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# BANK RISK-TAKING AND MISCONDUCT[*]

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**Abstract**

This paper studies bank misconduct using a novel dataset on malpractice that resulted in conduct costs in a sample of 30 financial institutions during 2000-2016. It shows that misconduct has been prevalent over the sample period and that its intensity varies over the business cycle. Furthermore, the initiation of misconduct is related to bank re-muneration schemes, increasing with CEO bonuses in periods of high economic growth and when bank leverage is high. To provide a possible explanation for the observed dynamics, the paper builds a theoretical model in which misconduct is linked to bank risk-taking. There, the implementation of profitable but risky projects requires more aggressive pay structures, in turn increasing managers' incentives to engage in other activities that boost short-term returns. The findings have implications for regulation aimed at preventing malpractice in financial institutions.

**Keywords**: Banks, Misconduct, Bonuses, Supervision

**JEL Classification**: G21, G28.

# 1. Introduction

Numerous conduct failures in banks that have been exposed in recent years have raised concerns that misconduct might be "a feature rather than a bug" in the financial industry (Zingales, 2015). Since the crisis of 2008-2009, major financial institutions have paid more than 300 billion US dollars for malpractice such as the packaging and sales of subprime mortgages, benchmark interest rate and foreign exchange market manipulations, or sales of unsuitable financial products and services to their customers.

The costs of these activities surpass the direct losses to the affected parties. Misconduct weakens trust in the financial system, and low confidence in banks has been shown to discourage investment in stock markets and reduce deposit holdings (Sapienza and Zingales, 2012). The Bank of England Financial Stability Report (2015) also suggests that depressed corporate borrowing from banks in the United Kingdom can be partly attributed to mistrust in financial institutions. Meanwhile, regulators are concerned about the effects that the subsequent fines and settlements have on bank lending and stability. For example, Mark Carney (2015) noted that "$150 billion of fines levied on global banks translates into more than $3 trillion of reduced lending capacity to the real economy." The report by the European Systemic Risk Board (2015) concludes that bank conduct failures and the resulting costs could be a source of systemic risk as they affect multiple markets and involve systemically important institutions.

Although the costs of misconduct in banks can be substantial, the drivers behind it are not well understood. Contrary to a large body of literature examining the effects of executive remuneration schemes or governance quality on (securities) fraud in other industries,[1] the contribution of these factors to incentives for malpractice in banks has been empirically addressed only to a limited extent. Recent theoretical literature also provides several different explanations for the recently observed high levels bank malpractice: for example, in Bénabou and Tirole (2016), misconduct is a consequence of compensation schemes focused on observable rather than pro-social tasks because of intense competition for talent. Morrison and Thanassoulis (2017) consider the case where bank shareholders find malpractice profitable, and use bonuses to encourage managers to take unethical actions.

This paper addresses the questions of which factors are most conducive to bank misconduct and what policies might be efficient in preventing it in two ways. First, it provides stylised evidence on dynamics in the intensity with which banks initiate misconduct over time and empirically examines whether misconduct events are linked to bank compensation schemes. To my knowledge, this is the first paper to investigate the conditions under which the risk of bank misconduct is higher, using data on the

[1] See Cumming et al. (2015) for a survey.

timing of its initiation (i.e. the events themselves) rather than subsequent enforcement actions.

Second, the paper introduces a theoretical framework which models the observed relationship between compensation schemes, regulatory actions, and misconduct over the business cycle. There, shareholders resort to short-term performance pay to encourage managers to implement risky investment projects at times when these become profitable. However, high bonuses also increase managerial incentives to engage in misconduct as it boosts observed short-term profitability. If managers' malpractice results in high conduct costs to bank shareholders, they might face a trade-off between encouraging risk-taking and preventing misconduct during booms.

To analyse bank misconduct empirically, I use a hand-collected dataset on the alleged initiation dates of malpractice which resulted in regulatory actions and private lawsuits against a sample of 30 major financial institutions in 2000-2016. Because of the time lag between the initiation and resolution of misconduct, the dataset provides information on malpractice that took place in 1998-2010. To measure the severity of misconduct initiated each year, I use the value of conduct costs incurred for the event subsequently. Compared to an indicator variable, this measure provides more information on variation in misconduct intensity across large banks, and also allows accounting for the different scales of various events. I further distinguish between cases related to bank underwriting activities, customer abuse, attempts to manipulate markets, compliance failures, breaches in sanctions or money laundering, cases resulting from individual employee initiatives, and other instances.

The resulting data on the number of cases initiated each year and their monetary value shows that bank misconduct has been quite prevalent over the sample period. While the number and resulting costs of events related to bank underwriting activities and customer abuse appear to be cyclical, other classes of misconduct are less so. It can be also observed that the value of bank misconduct has been somewhat increasing over time.

I further examine how the severity of misconduct initiated each year relates to compensation schemes. The results suggest that in periods of high economic growth, the severity of bank malpractice increases with CEO bonus to salary ratio. The correlation between CEO bonuses and malpractice is also stronger when bank leverage rises, possibly suggesting there is a relationship between managers' incentives to engage in misconduct and bank risk-taking activities.

Examining the extent to which various types of bank misconduct are related to investment opportunities or executive remuneration schemes, I find that malpractice related to bank underwriting activities, such as the issuance of mortgage-backed securities, is the most pro-cyclical and affected by remuneration schemes. This type of bank

misconduct also appears to be significantly related to executive stockholdings, which have a constraining effect in well-capitalised banks, but result in more misconduct when leverage increases. Meanwhile, other types of bank misconduct cannot be well-explained by the aforementioned factors.

Motivated by the empirical evidence, I build a theoretical model in which bank compensation schemes vary depending on the riskiness and profitability of bank investment opportunities, and result in changing intensity of misconduct over time. I use a setup where profit-maximising bank shareholders hire managers to supervise investment projects. Managers can choose to implement a safe or a risky project, both of which generate cash flows for two periods. Risky projects have a higher probability of yielding high payoffs in the short run, but carry long-term risk. Meanwhile, safe projects have lower short-term payoffs and are safe in the long run.

Bank managers can engage in misconduct which increases the probability of observing high short-term returns at a cost to the bank's customers. In the model, misconduct is distinct from traditional risk-taking as it does not affect the riskiness of bank assets. However, it runs the risk of being detected by regulators, resulting in managers having their employment contracts terminated. To bank shareholders, misconduct detection leads to conduct costs that can outweigh the gains from malpractice previously initiated by managers.

In the model, managers' compensation is determined endogenously by shareholders trying to maximise their income from investment projects while also minimising conduct costs. First, shareholders have to resort to short-term performance pay to encourage risk-taking as managers would shift to safe projects that have certain long-term payoffs otherwise. At the same time, misconduct can be prevented only if managers' gains in terms of higher performance pay from boosting short-term bank returns are outweighed by the risk of losing their long-term compensation.

The baseline model shows that when misconduct is costly to shareholders, they face a trade-off between encouraging risk-taking and preventing misconduct. When the risky project is more profitable, the managers' compensation shifts towards short-term performance pay to induce risk-taking. If the probability of detection by regulators is not sufficiently high to deter misconduct, performance pay also results in stronger incentives to engage in malpractice. At times when risky projects are unprofitable, shareholders can defer the managers' pay, reducing her incentives to engage in misconduct.

The model further illustrates how misconduct depends on the probability of detection and the costs that regulators can impose on bank shareholders. When detection risk is too low to discourage managerial malpractice but conduct costs are high, shareholders might find deferring pay and implementing safe projects more profitable than encouraging risk-taking even when the latter projects have higher cash flows. Mean-

while, increasing detection probability works through reducing managers' incentives for misconduct and the associated costs to shareholders, and therefore does not affect project choice.

In model extensions I consider a situation where regulators face constraints on the penalties they can impose on bank shareholders, and the case where financial institutions are leveraged. When conduct costs are limited by bank returns, misconduct becomes profitable to bank shareholders even at risk and detection levels at which it could have been prevented in the baseline model. In this case, misconduct and risky project implementation become complements, as long-term risk reduces expected conduct costs, resulting in more malpractice and risk-taking. Consistent with empirical evidence on the relation between bank leverage and misconduct, adding debt to the bank's balance sheet also encourages misconduct through increasing the attractiveness of risk-taking.

The paper has policy implications in the light of the recent incentives to regulate bankers' pay. Empirical evidence suggests that bank CEO compensation and misconduct are related, possibly implying that the introduction of restrictions on pay structures through bonus caps and requirements for deferred pay might reduce conduct failures going forward. However, the theoretical framework introduced in this paper implies that the trade-offs involved in these policies depend on whether malpractice is profitable to bank shareholders. If remuneration schemes are used to achieve shareholder objectives other than initiation of misconduct, regulating how executives are compensated might result in less profitable projects being implemented. In this case, raising detection risk through better supervision or internal controls might be more efficient than imposing restrictions on bank compensation schemes or increasing fines to shareholders. On the other hand, the latter can prevent misconduct without the associated losses in project value when misconduct is profitable to bank shareholders and bonuses are used to encourage malpractice.

## 2. Related Literature

The cases of bank malpractice that have come to light since the crisis of 2008-2009 have resulted in a growing body of research on conduct failures in financial firms.

From a theoretical perspective, an increasing literature is interested in how high-powered compensation structures contribute to the deterioration in firm ethics and culture, leading to worse behaviours. For instance, Morrison and Thanassoulis (2017) ague that bank shareholders might have incentives to create poor ethical standards in banks through reliance on bonus payments if misconduct is profitable. Bénabou and Tirole (2016) suggest that the decline in firm ethics and resulting malpractice cases

observed recently can be attributed to competition for talent, which leads to a shift in compensation schemes towards easily measurable tasks. This results in managers substituting away from pro-social behaviour, reducing firm performance and welfare in the long run.

This paper departs from the questions related to ethics and culture in banks and rather considers the monetary incentives for misconduct generated by bankers' compensation schemes: here, if the resulting increase in her performance pay outweighs the cost of being detected, the manager may choose to engage in misconduct. As conduct costs imposed by regulators on bank shareholders exceed their short-term gains from managers' malpractice, misconduct is a form of an agency cost. The reason why it is not prevented through lower reliance on performance pay is that bonuses are necessary to incentivize profitable risk-taking.

