
Log (Distance)	-0.256***	-0.254***	-0.259***	-0.255***
	(0.034)	(0.035)	(0.035)	(0.035)
Log (Total assets)	0.590***	0.598***	0.583***	0.590***
	(0.177)	(0.178)	(0.179)	(0.179)
Country FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Nb of Obs.	5,561	5,561	5,536	5,536
R-sq	0.7452	0.7446	0.7443	0.7437

This table reports estimated coefficients from linear regressions, in which the dependent variable is the log of profits before tax. The main explanatory variable is the tax rate. The different specifications use two different measures for tax rates: the effective tax rate (ETR), the statutory tax rate and tax differences between the host and all bank locations. The sample includes headquarter countries.

Table B.2. Regression results with the quadratic specification

Dependent variable: log of profits before tax	
Effective tax rate	-1.885**
	(0.910)
ETR squared	2.320
	(1.862)
Log(staff)	0.604***
	(0.010)
Log (GDP)	0.715**
	(0.296)
Log (GDP per capita)	0.067
	(0.142)
Governance Index	0.191
	(0.236)
Log (Distance)	-0.140***
	(0.043)
Log (Total assets)	0.683***
	(0.186)
Country FE	yes
Bank FE	yes
Year FE	yes
Nb of Obs	5,271
R-sq	0.7086

This table reports regression results from the quadratic specification. The Effective tax rate is included as well as the effective tax rate squared.

Appendix C. Revenues from the global minimum tax

Table C.1. Tax revenues from a global minimum tax of 15%

	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Headquarter	2 265,9	1 102,7	782,5	1 685,9	1 345,1	1 753,6	1 058,1
QDMTT	1,115.0	471.9	325,7	654.7	278,5	545,3	304,8

Figures are in EUR m. Figures are for the year 2019 and in EUR m. The revenues from a minimum tax of 15% are presented on a yearly basis and by scenario. In the Headquarter scenario, the country where the bank is headquartered collects the top up tax from the minimum tax. In the Qualified Domestic Minimum Top-up Tax (QDMTT), it is the host country where the affiliate is located that collects the revenues from a minimum tax. In both scenarios, a minimum tax of 15% is assumed without accounting for carve-outs.

Table C.2. Revenues from minimum tax under HQ and QDMTT scenarios for European countries

Country	**Headquarter scenario**	**QDMTT scenario**
Austria	11.3	80.8
Belgium	26.4	0.0
Germany	49.5	0.0
Denmark	2.9	96.5
Spain	215.1	0.0
France	296.6	0.0
UK	823.5	47.8
Italy	153.6	0.0
Netherlands	83.7	0.0
Sweden	35.6	0.0
Finland	55.7	0.0
Bulgaria	0.0	17.0
Estonia	0.0	1.7
Hungary	0.0	32.7
Ireland	0.0	70.2
Luxembourg	0.0	135.7
Latvia	0.0	0.7
Malta	0.0	19.5
Portugal	0.0	42.8
Total	**1 753.6**	**545.3**

Figures are for the year 2019 and in EUR m. The results from a minimum tax of15% are presented for selected European countries. In the headquarter scenario, the country where the bank is headquartered collects the top up tax from the minimum tax. In the Qualified Domestic Minimum Top-up Tax (QDMTT), it is the host country where the affiliate is located that collects the revenues from a minimum tax. In both scenarios, a minimum tax of 15% is assumed without accounting for carve-outs.

Appendix D. The construction of the bank Country-by-Country Database

EU Directive CRD IV article 89

Since 2015, country-by-country reporting became obligatory for financial institutions operating in EU countries under the Article 89 of the 2013/36/EU - Capital Requirements Directive IV. EU Member States require financial institutions to disclose publicly information on a consolidated basis for the financial year. This includes the activity of all their affiliates (subsidiaries and branches) on a country- by-country basis for the following items : turnover (net banking income), number of employees (on a full-time equivalent basis), profit or loss before tax, tax on profit or loss, and public subsidies received.

The constructed database uses information made available by this reporting obligation for banks in the EU. This includes reported information by 37 systemic banks headquartered in eleven European countries (i.e. Austria (1), Belgium (1), Denmark (1) France (6), Finland (1), Germany (7), Italy (3), Netherlands (3), Spain (4), Sweden (4), and the United Kingdom (6), and operating in up to 90 jurisdictions worldwide.

The 37 banks detailed names included in the database are the following: ERSTE group, KBC Bank, Danske Bank group, Nykredit Realkredit Group, Nordea Bank Abp, Crédit Agricole SA, Société Générale Group, BNP Paribas Group, Groupe BPCE, Groupe Crédit Mutuel, Deutsche Bank Group, DZ Bank Gruppe, Helaba Group, LBBW Group, Commerzbank Group, Norddeutsche Landesbank (Nord LB), Bayern LB, Intesa Sanpaolo, Unicredit Group, Monte dei Paschi di Siena Group, ING Groep NV, ABNAMRO Group N.V, Rabobank Group, Banco Bilbao Vizcaya Argentaria (BBVA), Banco Santander Group, Bankia BFA, Banco Sabadell, Handelsbanken, Skandinaviska Enskilda Banken AB (SEB), Swedbank, Standard Chartered PLC, Barclays PLC, HSBC Holdings PLC, Royal Bank of Scotland (RBS), Lloyds Banking Group, Nationwide Building Society, Groupe Banque Postale.

