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Do Banks Profit from Failing to Control Money Laundering?

An Empirical Study

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Abstract

Banks are fined when they break the law or fail to have sufficient controls to prevent financial crimes. Such sanctions generally gain a lot of attention from the press and thus the public. Banks are publicly named and shamed. The idea is that reputation loss is an extra deterrent for misconduct. Do customers shy away from named and shamed banks? Is naming and shaming banks effective? Or is it an indication for investors that a bank does everything to maximize profits? This study tests the effects of bank fines with a manually collected dataset of 713 financial penalties for 36 international banks between 2006 and 2019. The analysis shows that fining banks for their misconduct negatively impacts their performance. But when banks are fined for lack of compliance to prevent abuse by customers, performance is not negatively affected. Banks can even profit from deficient money laundering controls.

Keywords: Banking, Supervision, Penalties, and Econometrics

JEL-codes: G18 (Financial Markets Policy and Regulation), G21 (Banks), K42 (Illegal Behavior)

1. Introduction

We study the relationship between financial penalties and bank performance. This relationship has become increasingly relevant after the global financial crisis. Since then, citizens demand banks be held responsible for their misbehavior. This resulted in many financial penalties which were generally made public to 'name and shame' the wrongdoing. Only a few studies have examined the impact of these penalties on bank performance. These studies do not distinguish between the different types of violations banks are being fined for. Our study indicates that the type of violation matters significantly on how bank performance is affected by a fine. The effect also depends on how bank performance is measured and whether the extent of the fine is considered.

We show that banks find it harder to retain and/or attract customer deposits after receiving a fine, while harsher financial penalties harm banks' profitability. The impact of harsher financial penalties on bank performance depends on whether the fine is for misconduct of the bank or failing to control the misconduct of their customers. Generally, penalties for own misconduct harm bank performance, while penalties for the misconduct of customers have no impact. The most striking

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observation is that penalties for deficient anti-money laundering control generally lead to an increase in bank performance.

The literature so far focused on why financial penalties harm bank performance. Customers, companies, and investors might shy away from banks that have been fined for misconduct and named and shamed due to reputational damage. (see eg. Chen et al., 2019 and Taylor, 2019, although Nicholls, 2017 and Yorulmazer, 2014 argue that customers are reluctant to switch banks) Financial penalties directly affect bank performance because the fine decreases profits (Köster & Pelster, 2017), and the potential for a fine creates uncertainty and systemic risk in the banking sector. (Köster & Pelster, 2017)

However, we argue that a financial penalty – and the naming and shaming that comes with it – could also improve bank performance. If investors lack integrity and focus solely on profitability, a fine can be seen as an indication that the bank does everything to maximize profits (in the short run). A fine for failing to have sufficient measures to prevent misconduct such as money laundering, tax evasion, and transfers with countries on the sanction list can indicate a weakness that can attract money launderers, tax evaders, and sanction list avoiders, respectively. Moreover, a public fine generates publicity that can benefit the bank, if "there is no such thing as bad publicity". (Van Erp and Beckers, 2012)

The concept of corporate punishment received more and more attention in the past thirty years, especially after the global financial crisis. Examples of financial penalties in the banking sector date back many decades. However, they only became important during the late 1980s when – starting with drug trafficking – banks became an important line of defense in becoming aware of and reporting on the suspected acts of their customers to national financial intelligence units (Levi, 2018). Incorrect reporting of these acts resulted in the first significant examples of financial penalties. Gradually, the variety of crimes that banks were expected to identify has grown and ranges from tax and sanction violations to money laundering. In response, some banks developed sophisticated models to indicate criminal behavior, while other banks did not. This led to even more financial penalties (Levi, 2018). A well-known example of such a penalty is the 8.9 billion dollar settlement between BNP Paribas and the United States Department of Justice. This settlement resolved the claims that BNP Paribas had deliberately facilitated transactions from and to Sudan, Cuba, and Iran (Raymond, 2015).

Since the global financial crisis, banks have not only been penalized for misreporting the misconduct of their customers but have also been held responsible for their own misconduct, such as selling toxic securities and subprime mortgages, manipulating foreign exchange rates and interest rate benchmarks, and failing to provide correct data to regulatory authorities. An example of a financial penalty for any of these misconducts is the record settlement between Bank of America and the United States Department of Justice. This settlement amounted to 16.65 billion dollars and resolved the allegations that Bank of America had knowingly sold subprime mortgages to investors (Jenkins, 2014).

The total amount of financial penalties imposed on the global banking sector is estimated between 375 and 400 billion dollars. The strongest increase in financial penalties is visible between 2011 and 2019, with a peak in 2014 (Martinuzzi, 2019).

Despite the growing number and size of financial penalties, little is known about the impact of these penalties on bank performance. A few studies have dealt with this relationship, such as Köster & Pelster (2017) and Murphy et al. (2009), who studied the relationship of financial penalties on bank profitability and stock performance. The impact these financial penalties have had on the banking sector is not clear. Financial penalties lower bank performance and these penalties create uncertainty about the business model of banks (Köster & Pelster, 2017). But financial penalties can also be seen as another cost of doing business. Banks subject to financial penalties favor conducting business in areas

that are not properly regulated, which allows them to generate large gains that may even exceed the imposed financial penalties. Consequently, banks might not be too concerned about financial penalties. Moreover, banks may also risk being involved in misconduct because the costs of implementing controls to avoid this are too high (Köster & Pelster, 2017).

This study constructs a unique panel dataset with 713 financial penalties for 36 international banks between 2006 and 2019. Our empirical model controls for heterogeneous bank-specific effects and uses an instrumental variable (IV) approach to control for potential endogeneity. We perform subsample analyses to control for geographical differences in tax laws and bank supervision, differences in economic downturns resulting from the financial crisis, and specifically analyze the differences between penalty categories. For the years between 2006 and 2014, the financial penalty observations are obtained through Köster & Pelster (2017), while for the subsequent period between 2015 and 2019, these observations are collected by hand through Bloomberg, Reuters, and the website Violation Tracker. The data on bank performance is obtained through banks' annual reports and the application Moody's Analytics BankFocus.

This study contributes to the literature on the relationship between penalties and bank performance but also informs politicians, policymakers, and regulators about the economic consequences of financial penalties. Our findings can help them to determine whether financial penalties have the desired impact.

This paper is structured as follows. Section 2 gives an overview of the literature on corporate punishment and the effect of financial penalties on bank performance. Section 3 discusses the data and Section 4 our empirical design. Section 5 presents the results and Section 6 concludes. In Section 7 we discuss the limitations of our study and possible future research.

2. Literature

When banks engage in corporate misconduct, they generally do so in a big way. As a result, the harm inflicted by this misconduct is much greater than an individual could produce, both in terms of the dollars involved and the impact on society (Henning, 2010). However, for most of the legal history, corporate misconduct was hardly addressed and discussions of corporate punishment stopped in an early stage because people believed that companies 'have no soul to damn and no body to kick' (Braithwaite, 1982; Coffee, 1981). In other words, who pays when a financial penalty is imposed on a company?

2.1. Traditional paradigm of corporate punishment: 'do not punish the innocent'

The answer to the question above is that the owner of the company – the shareholder – pays the financial penalty, as financial penalties should not be passed on to consumers. Since ownership and control are separated in modern companies, financial penalties are essentially punishing those who are personally innocent of the misconduct of others, labeled as the overspill problem (Coffee, 1981).

From a retributivist perspective, spill-overs of corporate punishment to innocent shareholders are unacceptable, because retribution implies that sanctions are only imposed on those who have acted in a blameworthy way. Therefore, a criminal justice system based on a retributivist theory would

never accept punishing innocent shareholders (Hasnas, 2009). A similar conclusion can be drawn for a criminal justice system based on deterrence theory.

From a deterrence perspective, the purpose of punishment should be to shift the balance of economic incentives away from misconduct (Alexander & Cohen, 2011). This should not be done by any means, and certainly not by punishing the innocent. During World War II innocent members of communities in which acts of resistance occurred were punished to deter these acts in the future (Hasnas, 2009). Such a deterrence strategy may be effective but is not in line with a liberal criminal justice system.

Finally, criminal justice systems could be based on a rehabilitation theory. From a rehabilitation perspective, sanctions should be imposed on a wrongdoer to reform its character and to ensure better behavior in the future. The problem with this perspective is that one cannot rehabilitate an innocent shareholder and that doing so would imply deprivation of his liberty (Hasnas, 2009).

Another common argument against corporate punishment within the traditional paradigm is called the nullification problem. This argument entails that regulators and judges instinctively resist imposing harsh punishments on companies because they fear the societal consequences of these punishments, such as bankruptcies and massive layoffs. Companies that fear the imposition of a financial penalty can try to lower the penalty by threatening regulators and judges with the closure of plants and the layoff of employees (Alexander & Cohen, 2011; Coffee, 1981).

2.2. New paradigm of corporate punishment: 'punish the innocent'

The problems associated with corporate punishment – overspill and nullification – in the traditional paradigm create a tradeoff. On the one hand, regulators and judges want to punish corporate misconduct by imposing harsh financial penalties, while on the other hand, they do not want to punish the innocent for it.