The view that malpractice is costly to bank shareholders brings this paper closer to the literature on moral hazard in firms. For example, similar trade-offs faced by firm owners in setting compensation schemes have been argued to create managerial incentives to issue unsuitable loans, manipulate reported earnings, or choose value-destroying investment projects (see, for instance, Inderst and Ottavianni, 2006, or DeMarzo et al., 2014). In the context of financial institutions, Bannier et al. (2012) argue that the need to screen skilled managers leads to reliance on performance pay, which results in excessive risk-taking. Thanassoulis (2013) illustrates how costly myopic investment results from increasing competition for skilled employees which makes pay deferral excessively expensive. An important distinction in the model presented in this paper is that here, risky projects are implemented when preferred by shareholders, and the trade-off involved in setting performance pay concerns misconduct which boosts short-term returns at a risk of sanctions by regulators.

By empirically examining how malpractice initiation is linked to executive remuneration in major global banks, the paper also extends empirical literature on the causes of (financial) misconduct in other industries. Numerous studies have looked at the relationship between securities fraud and executive bonuses, pay-performance sensitivity, or stockholdings in non-financial firms, providing mixed evidence on the role of these variables: foe example, Gao and Shrieves (2002) find that bonuses increase the risk of financial manipulations, but Burns and Kedia (2006) and Peng and Röell (2008) do not confirm these findings; Alexander and Cohen demonstrate that higher executive stockholdings reduce the risk of corporate fraud, which is not supported by evidence in Johnson et al. (2009) or O'Connor et al. (2006). The findings presented in this paper similarly do not provide definite conclusions, but suggest that the incentives generated by myopic or highly sensitive remuneration schemes might vary with economic conditions or firm risk. These findings are in line with recent evidence by Savaser and

Sisli-Ciamarra (2016) that the effects of executive pay-performance sensitivity and firm risk vary over the business cycle.

The paper's findings on the relationship between bank bonuses and misconduct provided in this paper also relate to the wider empirical literature on the effects of compensation schemes in financial firms (for example, DeYoung et al., 2013, Bhagat and Bolton, 2014). In particular, by focusing on the effects of short-term compensation on managers' incentives to boost short-term payoffs, the paper relates to evidence in Livne et al (2013) on the positive relationship between bank CEO bonuses and short-term investments. The evidence on executive wealth invested in bank shares increasing the pro-cyclicality of malpractice related to asset quality misrepresentations is also interesting in the light of evidence that banks with better alignment between bank executive and shareholder interests suffered higher losses during the financial crisis (Fahlenbrach and Stulz, 2011).

The focus on misconduct in the banking sector further allows studying the role of bank-specific factors such as high leverage, and more forms of malpractice rather than securities fraud. To my knowledge, the only paper that analyses the drivers behind malpractice in financial firms is Nguyen et al. (2016) who focus on how board quality affects the risk of enforcement actions against US banks, and find that better monitoring acts as a misconduct deterrent and increases detection risk. The current paper departs from this study in several ways: first, it focuses on how the effects of remuneration structures vary with bank risk and investment opportunities. Data on the timing of misconduct instead of the dates of enforcement actions also helps investigate the factors related to the risk of misconduct initiation rather than its incidence or detection risk.

Finally, the policy implications of the paper are closely related to the literature on pay regulation in financial institutions. For example, Tanaka and Thanassoulis (2017) compare the effectiveness of restrictions on bankers' pay and claw-back provisions on risk-taking in too-big-to-fail banks. Contrary to the literature on risk-shifting, here, risky projects have a higher expected return, and therefore pay restrictions to prevent malpractice by managers might also result in lower-value projects being implemented. This trade-off is similar to the findings in Hakenes and Schnabel (2014) where bonus caps can discourage excessive risk-taking, but might also weaken managerial effort. The possibility to prevent malpractice through imposing higher financial penalties on bank shareholders and diminishing the returns from risky project implementation is also related to findings in Höffman et al. (2016), where requirements for deferred compensation can reduce the riskiness of bank investment through making the implementation of such projects more costly.

The remainder of the paper is structured as follows: Section 3 presents the empirical evidence, Section 4 introduces the theoretical model, and Section 5 concludes.

# 3. Empirical Evidence

In this section, I first introduce the dataset on conduct failures in the sample of 30 major financial institutions. I then move to examine whether and how the severity of conduct failures initiated each year relates to incentive schemes in banks and changes in economic conditions.

## 3.1. Data

### Sources and Sample

To examine the dynamics of bank misconduct over time and across banks, I construct a dataset on malpractice which resulted in conduct costs from regulatory actions, private lawsuits, arbitrations or class actions in a sample of 30 banks during 2000-2016. The banks in the sample include major banks in the United States and a subset of Globally Systemically Important Institutions, the sample choice being determined by the higher availability of data on malpractice in these banks.[2] Data on misconduct comes from bank annual reports or SEC 10-K filings, regulators' websites (SEC, FSA, FINRA, FRB, OCC, OTC, NYSE) and newspaper articles.

I focus on the years in which misconduct is initiated rather than the timing of disciplinary events as it allows to study the conditions under which banks have a higher propensity to engage in malpractice. To determine the dates at which each misconduct case is initiated, I read the related documents and collect further information on misconduct type, the year in which regulatory investigation was started (or the private lawsuit filed) if available, and the size of resulting penalties and restitutions. When possible, I drop cases in which sample banks paid fines for misconduct in institutions that they acquired after malpractice had been initiated there, as these cannot be related to the characteristics of acquirers at the time of misconduct.[3] Only cases in which misconduct results in costs higher than 1 million US dollars and for which the alleged starting year is available are used. While in some cases such as one-time events the timing of miscon-

[2]The 30 banks in the sample are JPMorgan Chase, Bank of America, Citigroup, Wells Fargo, Goldman Sachs, Morgan Stanley, U.S. Bancorp, Bank of New York Mellon, PNC Financial Services, Capital One, State Street Corporation, TD Bank, N.A., BB&T, SunTrust Bank, American Express Company, Fifth Third Bank, Charles Schwab Corporation, HSBC, RBS, UBS, Credit Suisse, Deutsche Bank, Barclays, Lloyds Bank, Standard Chartered, Santander, BNP Paribas, ING, Credit Agricole and Societe Generale.

[3]For instance, in April 2014, the Bank of America paid 950 million US dollars to the Financial Guaranty Insurance Co. and other investors for the faulty securities that Countrywide had pooled and sold; this case would not be included in the dataset. On the other hand, in August 2014, Bank of America settled for a total of 16.5 billion US dollars with the US Department of Justice for malpractice related to mortgage backed securities that was carried out by Bank of America as well as Countrywide and Merrill Lynch; this case would be included in the dataset as it also corresponds to misconduct by the bank itself.

duct is clear, for cases that run for longer periods of time, the initiation date might be hard to ascertain. In such instances, I use the beginning of the offence period indicated by regulators, or the beginning of class action periods in class action litigations. This can be expected to result in would in upward-biased initiation dates.

Figure 1 plots the annual dynamics in the numbers of misconduct cases initiated, investigations or private actions being launched, and regulatory or private actions against banks that result in conduct costs. As expected, it shows that booms in misconduct initiation are followed by booms by investigations launched by regulators or private lawsuit filings, and finally increased numbers of enforcement actions or private settlements.

I further classify misconduct into broad categories, as various types of conduct failures could result from different incentives that banks face. Namely, I differentiate between compliance failures; cases that involve asset quality misrepresentations related to banks underwriting or issuing securities; attempts to manipulate markets or asset prices and collusion; cases in which banks are disciplined for abusing customers; cases related to breaching sanctions, money laundering and assisting tax evasion; cases that result from initiatives of individual employees or unsystematic lawsuits that involve a single plaintiff; and other instances.[4]

The time period of 2000-2016 used to collect data on bank conduct costs affects the sample of years for which I have reliable information on bank misconduct initiation. Figure 2 presents the cumulative distribution of the time lags between alleged starting dates of misconduct and the resulting conduct costs (for cases that took less than 15 years to be resolved): half of the cases are resolved within 6 years since their alleged start; 90% of the cases are resolved within 10 years.

In what follows, I focus on misconduct initiated during the period of 1998-2010. Figure 2 suggests that of misconduct cases initiated before 1998, 10% would have been resolved and not included in the data based on conduct costs post-1999, while around 60% of the cases started after 2010 would have not been resolved by the end of 2016, which implies that some malpractice initiated in the sample period might have not been resolved yet. This results in a total of 763 actions over the 13 years for which the approximate starting date is known.

There are several important caveats to this dataset that should be outlined. First, it has to be noted that as information on bank misconduct comes from analysing data on enforcement actions, it is only representative of detected malpractice. Therefore, the observed severity of misconduct is determined by the multiple of its intensity and the scrutiny of regulators or bank customers. While several studies have used methods that model the risk of misconduct and probability of detection as separate processes which

[4] A more detailed explanation of the types of misconduct used in data analysis is provided in Appendix 1.

allows distinguishing the effects of various factors on both probabilities (Wang, 2011), employing those methods is made more complex because of the continuous measure of misconduct being used, and malpractice initiated in banks taking longer to be uncovered as compared to securities fraud.

Second, beside potentially affecting the share of conduct failures being discovered, variation or differences in the risk of detection also alter expected costs of misconduct, in turn affecting its likelihood. For example, evidence presented in Comerton-Forde and Putnins (2013), Kedia and Rajgopal (2011) or Cumming et al. (2017) suggests that better-funded, more geographically proximate, or stricter supervisors reduce the incidence of fraud. These effects might be especially important in the current setting if the risk of regulatory actions or lawsuits varies over time; for example, it is likely that regulators and bank customers are more vigilant during economic downturns. In data analysis, I attempt to account for changes in detection risk by controlling for the number of regulator investigations starting each year for each sample bank. Adding a measure capturing changes in economic conditions can also be expected to partially control for the strength of monitoring at the time of initiation.

Another concern regarding the dataset used in this analysis is the availability of information on conduct costs that could drive differences in misconduct observed across banks or over time. Namely, data on private cases comes mostly from bank annual reports and newspaper articles, and therefore depends on bank reporting choices and media coverage. There are differences in bank regulation across countries and the number of regulators supervising each sample bank, as well as legal differences affecting the propensity of clients to sue the financial intermediaries. Controlling for fixed bank effects and focusing on US banks in some specifications might alleviate such concerns to some extent.