The list of systemic banks is updated by the European Banking Authority (EBA) and can be found at the EBA's website: https://www.eba.europa.eu/risk-analysis-and-data/global-systemically-important- institutions. La Caixa bank was not included in the systemic bank data due to missing values in profits before tax.

Other non-systemic european banks are considerd and added to the data used in this paper. This includes reported information by 14 non-systemic European banks that are headquartered in 10 European countries (i.e. Austria, Bulgaria, Luxembourg, Cyprus, Belgium, Denmark, Finland, Greece, Hungary and Ireland). This includes the following banks: AIB, Aland bank, Alpha bank, Bank of Cyprus group, Bank of ireland group, Banque internationale du Luxembourg, Belfius, Central cooperative bank, Jyske, National bank of greece, Raiffeisen bank international, OTP bank, RCB bank and Sydbank.

Methodology

The data have been collected manually either from annual reports or from country-by-country reports filed separately by banks each year. They were then compiled in a unified dataset.

Overall, the analysis spans all years of obligatory reporting, 2015 to 2020 plus one earlier year 2014. For each bank and each year, the report with country-by-country information should be extracted either directly in the annual report of the bank or in a separate document found on the website of the bank. Once the report is retrieved, the currency has to be checked as the banks report in different currencies: Euro, pound sterling, US Dollars, Danish krone, Swedish krone. Since most of the banks were reporting in Euro, the whole database was converted into Euro. Some banks report in thousands and some other in millions of euros, therefore the values were all converted to million of euros. Another aspect to look out for when retrieving the raw data is the sign of the variable "Taxes". Some banks report "taxes" as an expense in the CbCR data with a negative sign for taxes paid and positive sign for taxes received. Some other banks report taxes as an expense but with a positive sign for taxes paid and negative sign for taxes received. The data was harmonized in a way were there is no sign for taxes paid and a negative sign for taxes received.

It should be noted that reports were retrieved for all banks in our sample except for RBS 2014 and Standard Chartered 2014. Also, the LBBW 2014 report was incomplete, reporting only the net banking income and number of employees. In order to have a balanced database, the missing variables were imputed for these 3 banks in 2014. For RBS 2014, data were imputed by multiplying by a growth factor using 2015 data. This factor was calculated based on the growth rate for each variable. The pre-tax profits were calculated by multiplying by 1.45 and the other variables are calculated by multiplying by 1.1. For Standard Chartered 2014, data were imputed by multiplying by a growth factor using the 2013 data. A growth rate of 1.18 was used for the different variables. For LBBW 2014, profits before tax and taxes are the missing variables to be computed. The profits before tax were imputed from the ratio between the net banking income and pre-tax profits using reporting in other available years. Specifically, an average ratio of 0.4 was used for profits before tax. For the corporate taxes paid, the mean effective tax rates for each partner countries were calculated, then multiplied by the imputed profits before tax.

Limitations/ further remarks

The data are reported on a consolidated basis and present a satisfactory level of homogeneity across banks and years for the purpose of our analysis. However, some limitations stem from the primary data reporting process, which relies on the banks themselves.

- Depending on the banks' operational structure, some banks include intracompany dividends, especially for parent jurisdictions.
- Some reporting excludes intracompany transactions, whilst other includes only cross border and yet other excludes them entirely.
- Some banks report income tax expense while others report taxes paid. The constructed database only reports one tax variable. Whenever the total tax expense is reported along with taxes paid, taxes paid were the variable selected.
- Some banks were reporting two jurisdictions as one observation (e.g. China and Hong Kong). For these cases, the variables were divided equally by the number of jurisdictions reported by the bank.

- This database does not include the variable “subsidies received” that is required in the public country by country reporting of banks.
- Null values in reports. For some affiliates variables were left blank or reported with null values. These have been replaced by zeros which should be carefully interpreted.
- Some taxes and profits have time misalignment which can appear in the form of a tax deduction or tax credit in the following year of an exercise. For instance, Monte Paschi profits in Luxembourg were adjusted for 2017 and 2018 according to an explanatory footnote they provide in the CbCR report of 2018. The reason for this adjustment is that some profits appear in Luxembourg in 2018 even though they should have been offset by losses in 2017. This is what they refer to as timing misalignment. Another case about mismatches with taxes: the payment of taxes for HSBC in Hong Kong in 2019 was reported in 2020. Therefore, it would be best to readjust taxes paid in 2019 and 2020 to account for underreporting in the former and overreporting in the latter year. These can be readjusted by multiplying the earnings before tax by the average effective tax rate of 11% in 2019 and 2020.
- The Royal bank of Scotland became NatWest bank starting from 2020
- Nordea changed its headquarter countru from Sweden to Finland in 2018
- Caixa and Bankia have merged in 2021