The opinion about corporate punishment shifted after the global financial crisis, when stories of severe misconduct in the banking sector emerged and peoples' levels of systematic trust fell sharply (Roth, 2009). Citizens increasingly started to hold banks responsible for their misbehavior and started to demand more severe financial penalties (Baer, 2012). This shift in public opinion was not ignored by politicians and regulators, who started to impose harsher financial penalties, even though this resulted in violations of their former principles regarding spill-overs and nullification (Diamantis & Laufer, 2019). The balance between not punishing the innocent and effective law enforcement turned to the latter (Hasnas, 2009). Corporate punishment became a form of collective punishment, where punishing the innocent was no longer a regrettable side effect, but the very objective of the corporate punishment regime (Diamantis & Laufer, 2019; Hasnas, 2009). Innocent shareholders became the proverbial body of companies that could be kicked through financial penalties in the case of misconduct. As a result of the paradigm shift in corporate punishment, the average value and the total size of the financial penalties imposed on banks increased sharply (Martinuzzi, 2019; Köster & Pelster, 2017).

2.3. Effect of financial penalties on profitability

Researchers and bank professionals are divided about the impact of financial penalties on bank profitability (Köster & Pelster, 2017; Murphy et al., 2009). Some argue that financial penalties have lowered bank profitability because their number and size have become a potential source of systematic risk, creating uncertainty about the solvency and the business model of banks (European Systematic Risk Board, 2015). Others argue that the gains of corporate misconduct may exceed the costs of financial penalties (Murphy et al., 2009; Simpson, 2002) and that banks may risk being involved

in misconduct because the costs of implementing internal controls are too high or the benefits of doing so exceed the expected value of the penalty costs (Köster & Pelster, 2017).

The most systematic analysis of the relationship between financial penalties and bank profitability has been carried out by Köster & Pelster (2017). They find a statistically significant and negative relationship between financial penalties and pre-tax return on assets of 0.14% for one standard deviation. In contrast, they do not find a statistically significant relationship between financial penalties and after-tax return on assets, most likely the result of national tax laws allowing banks to deduct some of the penalties from their taxable income (Köster & Pelster, 2017).

2.4. Effect of financial penalties on annual deposit growth

In contrast to profitability, the impact of financial penalties on annual deposit growth has not been studied so far. Yet several studies examine a similar relationship between banking scandals and annual deposit growth (e.g. Chen et al., 2019; Homanen, 2018). In general, these studies find that banking scandals harm annual deposit growth. For instance, Chen et al. (2019) find that there is an increased probability of deposit outflows and a decreased probability of deposit inflows following negative events. Their study indicates that these negative events increase the likelihood of deposit outflows by 25.8% and decrease the likelihood of deposit inflows by 15.6% (Chen et al., 2019). The theoretical explanation for this relationship given by Chen et al. (2019) is that depositors discipline banks by withdrawing their deposits or switching banks in the case of discontent over banking scandals. A well-known example of such disciplining reactions by depositors in response to a banking scandal is provided by Taylor (2019). He showed that Westpac, a large Australian bank, experienced heavy reactions of its depositors after Austrac (the Australian Financial Intelligence Unit) revealed that the bank had breached anti-money laundering and counter-terrorism finance laws for 11 billion in transactions, including several involving child abuses (Taylor, 2019).

In contrast, behavioral economic research indicates that, in many cases, depositors are reluctant to switch banks, even when they have a very good reason to do so (Nicholls, 2017; Yorulmazer, 2014). There are two main reasons. First, customer deposits are a form of demandable debt with explicit and implicit government protection. Second, the costs of bank switching deter depositors to leave a bank that is subject to banking scandals.

3. Data

We use a panel of 36 international banks to analyze the impact of financial penalties on bank performance. These banks have been selected based on the criterion that they have been fined at least once in the period from 2006 to 2019.[1] Most financial penalties were imposed in this period. We analyze 713 penalties with an aggregated value of $227.3 billion, about 60% of the total value of the financial penalties imposed on banks (Martinuzzi, 2019). The collected observations are aggregated on an annual basis: For banks with multiple penalties in a certain year, penalties are clustered into a single observation. To prevent an unbalanced panel, a zero penalty is allocated to banks that did not receive a penalty in a certain year between 2006 and 2019. Consequently, the panel is strongly balanced and contains 236 aggregated observations of financial penalties and 268 observations of no penalty. In each year, at least one bank did not get a financial penalty. For each type of violation, at least one bank did not get a financial penalty between 2006 and 2019.

[1] Annex I provides an overview of the selected banks.

The collection of data on financial penalties is not straightforward. Most banks do not provide information on expenses related to financial penalties. They typically aggregate these penalties with other expenses or only report on the most recent penalties. Therefore, we combine multiple data sources to construct a dataset with sufficient penalty observations. The observations for 2006-2014 come from Köster & Pelster (2017). We collect the observations for 2015-2019 by hand through Bloomberg, Reuters, and the website Violation Tracker. We consider only penalties with a final character: when a settlement is agreed on or a judgment has been made.

Accounting data is obtained through banks' annual reports and through Moody's Analytics BankFocus, which is an initiative from Bureau van Dijk. The collected data on bank performance is converted to US dollars to avoid biased results due to different currencies.[2]

3.1. Dependent variables

Our dependent variables are the dimensions of bank performance: ROA (return on assets), ROE (return on equity), and the annual deposit growth rate. For ROA and ROE, a distinction is made between the pre- and after-tax situation to control for national tax laws that allow banks to deduct some of the financial penalties from their taxable income. Annual deposit growth is transformed to a natural logarithm to linearize the trends and to make the coefficient directly interpretable as approximate proportional differences (Wooldridge, 2016). Before the logarithmic transformation of the annual deposit growth rate, we deal with outliers generated by mergers and acquisitions, because they disproportionally inflate the growth in customer deposits in certain years. We removed nine observations with growth rates above 50% or under -50%. The negative values of the annual deposit growth rate are converted into small positive numbers to avoid losing these observations with a logarithmic transformation. As a consequence, the logarithmic transformation for the annual deposit growth rate is given by *ln*(Deposits+λ) where λ is set at a value of 29.54. The dependent variables are presented in Table 1 with a brief description and calculation.

Table 1: *Dependent variables*

Variable	Description	Calculation
ptROA	Pre-tax return on assets	(Pre-tax profit/Total Assets) * 100%
atROA	After-tax return on assets	(After-tax profit/Total Assets) * 100%
ptROE	Pre-tax return on equity	(Pre-tax profit/Total Equity) * 100%
atROE	After-tax return on equity	(After-tax profit/Total Equity) * 100%
ln(Deposits + λ)	Annual deposit growth rate	$ln(\frac{\text{Deposits}_t - \text{Deposits}_{t-1}}{\text{Deposits}_{t-1}} + \lambda)$

3.2. Main independent variables

The main independent variable is a proxy for financial penalty costs. This variable is divided into an absolute and a relative variable. The absolute variable is the aggregated financial penalty costs. The relative variable is the aggregated financial penalty costs divided by total assets or total equity to make it better comparable across different banks. The absolute and relative variables make it possible to determine the impact of harsher financial penalties on bank performance. In addition, a dummy variable is constructed to indicate whether or not a bank has been fined in a certain year. This dummy

[2] Appendix II gives an overview of the annual average exchange rates used.

makes it possible to determine whether or not getting fined has an impact on bank performance. The financial penalty variables are presented in Table 2 with a brief description and calculation.

Table 2: *Main independent variables*

Variable	Description	Description
Penalty	Absolute financial penalty variable	Σ (financial penalty observations)
PenaltyTA	Relative financial penalty variable	(Penalty / Total Assets) * 100%
PenaltyTE	Relative financial penalty variable	(Penalty / Total Equity) * 100%
PenaltyD	Financial penalty dummy variable	1 = penalty, 0 = no penalty

3.3. Control variables

We include control variables to prevent omitted variable bias. These variables are based on Köster & Pelster (2017) and Chen et al. (2019).

For relevant control variables for the dependent variables ROA and ROE we include bank-specific and macroeconomic controls that cover the structure of the bank (in line with Köster & Pelster, 2017). The bank-specific controls comprise the size, asset structure, capitalization, and expense efficiency of a bank. The size (*Size*) of a bank is measured by the natural logarithm of total assets and by the square of that variable ($Size^2$). The asset structure (*Structure*) is the ratio of loans to assets, while the capitalization (*Capital*) of a bank is reflected by the ratio of equity to assets. Expense efficiency (*Costs*) is proxied by the ratio of operating expenses to assets. The macroeconomic controls comprise the annual growth rate of the real gross domestic product (*GDPG*) and the interest rate on the main refinancing operations of national central banks (*MRO*).

For relevant control variables for the annual deposit growth rate, we follow Chen et al. (2019). They include several time-varying and bank-level variables that can affect customer deposit change. These variables comprise the size (*Size* and $Size^2$), profitability (*ptROA*), capital ratio (*Tier1*), liquidity ratio (*Liquidity*), interest expenses (*Rate*), and annual growth rate of the real gross domestic product (*GDPG*). The capital ratio of a bank is defined as the ratio of a bank's core equity capital to its risk-weighted assets, while the liquidity ratio is the ratio of liquid assets to total assets. The interest expenses are proxied by the ratio of interest expenses on customer deposits to total customer deposits.

3.4. Descriptive statistics

Table 3 shows the descriptive statistics of the financial penalty variables. The 36 selected banks received an aggregated mean financial penalty of $451.1 million per year. In 46.8% of the observations a selected bank has received a penalty, which implies that in 53.2% of the observations (bank-year pair) no penalty has been recorded. The average bank in the sample paid penalties of 0.03% of total assets, and 0.51% of total equity.