**Descriptive Statistics**

There are two ways to measure the severity of bank misconduct: by using total conduct costs resulting from misconduct initiated each year, and the number of misconduct cases initiated annually. In regression analysis, I use the former measure as it might be more informative about the severity of bank actions than the number of cases.[5] This measure also provides more within-bank variation than an indicator variable as large institutions tend to engage in multiple misconduct cases annually. Meanwhile, the number of activities initiated in a given year will be used to complement the data on misconduct measured in monetary value as it is less affected by bank financial positions and the duration of their conduct failures. Using the number of misconduct cases

[5]For example, both Libor and silver price manipulations by the Deutsche Bank would each count as a single event, although the former might have been more wide-spread and affected a larger market.

starting each year as a measure of misconduct might be also misleading if it results in disciplinary actions from multiple regulators or numerous lawsuits. In order to avoid over-weighting events in which multiple parties take actions against banks, an attempt has been made to collapse such cases into one, the initiation date of misconduct taken as the earliest one cited among the multiple regulators or private lawsuits.[6]

Table 1 presents an overview of the number of bank misconduct cases initiated each year in total and when split by misconduct type (the cases where misconduct results in multiple disciplinary actions or lawsuits are collapsed to a single event and the earliest quoted date of initiation is used). First, it appears that misconduct has been quite prevalent during the last couple of decades. It can also be seen that the number of cases in most types of misconduct has been increasing over time, which could possibly result from growing bank sizes, stricter regulation, or more transparent coverage of such cases lately. Second, we can also observe that the intensity of misconduct initiation varies over time, peaking in 2000 and 2007. As expected, misconduct related to underwriting is the most pro-cyclical as the gains from such activities depend on asset prices. This pattern is also consistent with evidence in Dyck et al. (2014) who provide evidence that securities fraud increased during the dot-com boom. While the number of compliance failures and abuse of bank clients also vary over time, the incidence of cases related to breaching sanctions or market manipulation is less cyclical.

Table 2 provides information on the monetary value (in millions US dollars, 2010 prices) of bank conduct failures initiated each year. In total, the value of misconduct in the sample of 30 banks initiated during 1998-2010 has resulted in costs of around 200 billion US dollars.[7] Around 50% of the costs result from misconduct related to bank underwriting activities, followed by customer abuse and market manipulations.

The observed changes in the monetary value of compliance costs over time are by and large consistent with the dynamics in the number of cases. It appears that similar to Table 1, the intensity of bank misconduct first peaked in 2000, and then again in 2005, driven mostly by the dynamics of misconduct related to bank underwriting activities and customer abuse. The recent boom has resulted in higher costs to financial institutions than the preceding dot-com bubble, which could have resulted from increased bank size, more severe conduct failures, or stricter enforcement. Meanwhile, the intensity of individual cases and compliance failures as well as sanctions appears to have been stable or increasing in value.

[6] While such grouping of cases helps to avoid potential overweighting for some cases, it also under-weighs instances with multiple injured parties which might have been more widespread or severe.

[7] This is lower than the 300 billion US dollars quoted by the CCP foundation, which can be explained by the fact that the data used here does not include misconduct for which the year of initiation was not available or was outside of the sample period of 1998-2010, and excludes cases initiated by entities that were later acquired by banks in the sample.

Finally, in Table 3, I summarise the costs resulting from misconduct initiated in the period of 1998-2010 for each sample bank. Almost all banks have been subject to conduct costs resulting from customer abuse or compliance failures. However, there are also differences across banks which can be partially explained by their key activities. As expected, misconduct related to underwriting activities has been concentrated in major investment banks, and so were the majority of market manipulation cases. The costs related to breaches of sanctions, money laundering, and helping clients avoid taxes have also been imposed only on a subset of banks.

### 3.2. Empirical Analysis

In this section, regression analysis is used to measure how incentive schemes, economic conditions and balance sheet characteristics relate to misconduct in banks.

The general model that is estimated takes the following form:

$$Misconduct_{i,t} = \alpha + \beta_1 Compensation_{i,t-1} + \beta_2 Leverage_{i,t} + \beta_3 Cycle_{c,t} + \gamma Controls_{i,t} + u_i + \epsilon_{i,t}.$$

$Misconduct_{i,t}$ is the natural logarithm of conduct costs in bank $i$, year $t$.[8] In the baseline regression, I use the total cost resulting from all types of conduct failures, which is later on split into different types.

Several variables are chosen to measure the effects of compensation schemes in $Compensation_{i,t-1}$:[9] I use the ratio of CEO bonus to salary to capture the short-termist incentives of bank CEO, and the *average* ratio of bank CEO bonuses to salaries during the sample period to measure the extent to which bank shareholders tend to rely on short-term incentives to incentivize their managers. The natural logarithm of the value of shares owned by the bank's CEO (the number of shares held by CEO multiplied by the price of bank stock at the end of the year) captures the effects of shareholder exposure to bank performance in the long-run, and the extent to which their incentives are aligned to those of bank shareholders. This data is available from ExecuComp database only for the subsample of US banks.

The independent variable $Cycle_{c,t}$ is added to the model in line with the literature on changes in firm incentives to engage in securities fraud over the business cycle. The measure used is the deviation of GDP growth from its trend in bank location country $c$, retrieved from OECD Short-term Indicators database. As noted previously, one of the concerns regarding the assessment of fluctuations in bank malpractice over time is changes in detection risk.

[8] I winsorize all continuous variables at 1% and 99% of their distributions and use their values in US dollars in 2010 prices

[9] I use the values in the preceding year to avoid reverse causality where misconduct results in high CEO compensation.

$Leverage_{i,t}$ is the ratio of bank's total liabilities to total assets and controls for changes in bank capital structure and the resulting risk-taking incentives by shareholders. $Controls_{i,t}$ include contemporaneous total bank assets to control for bank size and the number of regulator-initiated investigations started the preceding year (the grouped number of cases is used) as it might affect the willingness of managers to initiate new cases of malpractice. I also add the ratio of the bank's net income to total assets in the preceding year to control for the effects of bank returns on misconduct, and also to account for the effects of the realised bank performance on CEO compensation. $u_i$ are fixed bank effects: fixed year effects are not included in the baseline analysis because of their correlation with the business cycle variable.[10] Descriptive statistics of all the variables used in data analysis are presented in Table 4.

I start data analysis by examining the factors that increase the value of all types of malpractice initiated annually (Table 5). Regression estimates confirm the dynamics observed in Table 1, the value of bank misconduct varying together with the business cycle. Also, as expected, larger banks pay higher fines. Returns on bank assets are not significantly related to the severity of misconduct initiated each year, but the coefficient sign indicates that higher profitability tends to reduce the incentives for bank misconduct. Finally, malpractice appears to be higher when bank leverage increases, possibly indicating a relationship between misconduct and bank riskiness.

In columns (2)-(11), I turn to investigate the relationship between bank conduct failures and compensation schemes. First, from columns (2)-(5), the ratio of CEO bonuses to fixed salaries and the value of stock held by the CEO appear to be positively correlated with the value of misconduct initiated, but the effects are not statistically significant.

In columns (6)-(11), I examine whether the relationship between misconduct initiation and executive pay varies with bank investment opportunities and risk. It could be expected that when prices and the profitability of malpractice increase, or prospective long-term losses are discounted more heavily because of higher failure risk, reliance on short-term variable compensation would lead to more misconduct. Therefore, I first interact the measures of firm reliance on bonus pay with $cycle_t$ which captures the deviation of GDP growth from trend. Regression estimates confirm that while past period's CEO bonus/salary ratio is on average not significantly linked to the value of malpractice, higher bonuses are related to more misconduct during economic booms, and have an opposite correlation when economic growth is slower.[11] While the coefficients on executive stockholdings exhibit a similar pattern, these effects are not significant.

[10] When fixed year or CEO effects are added to the regression, analysis yields comparable results (available upon request).

[11] Regression estimates suggest that for an average bank, higher executive bonuses were correlated with the value of misconduct initiated positively when the de-trended GDP index exceeded 100.

To examine whether the correlation between CEO remuneration and bank malpractice changes with bank risk, I also interact remuneration variables with bank leverage as a higher ratio of bank liabilities to assets increases failure probability as well as shareholder risk-taking incentives. Regression results in columns (9)-(11) indeed provide some evidence that higher reliance on myopic incentives might lead to malpractice when long-term risks rise.

Overall, the results in Table 5 provide some evidence that bank conduct failures and CEO compensation are related, but these effects vary with bank risk and investment opportunities. Namely, the findings of a positive relation between executive bonuses and the value of misconduct initiated during economic booms or in highly leveraged banks are consistent with a view that as short-term investment opportunities improve, or long-term risks rise, compensation schemes that focus on short-term performance become more conducive to misconduct.

In Tables 6-8, I further turn to examine how these relationships vary across different types of bank misconduct, as the incentives generated by compensation schemes and investment opportunities might be different for distinct classes of bank conduct failures. For example, it could be expected that underwriting fraud and systematic cases of customer abuse could be linked to bank incentive schemes more heavily than compliance failures such as reporting mistakes.

Therefore, in Table 6, the model is estimated for a major type of misconduct, namely cases related to bank underwriting activities. There, similar to Table 5, strong procyclicality can be observed. When we turn to the effects of compensation schemes, only average executive bonus to salary ratio is significantly related to the value of malpractice initiated. However, similar to the results in Table 5, a higher ratio of bonus to salary realised in the preceding period also increase malpractice at the peak of the business cycle.[12]

From regression results presented in columns (9)-(11), it appears that both higher CEO bonuses and the wealth they hold in bank stock are positively correlated with misconduct risk when bank leverage increases.[13] The findings in column (11) imply that for unlevered banks, better alignment between managers' and owners' interests leads to a reduction of malpractice, which can be interpreted as evidence of misconduct

[12]The findings in Table 6 are consistent with evidence in Wang et al. (2010) where IPO fraud increases with investor beliefs about the industry, and the expertise of underwriters matters most in bad times. As results in Table 6 incorporate conduct costs resulting both from banks issuing assets such as mortgage backed securities and underwriting other firms' stock, it captures both their willingness to engage in malpractice as asset prices increase, and possibly lower incentives to monitor in good times. The findings show that such pro-cyclicality might be also related to bank incentive schemes, reliance on performance pay strengthening the effects.

[13]Similar to column (6), the relationship between bank executive bonuses and malpractice is positive when the ratio of bank's liabilities to assets exceeds 91%

being an agency cost.

In Tables 7 and 8, other major classes of bank conduct failures related to disadvantaging clients and market manipulation are analysed (as expected, the results on compliance failures or money laundering and tax evasion do not appear to be systematically related to the variables chosen and are available upon request). Customer abuse is not strongly related to the variables considered, although the compensation scheme variables maintain their signs. The results suggest that bank returns might be an important determinant of such actions, the risk of misconduct increasing when profitability is low. When I turn to analysing the drivers behind attempted market manipulation, it appears to be procyclical, but not systematically related to compensation schemes of the top management, either.