Table 3: *Descriptive statistics for financial penalty variables*

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Penalty	504	451.1	1,573	0	16,667

Penalty Dummy	504	0.468	0.499	0	1
Penalty / Total Assets	504	0.034	0.107	0	0.791
Penalty / Total Equity	504	0.505	1.576	0	12.65

The absolute (*Penalty*) and relative (*Penalty / Total Assets* and *Penalty / Total Equity*) financial penalty variables can be disaggregated into six categories: 1) Interest and exchange rate manipulation, 2) Investor and consumer protection violations, 3) Data submission deficiencies, 4) Deficient AML controls, 5) Tax violations, and 6) Sanction violations. Table 4 shows how the absolute financial penalty variable is distributed across these categories. The aggregated mean values of the absolute financial penalty range considerably from $1.7 million for data submission deficiencies to $316.6 million for investor/consumer protection violations.

Table 4: *Distribution of absolute financial penalties across categories*

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
1) Interest/Exchange rate manipulation	504	44.96	215.1	0	2,515
2) Investor/Consumer protection violations	504	316.6	1,447	0	16,650
3) Data submission deficiencies	504	1.716	19.30	0	400
4) Deficient AML controls	504	25.80	262.2	0	5,100
5) Tax violations	504	16.32	152.1	0	2,798
6) Sanction violations	504	45.66	436.5	0	8,974

Table 5 presents the descriptive statistics for the dependent and control variables.

Table 5: *Descriptive statistics for the dependent and control variables*

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
ptROA	502	0.798	0.854	-2.737	5.649
atROA	502	0.578	0.622	-1.606	3.697
ptROE	502	11.74	11.46	-68.48	50.47
atROE	502	8.544	9.086	-51.62	36.70
Deposits	455	7.151	17.09	-55.77	148.6
Size	504	13.64	0.988	10.26	15.30
$Size^2$	504	187.1	25.91	105.4	234.1
Structure	497	46.58	19.66	1.233	120.2
Capital	504	6.459	2.473	1.113	19.07
Costs	502	2.391	2.435	0.119	15.94
Tier1	488	12.41	3.368	5.500	29.30
Liquidity	497	38.18	15.74	10.49	90.75
Rate	485	1.344	1.342	0.0379	11.26
EmpCost	502	139.7	90.56	48.24	661.5
GDPG	504	1.637	1.909	-8.070	6.870
MRO	504	1.247	1.618	-0.750	6.650
LFPR	504	75.19	4.250	62.01	84.21
UR	492	6.625	2.989	2.350	26.09

4. Empirical design

4.1. External validity

We see two reasons why our findings can be generalizable to the entire population of banks subject to financial penalties (Gertler et al., 2016). First, power calculations in the program Optimal Design show that the sample is sufficiently large. Based on a minimum detectable effect size of 0.4, a level of statistical significance of 0.05, and a level of statistical power of 0.8, the minimum required sample should include at least 198 annual observations of financial penalties. Our sample has 236 annual observations of financial penalties and 268 observations of a zero penalty.[3] Second, the sample is not subject to selection bias, because of exogeneous sample selection (Wooldridge, 2016). Our sample includes financial penalties with a final character only, so the sample selection is determined by an external and independent mechanism that is carried out by judges and regulatory agencies.

4.2. Internal validity

For internal validity (Wooldridge, 2016), we prevent the following validity issues: 1) omitted variable bias, 2) heteroskedasticity and serial correlation, 3) unobserved heterogeneity, and 4) simultaneity bias.

Apart from using relevant control variables (see Section 4 about our data selection), we deal with omitted variable bias by using a panel dataset controlling for unobserved omitted variables that are constant over time (Wooldridge, 2016).

Heteroskedasticity and serial correlation are present in an empirical model when the residuals follow an unequal scatter and/or do not follow a white noise distribution (Wooldridge, 2016). To prevent that the residuals are correlated across observations and/or over time we cluster the standard errors at bank-level in all empirical models.

4.2.1. Simultaneity bias

There are no empirical indications so far for a reversed relationship between financial penalties and bank performance, but an endogenous penalty variable cannot be ruled out. For example, less profitable banks are more likely to use unfair practices to remain competitive. Assuming that the unfair practices are revealed, these banks face higher penalty costs (Köster & Pelster, 2017).

We deal with potential simultaneity bias by constructing an IV-approach based on a 2SLS-procedure. For the dependent variable *ln*(Deposits+λ), such a procedure is not necessary, because the variable is already differenced. Our instrumental variable to avoid potential endogeneity in the financial penalty variable is the electoral cycle (*Elections*). This instrument is applied by Levitt (1996), who tested the effect of police levels on crime rates by identifying his models using electoral cycles as instruments. Levitt (1996) argues that in election years mayors and other local officials hire more police as a vote-getting strategy. Then election years can cause higher police levels (Levitt, 1996). Levitt (1996) shows that election years have no impact on crime rates other than the indirect effect produced by the beefed-up police forces. As a result, the instrument meets both the relevance and exogeneity criterium (Wooldridge, 2016). We follow this reasoning. Election years can cause higher financial penalties because governments like to show that they exercise sufficient control over the banking sector. This can be a viable vote-getting strategy, especially after the global financial crisis. We test this

[3] See the power calculations in Annex III.

relationship with the correlation between the instrument *Elections* and the relative financial penalty variables. The correlation matrix in Table 6 shows that the instrument is significantly correlated with the relative financial penalty variables at a 1% significance level and not significantly correlated with any of the dependent variables at a 1%-level, making it an exogeneous instrument.

Table 6: *Correlation matrix (*** p<0.01)*

	PenaltyTA	**PenaltyTE**	**Elections**
ptROA	-0.09		0.09
atROA	-0.09		0.10
ptROE		-0.17***	0.02
atROE		-0.16***	0.01
Elections	**0.17*** **	**0.11*** **	1.00

To assess the robustness of our instrument *Elections*, Table 7 shows the F-statistics for the first-stage regressions. The F-statistics are lower than the classic rule of thumb of 10, which ensures a maximum bias in the IV-estimates of 10% (Wooldridge, 2016). However, the F-statistics are close to 5, which is another – less conservative – threshold for robust instruments. We, therefore, conclude that the variable *Elections* is a valid but relatively weak instrument.

Table 7: *F-tests for the robustness of the IV*

	F-statistic
PenaltyTA (*ptROA*, *atROA*)	4.33
PenaltyTE (*ptROE*, *atROE*)	3.18

The Davidson-MacKinnon tests shown in Table 8 indicate that the weakness of the instrument *Elections* is not problematic, because the financial penalty variable is not significantly endogenous in any of our models. There may be a reversed relationship between financial penalties and bank performance, but this relationship is not statistically significant.

Tabe 8: *Davidson-MacKinnon tests for exogeneity*

	F-statistic	**Prob > F**
ptROA	0.353	**0.553**
atROA	0.126	**0.723**
ptROE	1.360	**0.244**
atROE	1.438	**0.231**

4.3. Empirical models

We apply two different empirical models. For models with profitability as a dependent variable, we base our choice for the panel data estimation techniques on Breusch-Pagan Lagrange Multiplier and

Hausman tests. These tests measure whether OLS-residuals contain significant levels of bank-specific error components and whether these components have a random or fixed character. For the models with annual deposit growth as a dependent variable, we use a pooled OLS specification because of first-differencing.

4.3.1. Profitability models

Our profitability models have as dependent variables *ptROA*, *atROA*, *ptROE*, or *atROE* (*pt* indicating pre-tax and *at* indicating after-tax). The Breusch-Pagan Lagrange Multiplier tests shown in Table 9 indicate that the OLS-residuals for these models contain a significant amount of bank-specific error components at a 1% significance level. So the null hypothesis that the variance of the bank-specific effects equals zero can be rejected.

Table 9: *Breusch-Pagan Lagrange Multiplier tests for the profitability models*

Variable	Var	Sqrt (Var)
ptROA	0.733	0.856
e	0.169	0.412
u	0.113	0.335
Test Var(a_i) = 0	chibar^2 = 494.93 Prob > chibar^2 = **0.000**	
atROA	0.390	0.624
e	0.107	0.327
u	0.055	0.235
Test Var(a_i) = 0	chibar^2 = 392.58 Prob > chibar^2 = **0.000**	
ptROE	124.451	11.156
e	61.158	7.820
u	16.706	4.087
Test Var(a_i) = 0	chibar^2 = 203.84 Prob > chibar^2 = **0.000**	
atROE	79.676	8.926
e	43.684	6.609
u	8.780	2.963
Test Var(a_i) = 0	chibar^2 = 148.80 Prob > chibar^2 = **0.000**	

We use Hausman tests to determine whether the profitability models should be specified as random or fixed-effects models (with the *sigmamore* option to reinforce that the covariance matrices are based on the estimated disturbance variance from the efficient estimator (Wooldridge, 2016)). Table 10 shows a significant correlation between the explanatory variables and the bank-specific effects for all profitability models at a 1% significance level, indicating that these models should be specified as fixed effects models.