To conclude, the results presented in this section somewhat support the view that bank conduct failures react to compensation schemes, but this does not hold for all types of misconduct. Although the effects of executive bonuses or shareholdings are in general not statistically significant on average, it appears that the direction of their effects vary with the business cycle and bank risk. Meanwhile, it has to be acknowledged that the sample size used for this analysis is small and the data on misconduct is noisy. The classes of misconduct used to distinguish between different types of malpractice are still broad, therefore summarising events that might result from different incentives. The imperfect information on exact initiation dates of bank malpractice might also reduce the precision with which the effects are estimated, especially when such cases last for extended time periods.

# 4. The model

In this section, I introduce a model which helps explain the positive relationship between bank managers' bonuses and misconduct, and why this relationship might be strongest when there are profitable investment opportunities and banks are highly leveraged.

## 4.1. Model Setup

The model has three periods ($t = 0, 1, 2$) and there are two types of risk-neutral agents: bank shareholders (he) and managers (she). At t=0, bank shareholders hire managers to implement projects and managers make the choice over which projects to invest in and whether to engage in misconduct. At t=1, the short-term returns of projects are realised. At t=2, the long-term risk of investment projects is realised, and misconduct results in disciplinary action by the regulator if detected.

**Bank Shareholders and Projects**

Bank shareholders have funds that can be invested in a risky or a safe project. In the baseline model, the bank is fully equity-financed and the funds that are invested are set to zero.

Project returns have two components: their distribution over time and riskiness. Projects generate payoffs in two periods, t=1 and t=2, where t=2 returns are discounted by the time value of money in the economy, $\delta$. At t=1, the safe project pays $H$ with probability $p_L$ and $L$ otherwise, and the risky project pays $H$ with probability $p_H$ and $L$ otherwise. As $H>L$ and $p_H>p_L$, the risky project has higher expected payoffs in the short run. However, it involves long-term risk: while the safe project pays $L$ at t=2 with certainty, the risky project generates $L$ only with probability $0<x<1$ at t=2 (and 0 otherwise). Project payoffs are depicted in Figure 3.

As in this setting bank returns are distributed over time, it differs from models in which risky bank payoffs are assumed to be realised at a single future date. Although this might be not representative of some business lines in financial institutions, it captures bank activities that generate short-term cash flows but entail the risk of losses in the long run. As noted by Acharya et al. (2016), the feature of earning a carry in the short run while entailing long-term risks is present in many financial products: mortgage backed securities, credit default swaps, insurance instruments.

The risky project has a higher net present value (NPV) when

$$p_H H + (1 - p_H)L + \delta x L > p_L H + (1 - p_L)L + \delta L.$$

The condition can be rewritten to show that the risky project is more profitable when its short-term returns outweigh long-term risks:

$$(p_H - p_L)(H - L) > \delta(1 - x)L. \tag{1}$$

In condition (1), the left-hand side represents the gain from a higher probability of observing returns $H$ rather than $L$ if the risky investment is made. The right-hand side is the present value of expected loss $L$ if long-term risk is realized.

Condition (1) can be related to the preceding empirical analysis. Growth periods correspond to times when there are profitable investment opportunities such as investments in mortgage-backed securities or technology stock, which also carry long-term risks. When the gains from investing in such projects are sufficiently low, (1) is not satisfied and banks shift to safer investments such as government bonds.

Finally, to carry out investment projects, bank shareholders have to hire a manager who chooses and implements the project. The project chosen by the manager is not

observable to shareholders, but its payoffs are. The bank can commit to a remuneration scheme that is dependent on observed returns, and cannot promise any payment to the manager when bank returns are 0. Shareholder objective is to maximise bank profits which depend on project returns at t=1 and t=2, manager's compensation expenses, and conduct costs described below.

### Managers

Bank managers live for three periods and have the objective to maximise their expected lifetime income. At t=0, managers are offered employment contracts by bank shareholders that specify their compensation at t=1 and t=2. The cost of project supervision is the same for all managers and is normalised to 0. Managers have a lifetime reservation wage $w$ and discount their t=2 income using the time value of money in the economy, $\delta$.

### Misconduct

Besides to choosing project type, managers can engage in misconduct which increases the probability of generating high return $H$ at t=1 by $\Delta$. The two choices that the manager makes - which project to implement and whether to engage in misconduct - are independent, although it will be later shown that they can be related. Also, contrary to models where agency conflicts result in excessive risk taking by managers, here misconduct does not affect the riskiness of the bank's investment project, but rather increases the short-term payoffs realised. Instances of such behaviour are selling unsuitable products to consumers to increase commission wages, engaging in insider trading to boost profits, collusion or underwriting fraud. It is assumed that misconduct is socially costly: the cost of misconduct to bank customers is $\eta\Delta(H-L)$ where $\eta>1$, and so misconduct is not just redistribution of income from bank customers to shareholders.[14]

If managers decide to engage in misconduct, regulators detect it at t=2 with probability $0<\lambda<1$. If detected, managers who engage in misconduct lose their job and remuneration at t=2. This form of sanction mimics real world where misbehaving employees lose their reputation and are barred by regulators or fired by the banks themselves.[15] I assume that in this case, the manager's compensation at t=2 is appropriated by the regulator rather than retained by bank shareholders.[16] The assumption of misconduct

[14] This assumption could be motivated by the costs of legal processes, bank customer risk aversion, or the externalities related to bank misconduct reducing confidence in the financial sector.

[15] Egan et al. (2016) show that around half of financial advisers lose jobs after misconduct detection

[16] It could also be viewed as a claw-back or financial penalty where the manager's pay is seized by regulators if improper past actions are detected. While in this case, only t=2 income is clawed back and t=1 income resulting from the realisation of return $H$ would be more reminiscent of such regulations, it can be argued that an agent's t=1 income is consumed and she has limited liability.

costs being borne only at t=2 rather than immediately at t=1 is motivated by the time lag between malpractice initiation and resulting disciplinary actions observed in Section 3. Misconduct is also not detected with certainty, which could result from resource constraints faced by regulators.

If managerial misconduct is detected at t=2, it also results in regulatory fines and/or restitution $C$ paid by bank shareholders. The assumption of misconduct resulting in costs to bank shareholders is consistent with the observed regulatory actions in which financial costs are mostly borne by financial institutions rather than individuals. Therefore, from bank shareholder perspective, detection risk $\lambda$ and conduct costs $C$ are substitutes in making misconduct costly. Even if regulators face constraints in detecting malpractice by managers, they can impose high financial penalties on shareholders. Meanwhile, bank managers can only lose their $t = 2$ compensation.

In the baseline model, contrary to bank managers who only incur costs when the long-term risk of the project does not materialise, shareholders are assumed to be subject to $C$ irrespective of bank returns at t=2. Although the risky project yields 0 with probability $1 - x$, the model considers the bank incurring costs in those states, as well. This could be income from other projects that the bank undertakes, reputation losses or a result of delayed judicial process in which case costs are imposed after t=2. In an extension, I consider the case where bank shareholders are subject to conduct costs only when positive returns are realised at t=2.

In the baseline model, it is further assumed that misconduct has a negative NPV to bank shareholders: the increased probability of observing high return $H$ rather than $L$ by probability $\Delta$ due to manager's misconduct is outweighed by regulatory costs if detected with probability $\lambda$:

**Assumption 1:** $\Delta(H - L) < \delta\lambda C$.

In practice, there is no clear consensus over whether conduct failures in banks are encouraged by shareholders or resorted to by managers themselves. While some argue that bank shareholders allow such cases and realise positive returns from misconduct, at least some cases appear to have resulted from managers' incentives to boost their short-term profits at a cost to bank owners. For example, currency exchange manipulation in UBS in 2015 was carried by employees after the bank had reached a non-prosecution agreement with regulators, breaching it and resulting in a significant fine.[17] Similarly, a Barclays trader Daniel James Plunkett attempted to fix gold prices the day after his bank was fined for rigging Libor rates, resulting in a 44 million US dollars fine to the bank's shareholders, possibly outweighing the potential gains.[18]

Finally, in the model bank shareholders can only prevent misconduct by changing

[17] See Financial Times "DoJ hard line on UBS raises concerns on deals with regulators", www.ft.com.
[18] Reuters, "Barclays slapped with 26 million pounds fine over gold price fix".

compensation schemes and reducing the incentives of managers to initiate malpractice. Therefore, the model abstracts from how changes in internal controls or governance could help prevent or detect conduct failures. This assumption is consistent with the findings by Dyck et al. (2010) who have shown that the traditional corporate governance bodies are not the main detectors of fraud in corporations.[19]

**Time line**

**t=0:** The risk and returns of the risky and safe projects are observed. Bank shareholders offer contracts to managers, specifying their remuneration at t=1 and t=2. Managers choose between implementing the risky and safe project, and choose whether to engage in misconduct.
**t=1:** The short-term returns of the project chosen by the manager are realised. Bank managers receive their t=1 compensation as specified in the contract.
**t=2:** Long-term risk is realised, and the manager receives her t=2 compensation. If misconduct was implemented at t=0, it gets detected with probability $\lambda$, resulting in the manager losing her t=2 compensation and costs $C$ to bank shareholders.

The time line is summarised in Figure 4.

## 4.2. Baseline Results

I start by solving the model in which bank managers cannot engage in misconduct. It allows to derive manager's incentive schemes that result in the safe or risky project being implemented and establish which projects would be chosen in the absence of bank malpractice. Later, misconduct is introduced to show the conditions under which managers prefer to engage in malpractice and it cannot be prevented by bank shareholders, and how this affects bank project choice.

In cases when managers cannot engage in misconduct, bank shareholders compare the returns of the risky and safe project net of manager's compensation costs, and design the remuneration scheme so that the profit-maximising project is chosen by the manager.

The bank cannot commit to pay anything to the manager if the risky project is implemented and returns are zero at t=2. Therefore, if the manager's pay was not dependent on observing $H$ or $L$ at t=1 and t=2 wages were higher than zero, she would always choose to implement the safe project as it increases the probability of receiving compensation at t=2.

[19] But also see Nguyen et al. (2016) who show that board quality matters in detecting and preventing compliance failures in banks.

I rule out the case of bank shareholders inducing risk-taking just by promising the manager's reservation wage at t=1 and making her project choice independent of returns at $t = 2$. I assume that if indifferent between the risky and the safe project, the manager chooses the safe one. This restriction could also be rationalised if bank managers are required to stay in the bank for project supervision at t=1 and t=2, and if paid the reservation wage at t=1, they would prefer not to work with an arbitrarily small effort cost.