Table 10: *Hausman tests for the profitability models*

	ptROA	***atROA***	***ptROE***	***atROE***
chi^2	28.09	23.78	30.09	31.33
Prob > chi^2	**0.001**	**0.005**	**0.000**	**0.000**

We use the following fixed effects profitability models:

$$ptROA_{it} \,/\, atROA_{it} \,/\, ptROE_{it} \,/\, atROE_{it} = \alpha_0 + \alpha_1 PenaltyTA_{it} + \alpha_3 X_{it} + \alpha_4 Year_t + a_i + \epsilon_{it}$$

Subscript *i* refers to the specific bank being observed. Subscript *t* refers to the specific year in which it is observed. $Year_t$ is a time-specific dummy variable that accounts for a linear trend in profits, a_i denotes the unobserved bank-specific effects, and ϵ_{it} is a random error term. In addition, X_{it} is a vector that captures the bank-specific and macroeconomic control variables *Size*, *Size²*, *Structure*, *Capital*, *Costs*, *GDPG* and *MRO*.

4.3.2. Annual deposit growth model

Since the dependent variable *ln(Deposits+λ)* measures the growth in total customer deposits from one year to another, unobserved heterogeneity is not a concern. We therefore use a pooled OLS specification for the annual deposit growth model. This model is in matrix notation:

$$ln(Deposits+\lambda)_{it} = \beta_0 + \beta_1 PenaltyTA_{it} + \beta_3 X_{it} + \beta_4 Year_t + \epsilon_{it}$$

The time-specific dummy variable $Year_t$ is included to account for a linear trend in the annual deposit growth rate and ϵ_{it} is a random error term. In addition, X_{it} is a vector that captures the control variables *Size*, *Size²*, *ptROA*, *Tier1*, *Liquidity*, *Rate,* and *GDPG*.

5. Results

Our regression result tables all have the same structure. Column 1 reports the results of a multivariate regression between the absolute financial penalty and our dependent variable. Column 2 uses a dummy for the penalty to determine the impact of the imposition of a financial penalty in itself and Column 3 uses the relative financial penalty variables to enhance the comparability of the financial penalties across banks. Column 3 is our baseline regression, highlighted in grey. We test the robustness of the baseline regression with an instrumental variable (column 4) and several subsample analyses (columns 5 to 13). We pay specific attention to Columns 8 to 13 that differentiate the results per type of violation.

5.1. The impact of financial penalties on banks' profitability

We report the results for profitability as measured in both pre- and after-tax ROA (return on assets). Appendix IV reports the same tests for ROE (return on equity) variables with similar results. Table 11 and 12 show the impact of financial penalties on banks' ROA. Column 1 shows that a one-standard-

deviation ($1573 million) increase in the absolute financial penalty leads to a statistically significant decrease in both pre- and after-tax ROA of respectively 0.091%-points and 0.058%-points, ceteris paribus. Since the average bank in our sample possesses $1190 billion in assets, the average decrease in pre- and after-tax profits is respectively $1083 and $690 million, which means that the average decrease in profits is less than the increase in the absolute financial penalty variable. So harsher financial penalties reduce banks' profitability but by less than their absolute size.

Table 11: *Pre-tax return on assets (ptROA)*

VARIABLES	(1) Full sample: *Penalty*	(2) Full sample*: PenaltyD*	(3) Full sample*: PenaltyTA*	(4) Full sample: *2SLS*	(5) USA	(6) Europe	(7) Crisis	(8) Interest/exchange rate manipulation	(9) Investor/consumer protection violations	(10) Data submission deficiencies	(11) Deficient AML controls	(12) Tax violations	(13) Sanction violations
Penalty	**-5.8e-05*** **	-0.0668	**-0.610** **	-1.409	**-1.142** **	0.0506	**-0.621** **	**-2.751*** **	**-0.804** **	**-20.72*** **	0.334	0.276	0.221
	(1.8e-05)	(0.0524)	(0.269)	(1.002)	(0.352)	(0.140)	(0.274)	(0.975)	(0.327)	(4.139)	(0.222)	(0.280)	(0.479)
Size	2.2955**	2.257**	2.575**	2.989***	2.494	0.796	2.132**	2.378**	2.472**	2.315**	2.257**	2.194**	2.264**
	(1.0671)	(1.044)	(1.091)	(1.086)	(4.886)	(1.482)	(1.026)	(1.077)	(1.074)	(1.039)	(1.055)	(1.060)	(1.059)
Size2	-0.0923**	-0.0900**	-0.103**	-0.120***	-0.0835	-0.0480	-0.0855**	-0.0946**	-0.0992**	-0.0920**	-0.0897**	-0.0875**	-0.0900**
	(0.0374)	(0.0364)	(0.0385)	(0.0396)	(0.177)	(0.0506)	(0.0361)	(0.0376)	(0.0377)	(0.0361)	(0.0367)	(0.0369)	(0.0369)
Structure	0.0005	0.000381	0.000399	0.000508	0.0138	-0.00433	0.00121	0.000354	0.000325	0.000387	0.000281	0.000273	0.000347
	(0.0053)	(0.00526)	(0.00528)	(0.00508)	(0.0107)	(0.00402)	(0.00514)	(0.00536)	(0.00539)	(0.00543)	(0.00546)	(0.00545)	(0.00545)
Capital	0.1568***	0.155***	0.157***	0.157***	0.298***	0.0614	0.150***	0.161***	0.159***	0.158***	0.158***	0.158***	0.158***
	(0.0488)	(0.0488)	(0.0485)	(0.0482)	(0.0690)	(0.0614)	(0.0458)	(0.0503)	(0.0484)	(0.0491)	(0.0490)	(0.0491)	(0.0491)
Costs	0.0125	0.00773	0.0104	0.0146	-0.0562	0.0119	0.00852	0.00893	0.0101	0.00750	0.00713	0.00704	0.00700
	(0.0216)	(0.0249)	(0.0229)	(0.0225)	(0.152)	(0.0334)	(0.0225)	(0.0243)	(0.0225)	(0.0246)	(0.0248)	(0.0248)	(0.0248)
GDPG	0.0502***	0.0505***	0.0487***	0.0481***	0.107*	0.0312***	0.0362***	0.0497***	0.0486***	0.0497***	0.0494***	0.0491***	0.0493***
	(0.0122)	(0.0125)	(0.0121)	(0.0125)	(0.0552)	(0.00984)	(0.0113)	(0.0121)	(0.0122)	(0.0121)	(0.0122)	(0.0122)	(0.0121)
MRO	0.1041***	0.110***	0.109***	0.103***	0.150**	0.0988*	0.107***	0.114***	0.109***	0.115***	0.114***	0.115***	0.115***
	(0.0293)	(0.0341)	(0.0304)	(0.0324)	(0.0524)	(0.0511)	(0.0291)	(0.0329)	(0.0301)	(0.0326)	(0.0326)	(0.0326)	(0.0326)
Year	0.0038	0.00564	0.00505	0.00578	-0.0470**	0.00515	-0.000176	0.00503	0.00378	0.00458	0.00413	0.00445	0.00443
	(0.0113)	(0.0117)	(0.0116)	(0.0112)	(0.0204)	(0.0157)	(0.0114)	(0.0118)	(0.0115)	(0.0120)	(0.0120)	(0.0119)	(0.0120)
Crisis							-0.149*						
							(0.0854)						
Constant	-22.2281	-25.72	-26.53	-30.45	74.14*	-12.05	-13.11	-25.35	-23.25	-24.07	-22.79	-23.00	-23.44
	(20.6387)	(21.80)	(21.80)	(21.01)	(38.40)	(30.62)	(20.60)	(22.05)	(21.30)	(22.36)	(22.54)	(22.30)	(22.38)
Observations	497	497	497	497	140	245	497	497	497	497	497	497	497
R-squared	0.251	0.222	0.236		0.427	0.203	0.244	0.225	0.242	0.222	0.220	0.220	0.219
Number of Banks	36	36	36	36	10	18	36	36	36	36	36	36	36
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: *After-tax return on assets (atROA)*