If bank shareholders prefer the risky project to be implemented, they have to offer higher compensation in cases when $H$ is observed at t=1. Namely, denoting the manager's remuneration at t=1 after $H$ is observed as $\alpha$ and t=2 compensation as $\beta$, the manager would choose to implement the risky project when her participation constraint (PC) and incentive compatibility constraint (ICC) are satisfied:

$$p_H\alpha + \delta x\beta \geq w \tag{PC}$$

$$p_H\alpha + \delta x\beta > p_L\alpha + \delta\beta \tag{ICC}$$

From the (ICC), performance pay $\alpha$ which ensures that the risky project is implemented is

$$\alpha > \frac{\delta(1-x)\beta}{p_H - p_L}, \tag{2}$$

which shows that increasing risk $(1 - x)$ requires higher short-term compensation to induce risk-taking, especially if the manager's losses in terms of deferred pay $\beta$ are high. Further setting the (PC) so that the manager's participation constraint is just satisfied, minimal variable pay that ensures risky project choice at t=0 can be derived. Solving for $\beta$ from the (PC) and substituting it in the condition for $\alpha$ in (2) and rearranging, the manager chooses the risky project if $\alpha > \frac{(1-x)w}{p_H - xp_L}$. As

$$\frac{\partial\alpha}{\partial x} = \frac{-w(p_H - p_L)}{(p_H - xp_L)^2}, \tag{3}$$

to induce risk-taking, $\alpha$, the variable pay conditional on observing $H$, has to increase when project risk increases (and $x$ diminishes). Meanwhile, $\alpha$ is decreasing in $p_H - p_L$ since for a given risk of receiving no returns at t=2, she is compensated at t=1 more often when the risky project is implemented. Finally, the effects of increasing risk are also stronger when the manager's reservation wage $w$ is high. Since higher wages could be a result of competition for talent, this finding is consistent with the result in Thanassoulis (2013) where higher required remuneration makes deferral costly, resulting in a higher share of remuneration awarded in the short run. Meanwhile, in the model here, the relationship between competition for managers and bonuses arises because of

the need for performance pay to induce risk-taking when managers' reservation wages are high.

If the manager's PC is just satisfied, the condition under which bank shareholders prefer the risky project to be implemented coincides with the socially optimal choice in (1):

$$p_H H + (1 - p_H)L + \delta x L - w > p_L H + (1 - p_L)L + \delta L - w. \tag{4}$$

As in this setting the bank is fully equity financed, it will choose the project with higher expected returns. The condition further reduces to the threshold value of $x$, the probability of observing returns $L$ at t=2, or maximum risk that shareholders are willing to bear:

$$x \geq \frac{\delta L - (p_H - p_L)(H - L)}{\delta L} \equiv \underline{x}. \tag{5}$$

Bank shareholders are willing to accept higher long-term risk, or lower $x$, when the gains in returns are sufficiently high, $\underline{x}$ decreasing in $(p_H - p_L)(H - L)$.

**Bank misconduct**

As introduced in the model setup, misconduct decision is made by the manager. I do not constrain her choice to engage in misconduct by making it dependent on project type and she can initiate malpractice either if the risky or the safe project is implemented.

The manager has an incentive to engage in misconduct at t=0 when her gains from increasing the likelihood of observing high return $H$ at t=1 by $\Delta$ outweigh the costs of regulatory actions at t=2. Such incentives depend on compensation schemes, which in turn depend on whether bank shareholders want to encourage risk-taking.

When the *safe* project is implemented, the manager prefers not to engage in misconduct when

$$(p_L + \Delta)\alpha + \delta(1 - \lambda)\beta < p_L \alpha + \delta\beta,$$

or her gains in observing $\alpha$ with a higher probability are outweighed by expected costs resulting from detection:

$$\Delta\alpha < \delta\lambda\beta. \tag{6}$$

Condition (6) is satisfied when $\alpha$ is sufficiently low: $\alpha < \frac{\delta\lambda\beta}{\Delta}$. Similarly, when *risky* projects are profitable and shareholders favour risk-taking, conditional pay does not create incentives for misconduct by managers when

$$(p_H + \Delta)\alpha + \delta x(1 - \lambda)\beta < p_H \alpha + \delta x\beta,$$

which results in a trade-off similar to that in (6):

$$\Delta\alpha < \delta x \lambda \beta. \tag{7}$$

From (7), the manager prefers not to engage in misconduct when $\alpha < \frac{\delta\lambda x\beta}{\Delta}$. Comparing this with the condition for $\alpha$ when the safe project is implemented in (6), managers have stronger incentives to engage in misconduct when the risky project is implemented. This results from the manager incurring the associated costs only when the long-term risk is not realised, very high project risk $(1-x)$ implying she almost never gets sanctioned for misconduct.

By Assumption 1 misconduct is costly to bank shareholders and they can only prevent it by changing the manager's compensation schemes. Therefore, to discourage malpractice, $\alpha$ should be set so that (6) and (7) are satisfied when the safe and risky projects are implemented, respectively.

However, satisfying the two conditions is not always feasible, leading to the main trade-off faced by bank shareholders when misconduct is costly. First, suppose the safe project has a higher NPV, or $x < \underline{x}$. In this case, the manager's ICC does not have to be fulfilled and performance pay can be freely set at $\alpha < \frac{\delta\lambda\beta}{\Delta}$, satisfying condition (6). On the other hand, if bank shareholders prefer the risky project to be implemented, it requires that $\alpha > \frac{\delta(1-x)\beta}{p_H - p_L}$ from the manager's ICC, while the condition of no misconduct when the risky project is implemented in (7) is $\alpha < \frac{\delta\lambda x\beta}{\Delta}$. The two conditions can be satisfied when

$$\frac{\delta(1-x)\beta}{p_H - p_L} < \frac{\delta\lambda x\beta}{\Delta}. \tag{8}$$

(8) shows that encouraging risk-taking and preventing misconduct is feasible when the short-term compensation that managers demand for the risk of foregoing deferred pay (left-hand side) is lower than the short-term pay for which the manager is willing to trade-off her $t = 2$ pay in case of misconduct. However, when long-term risks rise ($x$ diminishes), $\alpha$ required to fulfil the manager's ICC increases on the left-hand side of the equation, while misconduct becomes more attractive on the right-hand side, as expected costs from misconduct detection diminish. Solving for $x$ under which (8) does not hold leads to Proposition 1.

**Proposition 1:** when $x < \frac{\Delta}{\Delta + \lambda(p_h - p_L)} \equiv x^M(\lambda)$, bank shareholders cannot both incentivise risk-taking and prevent misconduct. When long-term risks associated with the risky project increase ($x$ decreases), higher short-term performance pay $\alpha$ is required to compensate managers for future risks. This in turn raises the gains from actions which boost the likelihood of receiving $\alpha$ beyond $p_H$, while expected detection costs decrease. Consistent with Becker's (1968) framework of the economics of crime, threshold $x$ in-

creases in the efficiency of misconduct measured by $\Delta$, and decreases in detection risk $\lambda$.

These results imply that even if the manager can engage in malpractice when both the risky and the safe project is implemented, we might observe more misconduct at times when banks take more risk. When safe projects yield higher returns, shareholder incentive schemes can be shifted from short-term compensation to deferred pay more easily, preventing malpractice. In cases when risky projects have a higher NPV, misconduct is harder to prevent as both higher performance pay necessary to encourage risk-taking and lower expected costs from misconduct make it more attractive to managers.

**Regulation, Risk and Project Choice**

When bank managers have the opportunity to engage in misconduct, shareholder choice between safe and risky projects depends not only on their respective returns, but can also be affected by the probability of detection and conduct costs imposed by regulators. The resulting risk and misconduct outcomes are considered below.

**Case 1:** $x > x^M(\lambda)$**.** In this case, misconduct can be prevented and bank shareholders prefer the socially optimal project, incentivising managers to invest in the risky project when $x > \underline{x}$ and choosing the safe project otherwise.

**Case 2:** $x < x^M(\lambda)$**.** When the risk of detection cannot prevent managers from engaging in misconduct, shareholders prefer the risky project over the safe one when

$$(p_H + \Delta)H + (1 - p_H - \Delta)L + \delta xL - \delta x\lambda C > p_L H + (1 - p_L)L + \delta L.$$

To evaluate how shareholder incentives change when managers engage in misconduct, it can be rearranged to

$$(p_h + \Delta - p_L)(H - L) > \delta(1 - x)L + \delta\lambda C. \tag{9}$$

Comparing to (1), the left-hand side of (9) now increases by $\Delta(H - L)$ as malpractice boosts bank payoffs in the short run. However, it also increases the long-term costs on the right-hand side, the term $\delta\lambda C$ representing expected financial penalties imposed by regulators.

As it is assumed that $\Delta(H - L) < \delta\lambda C$, the short-term gains from risky project implementation now diminish relative to long-term costs, making the risky project less attractive. The resulting new threshold $x$ for risky project implementation in this case changes to $x > \frac{\delta L - (p_h - p_L)(H-L) + (\delta\lambda C - \Delta(H-L))}{\delta L} \equiv \underline{x}^S(\lambda) > \underline{x}$. Therefore, conduct costs can reduce bank risk-taking when conduct costs $C$ are high.

The reason why detection probability that is not sufficiently high to prevent misconduct can change the incentives of shareholders is due to conduct costs that the regulators can impose. As financial penalties and the probability of being subject to disciplinary actions are substitutes in making misconduct costly to bank shareholders, sufficiently high levels of financial penalties can fully eliminate risky project implementation and malpractice even if detection risk is low.

In Figure 5, I illustrate how combinations of risk $(1-x)$ and detection probability $\lambda$ affect project choice and misconduct. When $x$, the probability of the risky project generating payoffs in the long-run, is low, the safe project is implemented irrespectively of the intensity of misconduct detection. There, shareholders do not need performance pay to encourage risk-taking, and can defer the manager's compensation, making malpractice costly to her. When the risky project has a higher NPV, $x^M(\lambda)$ separates the region in which the risk of detection can prevent managerial misconduct from the region where risky investments result in malpractice. When $x < x^M(\lambda)$ and detection probability is not sufficiently high to deter manager's misbehaviour for a given level of risk and associated performance pay, project choice depends on expected conduct costs to bank shareholders. In this case, risky projects are profitable when, holding $C$ constant, detection risk is sufficiently low and $x > \underline{x}^S(\lambda)$.

### 4.3. Extensions

#### Constrained regulators

In this extension, I consider the case in which conduct costs $C$ that regulators can impose on bank shareholders are limited to bank returns realised at t=2. This assumption might be realistic in situations where regulators are reluctant to impose fines on poorly capitalised banks, or when banks default if their returns are zero.

This assumption alters only conduct costs to shareholders, as the manager's decision to initiate malpractice is not affected by financial penalties. When the safe project is implemented, shareholders face the same costs from misconduct as in the baseline model since the safe project always yields returns at $t = 2$, misconduct being costly when

$$\Delta(H - L) < \delta\lambda C.$$

Assuming that Assumption 1 still holds even when $C \leq L$, misconduct is not profitable to bank shareholders when the safe project is implemented, and they prefer to defer manager's compensation in order to prevent it. When the risky project is implemented,

misconduct is costly to shareholders when

$$\Delta(H - L) < \delta x \lambda C. \tag{10}$$

As higher long-term risk diminishes expected conduct costs, shareholders find malpractice more profitable as risk increases. Condition (10) can again be expressed in terms of project risk, $x < \frac{\Delta(H-L)}{\delta\lambda C} \equiv x^S(\lambda)$ resulting in misconduct being profitable to bank shareholders when the risky project is implemented.

We can now compare $x^S(\lambda)$ to condition $x^M(\lambda)$ from Proposition 1 which defines risk levels above which the manager's malpractice cannot be prevented in the baseline model. Misconduct is costly to shareholders but cannot be prevented when $x^S(\lambda) < x < x^M(\lambda)$. Rearranging, it can be shown that $x^S(\lambda) < x^M(\lambda)$ when

$$\frac{\Delta(H - L)}{\lambda\delta L} < \frac{\delta C - (p_H - p_L)(H - L)}{\delta L}. \tag{11}$$

Noting that the left-hand side of (11) is the condition for misconduct being profitable to shareholders and the right-hand side is the threshold value of $x$ below which the safe projects have higher NPV than the risky ones when $C = L$, it is never the case that misconduct is costly to bank shareholders and cannot be prevented when the risky project is implemented, as the maximum conduct costs that can be imposed on shareholders are $L$.

Furthermore, when $x^M(\lambda) < x < x^S(\lambda)$, misconduct is now attractive to shareholders at risk levels at which it could have be prevented in the baseline model by setting performance pay $\alpha$ sufficiently low and still satisfying the manager's ICC for risky project implementation.

These results imply that limits on the costs that regulators can impose on banks can increase the prevalence of conduct failures. While in the baseline model shareholders could not prevent misconduct for $x < x^M(\lambda)$, they find it profitable in this extension. Furthermore, as shareholders prefer misconduct for risk levels at which it could have been prevented previously through setting $\alpha$ to satisfy (7), now they have incentives to increase $\alpha$ beyond the level required to induce manager's risk-taking in order to encourage the initiation of malpractice.

Does misconduct affect project choice when bank shareholders face lower financial penalties? First, as misconduct is never costly to shareholders when $x < x^S$, it does not reduce the profitability of risky project implementation in the region $\underline{x} < x < x^M(\lambda)$ under which it could not be prevented in the baseline model. Second, as expected conduct costs are lower when the risky project is implemented, fines being imposed only with probability $x$, misconduct increases the gains from risk-taking, or the two

become complements. Shareholders now prefer the risky project when

$$(p_h + \Delta - p_L)(H - L) > \delta(1 - x)L + x\delta\lambda C. \tag{12}$$

The condition is similar (9) in the baseline model, however here, misconduct increases the profitability of risky projects since malpractice results in conduct costs in the long run only with probability $x$. The resulting threshold risk level making the safe project more profitable is now $x < \frac{\delta L - \delta\lambda C - (p_H + \Delta - p_L)(H-L)}{\delta L - \delta\lambda C} \equiv \underline{x}'(\lambda) < \underline{x}$, shareholders implementing the risky projects even when the safe project has a higher NPV.

Therefore, when the costs that regulators can impose on bank shareholders are constrained by their returns at t=2, it leads to both more misconduct and risk-taking. Figure 6 illustrates the resulting project choice and misconduct intensity for combinations of project risk and detection probability.

**Bank leverage**

Empirical evidence presented in Section 3 suggests that bank leverage might be positively related to misconduct, and that short-term incentive schemes have stronger effects when bank leverage increases. As in the baseline model it is assumed that the bank is fully equity-funded, in this extension I consider the case in which the bank takes on debt. I assume that each project now costs one unit to invest, and the bank funds $D$ of it with insured deposits that have to be repaid at t=2. It is further assumed that $L - \beta > D$, or the bank does not have sufficient returns to repay its depositors at t=2 only if the risky project is chosen and bank returns are zero.

Assuming again that misconduct is costly to bank shareholders, when $x > x^M$ and misconduct can be prevented, shareholders prefer the risky project when

$$(p_h - p_L)(H - L) > \delta(1 - x)(L - D). \tag{13}$$

Comparing to the baseline case, debt makes risky projects more profitable through reducing shareholder losses in case long-term risk is realised at t=2. The result is akin to traditional risk-shifting where leverage increases the attractiveness of the risky project as part of the cost from implementing it is now borne by creditors. Rewriting in terms of risk $1 - x$ that shareholders are willing to bear, leverage shifts the threshold $x$ down to $\underline{x}^D = \frac{\delta(L-D) - (p_H - p_L)(H-L)}{\delta(L-D)} < \underline{x}$ with $\frac{\partial \underline{x}^D}{\partial D} < 0$.

When $x < x^M(\lambda)$ and the implementation of the risky project results in conduct costs to bank shareholders, they prefer it to the safe project when

$$(p_h + \Delta - p_L)(H - L) > \delta(1 - x)(L - D) + \delta\lambda C. \tag{14}$$

Comparing this to condition (9), debt reduces the negative effects of malpractice on the profitability of risky projects through risk-shifting. This results in risk-taking for values of $x$ at which the risky project had a higher NPV, but was unattractive due to conduct costs in the baseline model.

The effects of leverage on bank malpractice and risk-taking are presented in Figure 7. Leverage leads to more risk-taking and misconduct both through making risky projects more profitable relative to the safe ones due to risk-shifting, and encouraging risk-taking in cases where the safe project might have been preferred because of the conduct costs resulting from managers' malpractice.[20]

## 5. Discussion and Conclusion

This paper has attempted to gather and examine data on bank malpractice initiation in order to assess its developments over time, and the extent to which misconduct relates to bank incentive schemes and economic conditions. It appears that misconduct is quite persistent and might have been increasing lately. I also find some evidence that certain types of misconduct are positively related to bank CEO bonuses, especially in periods of high economic growth.

These findings are important for better understanding the drivers behind bank conduct failures and designing policies to prevent them. The observed procyclicality of misconduct might imply that regulators should be more vigilant during economic upturns, and pay more attention to the behaviours of risky firms. Meanwhile, the somewhat limited evidence on the relationship between executive compensation and malpractice is relevant in the light of recent initiatives to improve conduct through regulating bankers' pay. Namely, the positive relationship between bank CEO bonuses and misconduct intensity during periods of high growth might imply that restricting short-term payouts and postponing compensation could reduce managers' incentives to engage in socially costly activities in periods of high growth and risk-taking. The results in the theoretical model suggest that such regulations might be especially useful when compensation schemes in banks are designed to incentivise managerial misconduct rather than in order to achieve other shareholder objectives.

However, one of the implications of the theoretical model is that regulating managers' pay or the imposition of increasingly high financial penalties can be costly. If manager compensation schemes are designed to achieve shareholder objectives other than encouraging malpractice, imposing constraints on pay might result in lower value

[20] Another possible effect of bank debt $D$ on misconduct that is not modelled here works through reducing financial penalties $C$ that regulators are willing to impose on bank shareholders, reinforcing the positive relationship between bank misconduct and risk-taking.

projects being implemented. Similarly, the imposition of high conduct costs can reduce misconduct through encouraging shareholders to change compensation schemes, but it also results in sub-optimal project choice. In such cases, increasing the risk of detection eliminates managers' incentives to initiate malpractice without changing bank investment choices.

Overall, the theoretical framework suggests that the extent to which misconduct results from incentive schemes designed to achieve shareholder objectives other than encouraging malpractice should be an important factor when thinking about regulating compensation in banks. Therefore, attempting to quantify the gains to bank shareholders from misconduct might be a possible direction for future research. Also, as it has been acknowledged that the data used in empirical analysis has several shortcomings related to its availability, challenges in determining the initiation date, and only detected conduct failures being observed, the results should be interpreted carefully. Further work on designing a comprehensive database on bank conduct failures could be useful for a more detailed analysis of the drivers behind them.

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# Figures and Tables

Figure 1: Bank Misconduct Initiations, Investigations and Fines

Notes: This figure plots the total number of misconduct cases and their investigations starting each year as well as the total number of fines imposed. The events are not grouped so that cases resulting in multiple actions receive more weight.

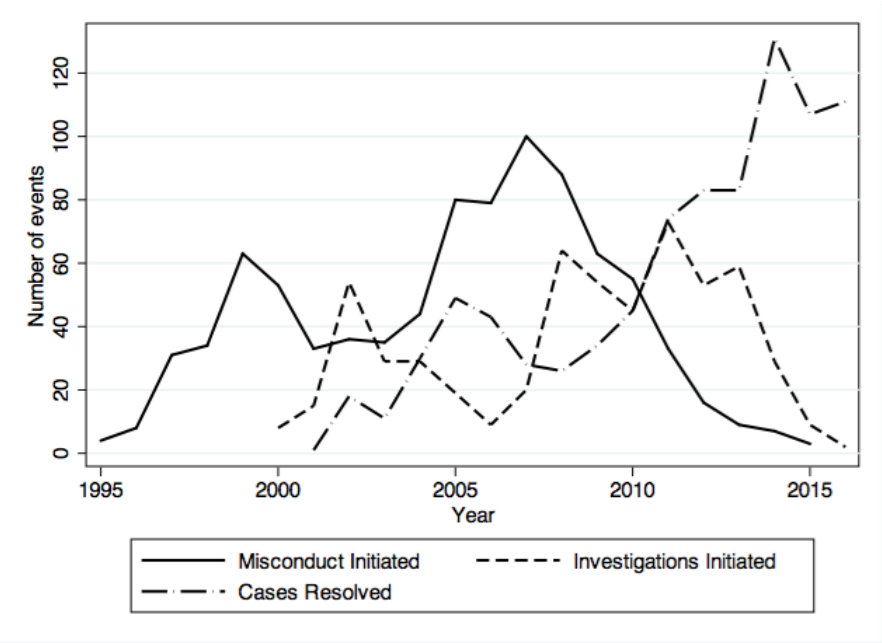


Figure 2: Share of cases resolved since the date of alleged start

Notes: This table presents the cumulative distribution of the time lag between alleged misconduct starts and the dates at which they resulted in conduct costs to banks.