VARIABLES	(1) Full sample: *Penalty*	(2) Full sample*: PenaltyD*	(3) Full sample*: PenaltyTA*	(4) Full sample: *2SLS*	(5) USA	(6) Europe	(7) Crisis	(8) Interest/exchange rate manipulation	(9) Investor/consumer protection violations	(10) Data submission deficiencies	(11) Deficient AML controls	(12) Tax violations	(13) Sanction violations
Penalty	**-3.7e-05*** **	-0.0322	**-0.386** **	-0.765	**-0.773*** **	0.0197	**-0.389** **	**-1.630***	**-0.539** **	**-16.56*** **	**0.344*** **	0.225	0.307
	(1e-05)	(0.0465)	(0.171)	(0.855)	(0.222)	(0.136)	(0.173)	(0.947)	(0.205)	(4.296)	(0.114)	(0.265)	(0.541)
Size	1.5947	1.570	1.771*	1.968**	0.0733	1.895	1.643	1.642	1.715*	1.616*	1.570	1.519	1.579
	(0.9993)	(0.973)	(0.985)	(0.994)	(3.472)	(1.384)	(0.977)	(0.994)	(0.990)	(0.951)	(0.969)	(0.952)	(0.971)
Size2	-0.0634*	-0.0619*	-0.0700*	-0.0780**	0.0197	-0.0840	-0.0650*	-0.0647*	-0.0681*	-0.0636*	-0.0617*	-0.0600*	-0.0621*
	(0.0365)	(0.0354)	(0.0359)	(0.0373)	(0.125)	(0.0485)	(0.0358)	(0.0362)	(0.0362)	(0.0345)	(0.0352)	(0.0346)	(0.0353)
Structure	-0.0005	-0.000640	-0.000619	-0.000567	0.00343	-0.00462	-0.000383	-0.000649	-0.000665	-0.000614	-0.000707	-0.000706	-0.000627
	(0.0033)	(0.00333)	(0.00328)	(0.00319)	(0.00538)	(0.00387)	(0.00325)	(0.00334)	(0.00334)	(0.00337)	(0.00339)	(0.00339)	(0.00337)
Capital	0.1294***	0.129***	0.130***	0.130***	0.246***	0.0816	0.128***	0.132***	0.131***	0.131***	0.130***	0.131***	0.130***
	(0.0320)	(0.0317)	(0.0319)	(0.0318)	(0.0518)	(0.0499)	(0.0313)	(0.0330)	(0.0318)	(0.0323)	(0.0322)	(0.0322)	(0.0323)
Costs	0.0189	0.0158	0.0175	0.0195	0.139	0.00799	0.0170	0.0165	0.0174	0.0158	0.0155	0.0154	0.0153
	(0.0179)	(0.0191)	(0.0182)	(0.0173)	(0.104)	(0.0231)	(0.0179)	(0.0188)	(0.0180)	(0.0190)	(0.0192)	(0.0192)	(0.0191)
GDPG	0.0323***	0.0323***	0.0314***	0.0311***	0.0427	0.0179	0.0277***	0.0320***	0.0313***	0.0321***	0.0318***	0.0316***	0.0318***
	(0.0091)	(0.00949)	(0.00911)	(0.00941)	(0.0313)	(0.0109)	(0.00943)	(0.00900)	(0.00914)	(0.00902)	(0.00911)	(0.00910)	(0.00906)
MRO	0.0961***	0.100***	0.0995***	0.0963***	0.163***	0.0964**	0.0987***	0.103***	0.0987***	0.103***	0.102***	0.103***	0.103***
	(0.0215)	(0.0238)	(0.0218)	(0.0246)	(0.0435)	(0.0431)	(0.0216)	(0.0230)	(0.0217)	(0.0228)	(0.0229)	(0.0229)	(0.0230)
Year	0.0009	0.00184	0.00165	0.00199	-0.0433**	-0.00234	0.000132	0.00161	0.000815	0.00136	0.000911	0.00126	0.00120
	(0.0085)	(0.00866)	(0.00864)	(0.00848)	(0.0170)	(0.0140)	(0.00881)	(0.00884)	(0.00861)	(0.00893)	(0.00902)	(0.00893)	(0.00895)
Crisis							-0.0432						
							(0.0642)						
Constant	-12.0960	-13.97	-14.82	-16.68	80.30**	-5.416	-10.93	-14.00	-12.73	-13.35	-12.15	-12.48	-12.79
	16.4186	(16.70)	(16.85)	(16.86)	(27.52)	(27.69)	(17.32)	(17.01)	(16.80)	(17.12)	(17.35)	(17.04)	(17.18)
Observations	497	497	497	497	140	245	497	497	497	497	497	497	497
R-squared	0.235	0.216	0.226		0.430	0.191	0.227	0.218	0.231	0.217	0.215	0.215	0.215
Number of Banks	36	36	36	36	10	18	36	36	36	36	36	36	36
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In contrast to harsher financial penalties, Column 2 shows that there is no significant relationship between the imposition of a financial penalty in itself and ROA. Imposing a financial penalty does not necessarily reduce ROA, but that harsher financial penalties do. This conclusion is supported by the findings from the baseline regression in Column 3, which comprises the impact of the relative financial penalty variable (*PenaltyTA*) on both pre- and after-tax ROA. A one-standard-deviation (0.107) increase in this financial penalty variable leads to a significant decrease in both pre- and after tax ROA of respectively 0.065%-points and 0.041%-points, ceteris paribus.

Column 4 presents the robustness check for simultaneity bias. After instrumentation of the financial penalty variable, the negative relationship with ROA is maintained. However, the relationship now appears to be stronger and no longer statistically significant. This observation suggests that the relationship between financial penalties and ROA is stronger when controlled for potential endogeneity.

Bank supervision and tax laws are at least marginally different across countries. To control for these differences, Columns 5 and 6 show a subsample analysis for the United States and Europe. Compared to the baseline regression in column 3, the subsample for the United States shows a statistically significant impact of financial penalties on both pre- and after-tax ROA that is almost twice as big. For Europe, there is no significant impact of financial penalties on ROA. Therefore, the negative impact of financial penalties on ROA seems to be driven by US banks. This finding is different from Köster & Pelster (2017). Although they also find that the impact of financial penalties on pre-tax ROA is stronger for US banks, they still find a significant and negative impact for European banks. The after-tax situation is even more different because Köster & Pelster (2017) do not find a statistically significant impact for US banks here, while they do find such an impact for European banks. Little has changed in the United States' and European judicial systems since the publication of Köster & Pelster (2017). (Macartney et al., 2019) What has changed since the publication of Köster & Pelster (2017) is the size and number of the financial penalties imposed on banks. This growth may explain why we find a significant and negative impact of financial penalties on after-tax ROA for US banks but not why we find an insignificant effect for European banks. The only explanation for this could be that US banks are fined more often and that these fines are generally harsher than for European banks. Table 13 indicates that the mean financial penalty (in millions) is almost three times higher for US banks compared to European banks.

Table 13: *Mean financial penalties for US and European banks*

	Mean	**Max**
US banks	$997.4	$16666.6
European banks	$338.0	$9053.6

The financial crisis led to economic downturns of various extents and durations. To control for these effects, a dummy variable is included in Column 7 indicating whether or not there is a systematic banking crisis going. To identify the periods of systematic banking crises in different countries, we use the financial crisis database of Laeven and Valencia (2018). The results in Column 7 indicate that the global financial crisis has a significantly negative impact on pre-tax ROA at a 10% significance level. This relationship disappears for the after-tax situation. The results in Column 7 show that the impact of financial penalties on both pre- and after-tax ROA is similar to the baseline regression result (Column

3). Hence, the impact of financial penalties on ROA seems not crisis-driven, as also concluded by Köster & Pelster (2017).

Financial penalties for different types of violations can have a distinct impact on ROA. These impacts are presented in Columns 8 to 13. Financial penalties for investor and consumer protection violations have the most negative impact on both pre- and after-tax ROA. These penalties are also the largest in size and number. A one-standard-deviation (0.0946) increase in financial penalties for investor and consumer protection violations yields a decrease in pre- and after-tax ROA of respectively 0.076%-points and 0.051%-points, ceteris paribus. Financial penalties for interest and exchange rate manipulation and data submission deficiencies also lead to a statistically significant decrease in ROA, both before and after taxation. In contrast, financial penalties for tax violations and sanction violations do not significantly decrease ROA. For financial penalties related to deficient AML controls, there is even a positive and statistically significant impact on after-tax ROA. A one-standard-deviation (0.0256) increase in this financial penalty type yields an increase in after-tax ROA of 0.009%-points, ceteris paribus.

5.2. The impact of financial penalties on annual deposit growth

Table 14 shows the results of the analysis on the impact of financial penalties on annual deposit growth. The first column of Table 14 indicates that the relationship between the absolute financial penalty variable and the annual deposit growth rate is positive but statistically insignificant. A similar conclusion holds for the baseline regression in Column 3, which is also positive and insignificant. For the robustness check for the geographic location of banks (Columns 4 and 5), the findings are slightly different. For US banks, there is a negative and insignificant relationship between the relative financial penalty variable and the annual deposit growth rate, while this relationship is positive and insignificant for European banks. Column 6 shows that the financial crisis has no significant impact on the annual deposit growth rate and that it does not drive the relationship between financial penalties and annual deposit growth.

In sharp contrast, Column 2 shows that the imposition of a financial penalty in itself significantly reduces the annual deposit growth rate. A one-standard-deviation increase (0.499) in the likelihood of receiving a financial penalty decreases the annual deposit growth rate by 4.49%, ceteris paribus. This means that being imposed with a financial penalty significantly reduces the annual deposit growth rate while increasing the size of the financial penalty does not have such an effect. The underlying explanation for this could be that depositors are more sensitive to the release of negative events in the form of a financial penalty than to the actual size of that penalty. Chen et al. (2019) and Homanen (2018) find something similar: The release of unexpected negative bank social performance increases the likelihood of large deposit outflows and decreases the likelihood of large deposit inflows.

When focusing on the different types of violations, we see that this does not hold for imposing harsher financial penalties for interest and exchange rate manipulation and data submission deficiencies. A one-standard-deviation (0.0137 and 0.0011) increase in the size of these financial penalties leads to a statistically significant decrease in the annual deposit growth rate by respectively 2.61% and 1.96%, ceteris paribus. The contrast for deficient AML controls is arguably even starker. A one-standard-deviation (0.0256) increase in the financial penalties related to this category results in a statistically significant increase in the annual deposit growth rate by 1.15%, ceteris paribus.

Table 14: *Annual deposit growth rate (ln(Deposits+λ))*

VARIABLES	(1) Full sample: *Penalty*	(2) Full sample*: PenaltyD*	(3) Full sample*: PenaltyTA*	(4) USA	(5) Europe	(6) Crisis	(7) Interest/exchange rate manipulation	(8) Investor/consumer protection violations	(9) Data submission deficiencies	(10) Deficient AML controls	(11) Tax violations	(12) Sanction violations
Penalty	1.98e-06	**-0.0899****	0.0173	-0.00770	0.101	0.0182	**-1.902****	0.117	**-17.83*****	**0.449*****	-0.390	-0.563
	(6.37e-06)	(0.0344)	(0.0983)	(0.137)	(0.173)	(0.0987)	(0.821)	(0.0894)	(5.300)	(0.154)	(0.531)	(1.052)
Size	0.164	0.264	0.160	2.172**	-1.748**	0.136	0.168	0.144	0.152	0.152	0.145	0.161
	(0.503)	(0.453)	(0.502)	(0.838)	(0.647)	(0.496)	(0.501)	(0.507)	(0.502)	(0.508)	(0.508)	(0.505)
Size2	-0.00749	-0.0107	-0.00731	-0.0812**	0.0615**	-0.00634	-0.00751	-0.00677	-0.00697	-0.00701	-0.00684	-0.00734
	(0.0187)	(0.0169)	(0.0186)	(0.0300)	(0.0240)	(0.0184)	(0.0186)	(0.0188)	(0.0186)	(0.0188)	(0.0188)	(0.0188)
ptROA	0.0835***	0.0900***	0.0834***	0.0781*	0.194**	0.0867***	0.0807***	0.0833***	0.0822***	0.0831***	0.0821***	0.0825***
	(0.0272)	(0.0267)	(0.0272)	(0.0356)	(0.0863)	(0.0287)	(0.0260)	(0.0273)	(0.0267)	(0.0269)	(0.0265)	(0.0268)
Tier1	-0.0178	-0.0169	-0.0178	-0.0105	-0.0443**	-0.0175	-0.0178	-0.0179	-0.0178	-0.0181	-0.0179	-0.0181
	(0.0109)	(0.0103)	(0.0109)	(0.0133)	(0.0202)	(0.0105)	(0.0111)	(0.0109)	(0.0108)	(0.0111)	(0.0107)	(0.0108)
Liquidity	0.00758***	0.00828***	0.00758***	0.00562***	0.00374	0.00775***	0.00750***	0.00750***	0.00756***	0.00759***	0.00765***	0.00764***
	(0.00132)	(0.00141)	(0.00132)	(0.00163)	(0.00305)	(0.00145)	(0.00130)	(0.00132)	(0.00132)	(0.00133)	(0.00134)	(0.00131)
Rate	0.0443***	0.0373***	0.0441***	0.0444**	0.0450	0.0455***	0.0416***	0.0450***	0.0437***	0.0434***	0.0435***	0.0442***
	(0.0142)	(0.0134)	(0.0140)	(0.0162)	(0.0443)	(0.0141)	(0.0141)	(0.0141)	(0.0138)	(0.0142)	(0.0141)	(0.0139)
GDPG	0.0376**	0.0414***	0.0377**	-0.0261	0.0539**	0.0340**	0.0390**	0.0374**	0.0384**	0.0378**	0.0378**	0.0375**
	(0.0144)	(0.0141)	(0.0143)	(0.0150)	(0.0252)	(0.0132)	(0.0144)	(0.0143)	(0.0144)	(0.0144)	(0.0143)	(0.0144)
Year	-0.0112	-0.0112	-0.0112	-0.0117	0.00760	-0.0139**	-0.0109	-0.0110	-0.0111	-0.0115	-0.0111	-0.0108
	(0.00758)	(0.00728)	(0.00756)	(0.00960)	(0.0144)	(0.00656)	(0.00760)	(0.00762)	(0.00755)	(0.00747)	(0.00753)	(0.00760)
Crisis						-0.0529						
						(0.0747)						
Constant	24.93	24.31	25.04	12.58	0.784	30.69**	24.26	24.74	24.80	25.67	24.91	24.16
	(15.63)	(15.17)	(15.56)	(20.64)	(26.08)	(13.61)	(15.76)	(15.64)	(15.60)	(15.41)	(15.38)	(15.67)
Observations	444	444	444	124	216	444	444	444	444	444	444	444
R-squared	0.214	0.225	0.214	0.323	0.222	0.216	0.219	0.215	0.217	0.215	0.215	0.215
Number of Banks	36	36	36	36	36	36	36	36	36	36	36	36
Bank FE	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year FE	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6. Conclusions

We find that the imposition of a financial penalty in itself has no impact on a banks' profitability, but the imposition of a harsher financial penalty leads to a statistically significant reduction in profitability, both before and after taxation. There is no multiplier effect present in this relationship; the decrease in a banks' profitability is on average less than the absolute size of the financial penalty imposed. The impact of financial penalties on a banks' profitability seems to be driven by US banks. The global financial crisis plays no significant role in this relationship. The impact of penalties on bank performance differs across financial penalties for different violations. Penalties for investor and consumer protection violations, interest and exchange rate manipulation, and data submission deficiencies yield a significant decrease in both pre- and after-tax profitability. In contrast, penalties for deficient AML controls significantly increase bank profitability. Penalties for tax and sanction violations do not significantly decrease a banks' profitability.

We also study the impact of penalties on deposits. We find that the imposition of a financial penalty in itself leads to a statistically significant reduction in the annual deposit growth rate, while the imposition of a harsher financial penalty does not have an impact on this growth rate. The impact on deposit growth differs across financial penalties for different violations. Harsher penalties for interest and exchange rate manipulation and data submission deficiencies lead to a significant decrease in the annual deposit growth rate. Harsher financial penalties for deficient AML controls increase the annual deposit growth rate.

There is a difference between the impact of imposing a financial penalty in itself and imposing a harsher financial penalty. Whereas the former appears to be particularly detrimental to a banks' ability to retain and/or attract customer deposits, the latter appears to be particularly detrimental to a banks' profitability. So it seems consumers are not focused on the size of the fine, but only on whether a financial penalty has been imposed while financially the effect for the bank comes particularly from the size of the fine.

Table 15: *Own misconduct versus misconduct of clients*

Dependent variable	**Own misconduct**			**Misconduct of customers**		
	Interest/exchange rate manipulation	Investor/consumer protection violations	Data submission deficiencies	Deficient AML controls	Tax violations	Sanction violations
Pre-tax ROA	–	–	–			
After-tax ROA	–	–	–	+		
Pre-tax ROE	–	–	–	+		
After-tax ROE	–	–	–	+		
Deposit Growth	–		–	+		

A + sign indicates a significant positive relationship. A – sign indicates a significant negative relationship. A blank indicates no significant relationship.

The impact of financial penalties on bank performance differs for financial penalties for different violations. Table 15 shows the main difference is between 'own misconduct' and 'misconduct of customers'. Financial penalties for own misconduct almost always have a significantly negative impact on bank performance, while financial penalties for the misconduct of customers have no significant impact or even a significantly positive impact on bank performance. We are not aware of similar results found in the literature. We discuss some possible explanations.

First, penalties imposed for own misconduct are generally more severe than for the misconduct of customers. However, our analysis indicates that this can not be the full explanation. Table 4 shows that indeed the categories interest and exchange rate manipulation and investor and consumer protection violations have generally more severe penalties, but this generally does not hold for the category data submission deficiencies while this still shows a similar effect. Also, financial penalties for sanction violations are relatively harsh but these do not result in a statistically significant impact on bank performance.

Second, banks might be able to balance the financial penalty costs for the misconduct of their customers with the extra revenue they can earn from those customers. These extra revenues may even exceed the financial penalty costs. This means that banks could potentially accept and facilitate the misbehavior of their customers because this is a way for them to retain these customers and generate more profit. This would imply that financial penalties for the misconduct of customers are insufficient to discourage violations.

Third, banks might anticipate financial penalties for their customers' misconduct more than financial penalties for their own misconduct, which come more often as a surprise.

Our study indicates a significant and positive relationship between financial penalties for deficient AML controls and almost all dimensions of bank performance (see Table 15). This means that financial penalties in this category significantly enhance a banks' profitability (except for pre-tax ROA) and systematically attract more customer deposits. These findings contradict the goals of these fines. Why would these fines not end up punishing banks as intended?

The financial penalties for deficient AML controls might simply be too low. Financial penalties for deficient AML controls (26 mln USD) are on average lower than for sanction violations (45 million USD), interest and exchange rate manipulation (45 million USD), and investor and consumer protection violations (317 million USD). (see Table 4)

We offer three possible (partial) reasons why a financial penalty for deficient AML controls – and the naming and shaming that comes with it – could improve bank performance. First, such a fine can be seen as an indication that the bank does everything to maximize profits (in the short run), which is interesting for investors without integrity who focus solely on profitability. Second, a fine for failing to have sufficient measures to prevent money laundering can indicate a weakness that can attract money launderers. Third, a public fine generates publicity that can benefit the bank, if "there is no such thing as bad publicity". (Van Erp and Beckers, 2012)

7. Limitations and future research

There is no universal database in which all financial penalties imposed on banks worldwide are stored and from which a random sample could be drawn. We collected as many financial penalties as possible to minimize the negative consequences of the sample selection. According to the estimates of Martinuzzi (2019), the sample for this research includes almost 60% of the financial penalties imposed on banks. Our study had an explorative character, providing first insights into the relationship between financial penalties and bank performance. Future research could be aimed at further developing this knowledge, by testing this relationship with a bigger sample. Such a sample can eliminate the sample selection limitation of this study.