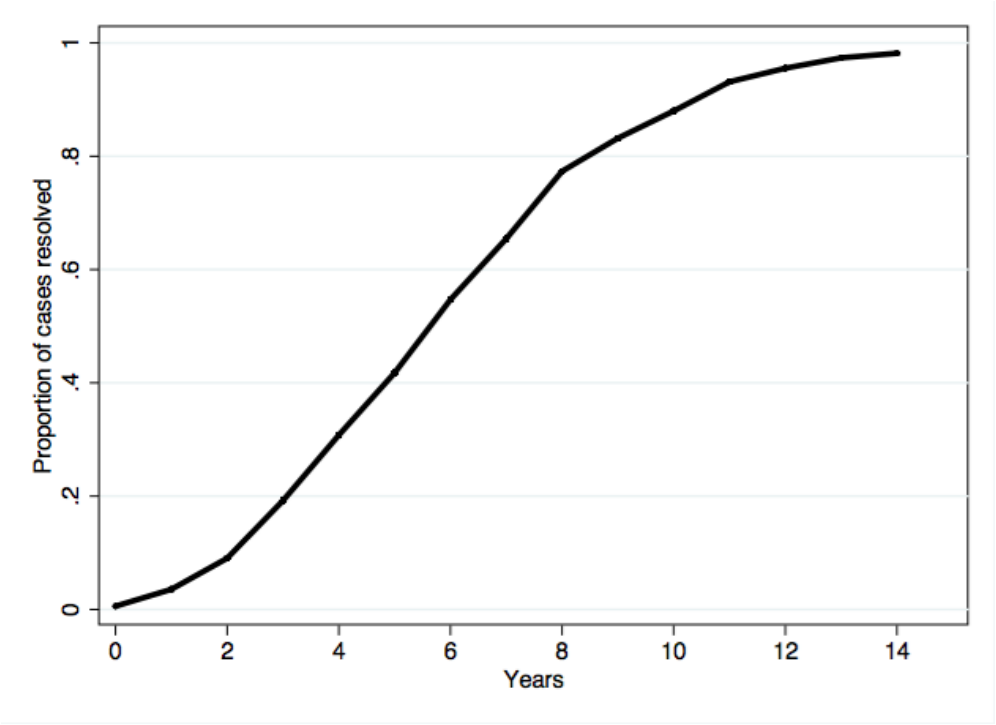


Figure 3: Project payoffs

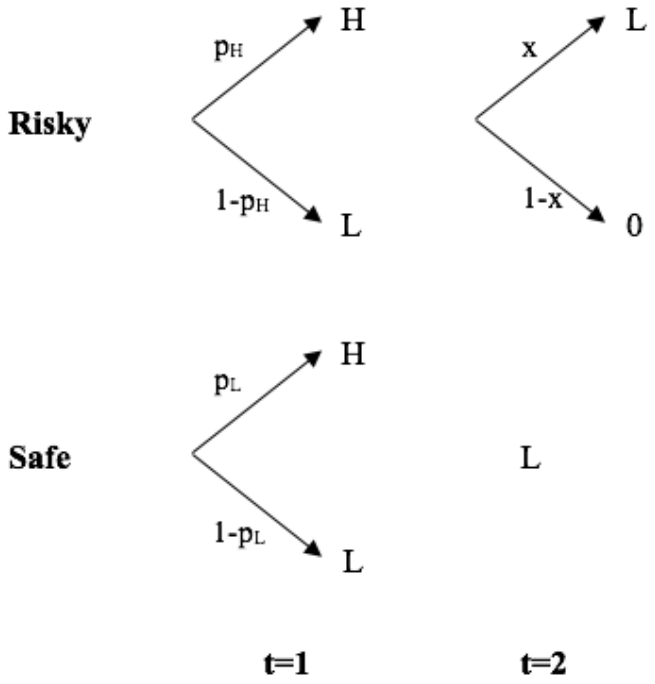



Figure 4: The timeline

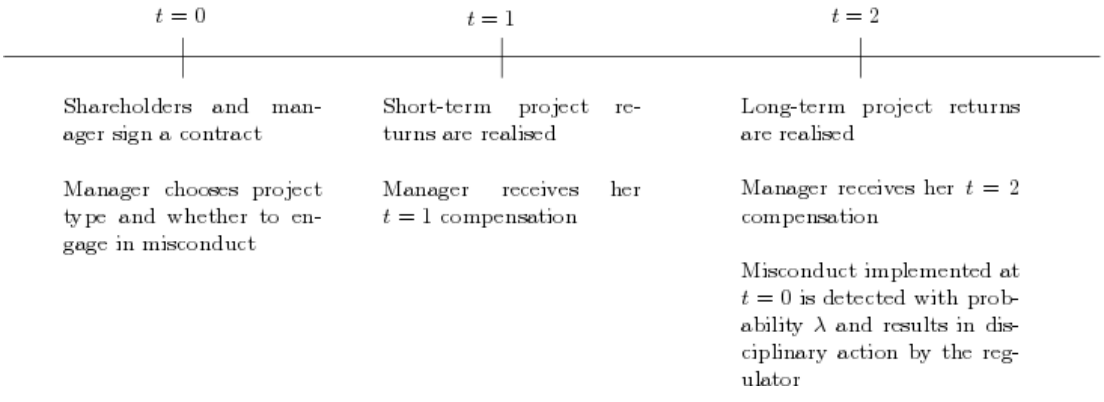


Figure 5: Misconduct, detection and project type

Notes: This figure presents the regions of bank risk-taking and misconduct that result from combinations of project risk and detection intensity in cases when misconduct is costly to bank shareholders.

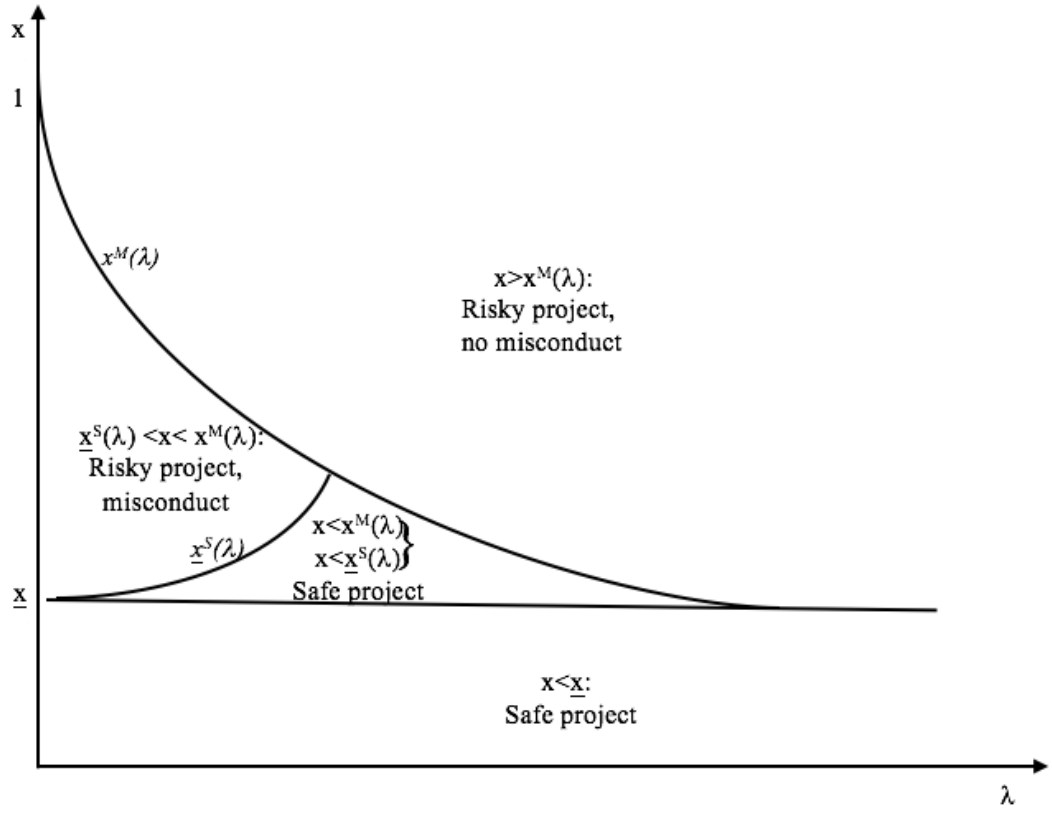


Figure 6: Misconduct and project type under low conduct costs

Notes: This figure presents the regions of bank risk-taking and misconduct that result from combinations of project risk and detection intensity in cases when bank shareholders are subject to conduct costs only if long-term risk at t=2 is not realised and the maximum amount of conduct costs is constrained by $L$, project return at t=2.