A potential limitation of our study is that we do not control for persistent dependent variables. Some studies show that profitability persists over time (Dietrich & Wanzenried, 2014). This persistence could be explained by impediments to market competition, informational opacity, and sensitivity to macroeconomic shocks to the extent that these are serially correlated (Köster & Pelster, 2017).

Controlling for the persistency of the dependent variables would imply the inclusion of lagged dependent variables, which would cause biased and inconsistent results in our fixed effects models, known as Nickell bias (Wooldridge, 2016). Further research might want to specify the models according to a GMM-estimator, which employs lagged values of the dependent variables in differences and levels and lagged values of other independent variables that persist over time (Wooldridge, 2016).

Although we give some possible explanations for why financial penalties for deficient AML controls can improve bank performance, we are not able to test such explanations. Future research should aim to understand this relationship better. The same holds for our finding that financial penalties for own misconduct of banks almost always harm bank performance, while financial penalties for the misconduct of customers hardly impact bank performance.

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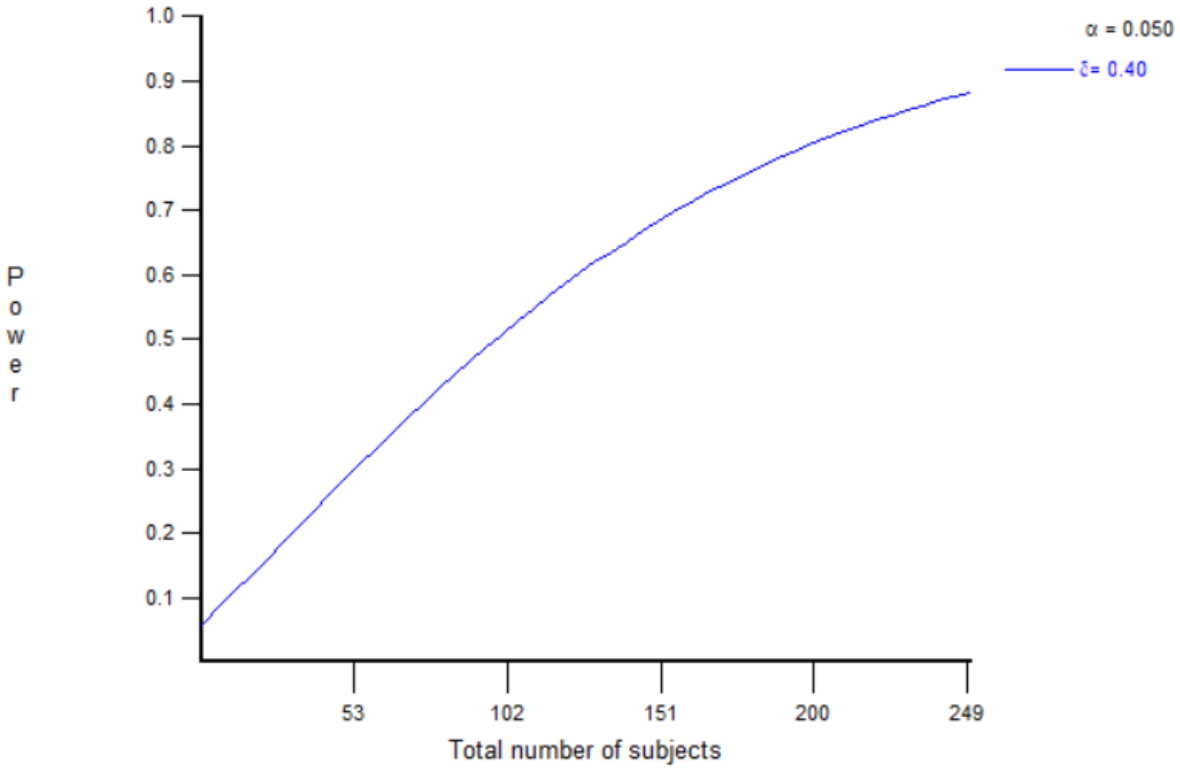
Appendix I – Overview of the selected banks

Name of bank	Identifier
Bank of America	1
American Express	2
Mitsubishi UFJ Financial Group	3
UBS Group	4
Australia and New Zealand Banking Group	5
Credit Suisse Group	6
Lloyds Banking Group	7
Commerzbank	8
Royal Bank of Scotland Group	9
Barclays	10
Sumitomo Mitsui Financial Group	11
Bank Leumi Le-Israel	12
Wells Fargo	13
Bank Hapoalim	14
JPMorgan Chase & Co	15
ING Group	16
HSBC Holdings	17
Standard Chartered	18
Nordea Bank	19
Intesa Sanpaolo	20
Toronto Dominion Bank	21
Deutsche Börse	22
BNP Paribas	23
Citigroup	24
Credit Agricole	25
Deutsche Bank	26
Societe Generale	27
Rabobank	28
U.S. Bancorp	29
Commonwealth Bank of Australia	30
Royal Bank of Canada	31
Goldman Sachs	32
UniCredit	33
Santander	34
Julius Baer	35
Morgan Stanley	36

Appendix II – Overview of the annual average exchange rates

	US $ 2006	**US $ 2007**	**US $ 2008**	**US $ 2009**	**US $ 2010**	**US $ 2011**	**US $ 2012**	**US $ 2013**	**US $ 2014**	**US $ 2015**	**US $ 2016**	**US $ 2017**	**US $ 2018**	**US $ 2019**
AUD	0,75	0,84	0,84	0,78	0,92	1,03	1,04	0,97	0,90	0,75	0,74	0,77	0,75	0,68
CAD	0,88	0,93	0,94	0,88	0,97	1,01	1,00	0,97	0,91	0,78	0,75	0,77	0,77	0,76
CHF	0,80	0,83	0,92	0,92	0,96	1,13	1,07	1,08	1,09	1,04	1,01	1,02	1,02	1,02
EUR	1,25	1,37	1,46	1,39	1,32	1,39	1,28	1,33	1,33	1,11	1,11	1,13	1,18	1,12
GBP	1,84	2,00	1,84	1,56	1,55	1,60	1,58	1,56	1,65	1,53	1,35	1,29	1,33	1,28
NIS	0,22	0,24	0,28	0,25	0,27	0,28	0,26	0,28	0,28	0,26	0,26	0,28	0,28	0,28
JPY	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
NZD	0,65	0,73	0,70	0,62	0,72	0,79	0,81	0,82	0,83	0,70	0,70	0,71	0,69	0,66

Appendix III – Power calculations



Appendix IV: Results for Return on equity (ROE)

The other two profitability models show the impact of financial penalties on both pre- and after-tax ROE (instead of ROA). Tables 16 and 17 show the results of these models. Column 1 shows the multivariate regression between the absolute financial penalty and pre- and after-tax ROE. This column shows that a one-standard-deviation ($1573 million) increase in the absolute financial penalty leads to a statistically significant decrease in both pre- and after-tax ROE of respectively 1.148%-points and 0.739%-points, ceteris paribus. Since the average bank in our sample possesses $74 billion in equity, the average decrease in pre- and after-tax profit is respectively $850 and $547 million, which means that the average decrease in profits is less than the increase in the absolute financial penalty variable. This confirms that financial penalties reduce banks' profitability but by less than their absolute size.

In contrast to harsher financial penalties, column 2 shows that there is no significant relationship between the imposition of a financial penalty in itself and ROE. Column 3 shows the impact of the relative financial penalty (*PenaltyTE*) on pre- and after-tax ROE. A one-standard-deviation (1.576) increase in the relative financial penalty variable leads to a significant decrease in both pre- and after tax ROE of respectively 0.812%-points and 0.544%-points, ceteris paribus.

The fourth column comprises the robustness check for simultaneity bias. After instrumentation of the financial penalty variable, the negative relationship with ROE is maintained. The relationship is stronger but no longer statistically significant. This observation suggests that the relationship between financial penalties and ROE is much stronger when controlled for potential endogeneity.

Columns 5 and 6 show a similar subsample analysis as for ROA correcting for at least marginally different bank supervision and tax laws across countries. Compared to the baseline regression in column 3, the subsample for the United States shows a statistically significant impact of financial penalties on both pre- and after-tax ROE that is almost three times as big. For Europe, there is no significant impact of financial penalties on ROE, similar to the finding for ROA. The sign of the relationship for European banks is now negative, which is more in line with the findings of Köster & Pelster (2017). The negative impact of financial penalties on banks' profitability still seems to be driven by US banks.

The results in column 7 (correcting for crises) are pretty similar to the results for ROA. The financial crisis has a statistically significant and negative impact on pre-tax ROE at a 10% significance level, while the significance of this relationship disappears in the after-tax situation.

Columns 8 to 13 show the effects differentiated for the different types of violations. Financial penalties for investor and consumer protection violations have the most negative impact on both pre- and after-tax ROE, similar to the findings for ROA. A one-standard-deviation (0.2973) increase in this type of financial penalties yields a decrease in pre- and after-tax ROE of respectively 0.258%-points and 0.182%-points, ceteris paribus. Financial penalties for interest and exchange rate manipulation and data submission deficiencies also yield a statistically significant decrease in ROE, both before and after taxation. In contrast, financial penalties for deficient AML controls shows a statistically significant and positive impact on both pre- and after-tax ROE. A one-standard-deviation (0.4398) increase in this type of financial penalties yields an increase in pre- and after-tax ROE of respectively 0.467%-points and 0.369%-points, ceteris paribus.

Table 16: *Pre-tax return on equity (ptROE)*

VARIABLES	(1) Full sample: *Penalty*	(2) Full sample*: PenaltyD*	(3) Full sample*: PenaltyTE*	(4) Full sample: *2SLS*	(6) USA	(7) Europe	(7) Crisis	(8) Interest/exchange rate manipulation	(9) Investor/consumer protection violations	(10) Data submission deficiencies	(11) Deficient AML controls	(12) Tax violations	(13) Sanction violations
Penalty	**-7.3e-04*** **	0.203	**-0.515***	-3.294	**-1.457****	-0.138	**-0.512***	**-2.829*****	**-0.869****	**-29.90*****	**1.062*****	0.308	0.163
	(3^{e}-04)	(1.228)	(0.299)	(2.670)	(0.603)	(0.330)	(0.294)	(0.925)	(0.374)	(8.476)	(0.120)	(0.186)	(0.542)
Size	72.9393***	72.47***	76.36***	97.33***	20.98	100.8***	65.73***	74.36***	75.13***	73.28***	72.52***	71.22***	72.50***
	(19.5138)	(18.83)	(19.28)	(30.26)	(68.41)	(32.01)	(17.71)	(19.45)	(19.48)	(18.35)	(18.91)	(18.81)	(18.85)
Size2	-2.9218***	-2.890***	-3.051***	-3.917***	-0.756	-4.098***	-2.638***	-2.970***	-3.013***	-2.921***	-2.887***	-2.845***	-2.892***
	(0.7245)	(0.694)	(0.714)	(1.189)	(2.535)	(1.139)	(0.649)	(0.719)	(0.724)	(0.674)	(0.698)	(0.695)	(0.697)
Structure	-0.1254*	-0.128*	-0.127*	-0.120*	-0.0462	-0.196**	-0.108	-0.126*	-0.129*	-0.127*	-0.131*	-0.129*	-0.128*
	(0.0707)	(0.0710)	(0.0696)	(0.0697)	(0.117)	(0.0929)	(0.0669)	(0.0703)	(0.0705)	(0.0706)	(0.0705)	(0.0711)	(0.0708)
Capital	0.9734	0.991	0.940	0.712	1.546	1.391	0.765	0.994	0.969	0.980	0.992	1.000	0.983
	(0.7911)	(0.810)	(0.788)	(0.814)	(0.923)	(1.508)	(0.753)	(0.806)	(0.775)	(0.790)	(0.794)	(0.796)	(0.795)
Costs	0.0176	-0.0520	-0.0168	0.163	-1.230	0.221	-0.0620	-0.00618	-0.0216	-0.0473	-0.0524	-0.0516	-0.0517
	(0.3979)	(0.425)	(0.419)	(0.445)	(2.073)	(0.387)	(0.413)	(0.412)	(0.416)	(0.423)	(0.423)	(0.429)	(0.429)
GDPG	1.1764***	1.161***	1.152***	1.086***	1.394**	1.168**	0.856***	1.170***	1.146***	1.187***	1.174***	1.163***	1.165***
	(0.3013)	(0.297)	(0.301)	(0.293)	(0.613)	(0.488)	(0.298)	(0.300)	(0.301)	(0.301)	(0.300)	(0.300)	(0.300)
MRO	1.4491***	1.597***	1.535***	1.284**	1.849**	1.356	1.475***	1.558***	1.529***	1.582***	1.568***	1.587***	1.584***
	(0.4581)	(0.485)	(0.462)	(0.571)	(0.650)	(1.056)	(0.452)	(0.472)	(0.465)	(0.469)	(0.472)	(0.470)	(0.471)
Year	-0.1153	-0.110	-0.0871	0.0201	-0.552**	-0.415	-0.211	-0.0928	-0.0999	-0.108	-0.127	-0.108	-0.108
	(0.1732)	(0.179)	(0.174)	(0.188)	(0.238)	(0.329)	(0.177)	(0.176)	(0.173)	(0.179)	(0.180)	(0.179)	(0.179)
Crisis							-3.521*						
							(1.858)						
Constant	-208.8	-218.4	-287.6	-625.0	968.8	234.8	30.92	-264.7	-252.4	-229.0	-186.5	-214.9	-224.0
	(309.0)	(314.0)	(315.1)	(437.9)	(532.8)	(577.1)	(318.9)	(310.4)	(311.5)	(316.4)	(318.5)	(318.4)	(318.8)
Observations	497	497	497	497	140	245	497	497	497	497	497	497	497
R-squared	0.212	0.198	0.206		0.393	0.205	0.219	0.206	0.212	0.204	0.201	0.198	0.198
Number of Banks	36	36	36	36	10	18	36	36	36	36	36	36	36
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 17: *After-tax return on equity (atROE)*

VARIABLES	(1) Full sample: *Penalty*	(2) Full sample*: PenaltyD*	(3) Full sample*: PenaltyTE*	(4) Full sample: *2SLS*	(6) USA	(7) Europe	(7) Crisis	(8) Interest/exchange rate manipulation	(9) Investor/consumer protection violations	(10) Data submission deficiencies	(11) Deficient AML controls	(12) Tax violations	(13) Sanction violations
Penalty	**-4.7e-04*** **	0.524	**-0.345***	-2.760	**-0.947****	-0.131	**-0.344***	**-1.983***	**-0.613****	**-29.62****	**0.839*****	0.254	0.184
	(2e-04)	(0.972)	(0.202)	(2.478)	(0.344)	(0.238)	(0.198)	(1.094)	(0.234)	(12.11)	(0.102)	(0.194)	(0.555)
Size	58.1435**	57.85**	60.44**	78.68**	-7.812	105.1***	55.74**	59.17**	59.71**	58.65**	57.88**	56.81**	57.88**
	(23.0951)	(22.38)	(22.59)	(32.61)	(50.24)	(30.78)	(22.04)	(22.96)	(23.04)	(22.06)	(22.65)	(22.35)	(22.53)
Size2	-2.3066**	-2.285**	-2.394***	-3.146**	0.487	-4.183***	-2.211**	-2.342**	-2.372**	-2.316***	-2.284**	-2.249**	-2.288**
	(0.8796)	(0.849)	(0.858)	(1.283)	(1.855)	(1.099)	(0.838)	(0.872)	(0.879)	(0.836)	(0.861)	(0.850)	(0.856)
Structure	-0.1108*	-0.113**	-0.112*	-0.106*	-0.0777	-0.184**	-0.103*	-0.111*	-0.113**	-0.111*	-0.115**	-0.113*	-0.112*
	(0.0559)	(0.0557)	(0.0551)	(0.0574)	(0.0855)	(0.0728)	(0.0556)	(0.0555)	(0.0554)	(0.0556)	(0.0555)	(0.0560)	(0.0556)
Capital	1.0310*	1.058*	1.009	0.810	1.452**	1.708	0.931	1.045*	1.028*	1.034*	1.045*	1.052*	1.038*
	(0.5986)	(0.614)	(0.600)	(0.632)	(0.528)	(1.289)	(0.589)	(0.608)	(0.589)	(0.597)	(0.600)	(0.602)	(0.601)
Costs	0.1185	0.0698	0.0968	0.253	0.759	0.176	0.0768	0.105	0.0946	0.0773	0.0726	0.0732	0.0727
	0.2504	(0.266)	(0.262)	(0.303)	(1.303)	(0.280)	(0.257)	(0.254)	(0.263)	(0.261)	(0.264)	(0.269)	(0.269)
GDPG	0.8832***	0.866***	0.867***	0.810***	0.656	0.854	0.736**	0.879***	0.863***	0.897***	0.883***	0.874***	0.876***
	0.3023	(0.296)	(0.303)	(0.291)	(0.363)	(0.498)	(0.303)	(0.301)	(0.303)	(0.303)	(0.302)	(0.302)	(0.302)
MRO	1.3226***	1.449***	1.378***	1.160**	1.892***	1.263	1.351***	1.393***	1.371***	1.409***	1.398***	1.413***	1.412***
	(0.3567)	(0.372)	(0.354)	(0.474)	(0.470)	(0.826)	(0.359)	(0.357)	(0.358)	(0.354)	(0.357)	(0.356)	(0.358)
Year	-0.1477	-0.151	-0.129	-0.0358	-0.536**	-0.475	-0.184	-0.132	-0.137	-0.143	-0.158	-0.143	-0.143
	(0.1430)	(0.147)	(0.142)	(0.152)	(0.181)	(0.297)	(0.153)	(0.144)	(0.141)	(0.146)	(0.148)	(0.146)	(0.147)
Crisis							-1.559						
							(1.488)						
Constant	-60.7513	-54.16	-113.3	-406.5	1,087**	307.8	27.73	-99.12	-90.62	-75.25	-40.90	-62.99	-70.14
	272.9433	(270.9)	(268.4)	(400.8)	(393.4)	(520.6)	(301.4)	(266.8)	(273.3)	(271.3)	(275.6)	(272.9)	(274.4)
Observations	497	497	497	497	140	245	497	497	497	497	497	497	497
R-squared	0.196	0.188	0.193		0.425	0.203	0.196	0.193	0.198	0.196	0.190	0.188	0.188
Number of Banks	36	36	36	36	10	18	36	36	36	36	36	36	36
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1