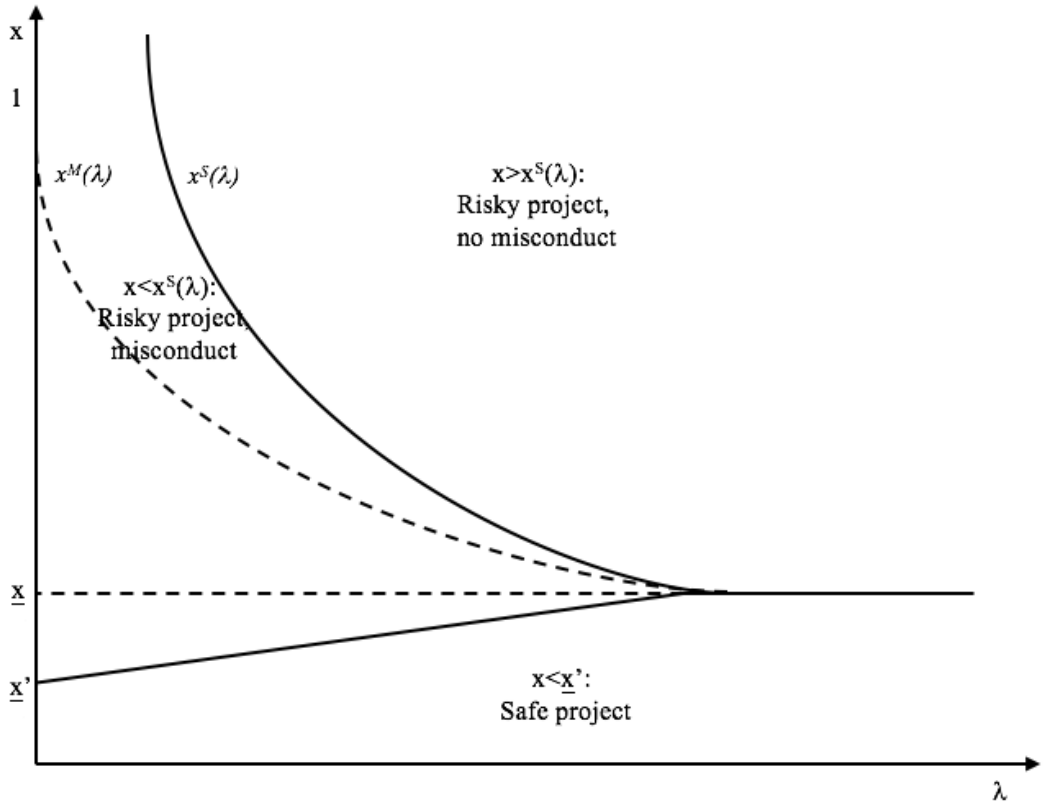
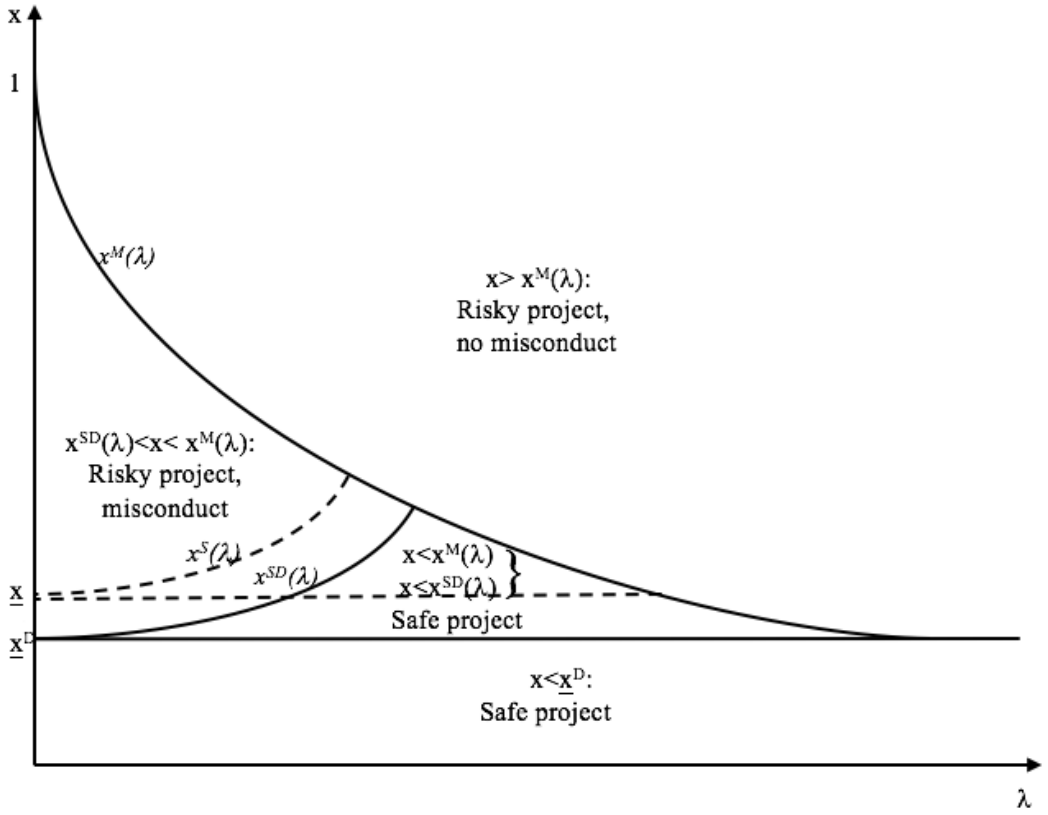


Figure 7: Misconduct and project type when the bank is leveraged.

Notes: This figure presents the regions of bank risk-taking and misconduct that result from combinations of project risk and detection intensity hwen misconduct is costly to bank shareholders and the bank is leveraged.



## Table 1

Notes: This table presents the total number of misconduct cases initiated each year that have resulted in conduct costs of at least 1m US dollars in the sample of 30 banks during 2000-2016. Instances in which bank malpractice resulted in multiple actions by regulators or lawsuits are treated as a single case, the earliest initiation date available used in such cases.

| Year | Total | Underwr. | Compl. | Manipul. | Abuse | Individ. Cases | Sanctions |
|---|---|---|---|---|---|---|---|
| 1998 | 31 | 13 | 4 | 2 | 8 | 1 | 0 |
| 1999 | 51 | 19 | 12 | 4 | 6 | 2 | 2 |
| 2000 | 41 | 19 | 7 | 1 | 9 | 1 | 1 |
| 2001 | 30 | 2 | 7 | 0 | 14 | 1 | 1 |
| 2002 | 33 | 2 | 13 | 3 | 4 | 1 | 5 |
| 2003 | 28 | 2 | 4 | 3 | 14 | 0 | 3 |
| 2004 | 34 | 6 | 7 | 3 | 12 | 2 | 2 |
| 2005 | 43 | 13 | 3 | 7 | 7 | 3 | 6 |
| 2006 | 47 | 13 | 7 | 3 | 17 | 2 | 0 |
| 2007 | 71 | 3 | 18 | 10 | 22 | 9 | 4 |
| 2008 | 73 | 1 | 26 | 9 | 19 | 8 | 4 |
| 2009 | 53 | 0 | 15 | 8 | 19 | 3 | 0 |
| 2010 | 51 | 14 | 12 | 3 | 11 | 5 | 1 |
| **Total** | 586 | 107 | 135 | 56 | 162 | 38 | 29 |

## Table 2

Notes: This table presents the total value of misconduct initiated each year measured in terms of resulting conduct costs (in m US dollars at 2010 prices). The data covers cases that have resulted in conduct costs of at least 1m US dollars in the sample of 30 banks during 2000-2016.

| Year | | Total | Underwr. | Compl. | Manipul. | Abuse | Individ. Cases | Sanctions |
|---|---|---|---|---|---|---|---|---|
| 1998 | **Sum** | **2303** | **1329** | **6** | **183** | **664** | **10** | **0** |
| | Mean | 76.77 | 44.28 | 0.19 | 6.09 | 22.13 | 0.32 | 0 |
| | Median | 0.60 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 138.11 | 109.40 | 0.52 | 33.35 | 84.49 | 1.75 | 0 |
| 1999 | **Sum** | **3115** | **1841** | **46** | **251** | **225** | **98** | **388** |
| | Mean | 103.83 | 61.36 | 1.55 | 8.38 | 7.51 | 3.26 | 12.92 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 195.43 | 138.78 | 3.81 | 24.64 | 29.85 | 13.26 | 57 |
| 2000 | **Sum** | **13235** | **9315** | **65** | **173** | **2214** | **2** | **845** |
| | Mean | 441.17 | 310.48 | 2.17 | 5.78 | 73.78 | 0.08 | 28.15 |
| | Median | 26.45 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 1085.27 | 1019.32 | 6.39 | 31.67 | 202.94 | 0.45 | 154.21 |
| 2001 | **Sum** | **3352** | **1496** | **51** | **0** | **1009** | **25** | **411** |
| | Mean | 111.74 | 49.85 | 1.70 | 0 | 33.63 | 0.82 | 13.70 |
| | Median | 0.76 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 335.08 | 270.28 | 8.32 | 0 | 103.62 | 4.48 | 75.02 |
| 2002 | **Sum** | **14230** | **957** | **185** | **300** | **918** | **0** | **10420** |
| | Mean | 474.33 | 31.90 | 6.17 | 10.01 | 30.60 | 0 | 347.34 |
| | Median | 3.06 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 1892.73 | 139.50 | 15.67 | 33.37 | 158.69 | 0 | 1858.57 |
| 2003 | **Sum** | **11373** | **8787** | **8** | **48** | **1408** | **0** | **880** |
| | Mean | 379.10 | 292.91 | 0.26 | 1.61 | 46.93 | 0 | 29.33 |
| | Median | 11.87 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 1678.84 | 1509.87 | 0.70 | 5.23 | 167.94 | 0 | 159.64 |
| 2004 | **Sum** | **1807** | **683** | **21** | **139** | **879** | **37** | **44** |
| | Mean | 60.23 | 22.77 | 0.68 | 4.65 | 29.31 | 1.24 | 1.48 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 122.32 | 93.53 | 2.05 | 16.55 | 85.92 | 6.78 | 6 |
| 2005 | **Sum** | **62886** | **54479** | **31** | **6535** | **854** | **1** | **376** |
| | Mean | 2096.20 | 1815.97 | 1.02 | 217.83 | 28.45 | 0.04 | 12.52 |
| | Median | 22.60 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 5303.60 | 4953.85 | 3.73 | 676.65 | 84.68 | 0.20 | 34.07 |
| 2006 | **Sum** | **27004** | **22520** | **103** | **1930** | **1835** | **20** | **0** |
| | Mean | 900.13 | 750.65 | 3.44 | 64.34 | 61.15 | 0.68 | 0 |
| | Median | 86.05 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 3293.85 | 3301.94 | 14.20 | 174.70 | 226.94 | 3.40 | 0 |
| 2007 | **Sum** | **12901** | **2677** | **383** | **4915** | **4457** | **379** | **26** |
| | Mean | 430.04 | 89.24 | 12.77 | 163.84 | 148.56 | 12.63 | 0.87 |
| | Median | 84.83 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 582.02 | 207.59 | 36.76 | 316.41 | 269.72 | 60.55 | 4.36 |
| 2008 | **Sum** | **36087** | **19** | **194** | **4951** | **27295** | **853** | **137** |
| | Mean | 1202.91 | 0.62 | 6.46 | 165.04 | 909.83 | 28.44 | 4.56 |
| | Median | 24.44 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 3043.29 | 2.58 | 15.57 | 357.95 | 2669.07 | 83.99 | 19.11 |
| 2009 | **Sum** | **7750** | **318** | **478** | **384** | **6187** | **9** | **0** |
| | Mean | 258.32 | 10.60 | 15.93 | 12.80 | 206.25 | 0.28 | 0 |
| | Median | 21.20 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 551.86 | 58.07 | 78.14 | 21.96 | 520.65 | 1.31 | 0 |
| 2010 | **Sum** | **5914** | **103** | **61** | **5281** | **324** | **62** | **4** |
| | Mean | 197.12 | 3.44 | 2.05 | 176.05 | 10.81 | 2.07 | 0.12 |
| | Median | 7.79 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 560.92 | 9.29 | 5.31 | 554.50 | 38.49 | 9.03 | 0.64 |
| **Total** | **Sum** | **201956** | **104523** | **1632** | **25092** | **48268** | **1495** | **13530** |

## Table 3

Notes: This table presents the total value of misconduct measured in terms of resulting conduct costs (in m US dollars at 2010 prices) initiated in each sample bank during the period 1998-2010. The data covers cases that have resulted in conduct costs of at least 1m US dollars in the sample of 30 banks during 2000-2016

| Bank | | Total | Underwr. | Compl. | Manipul. | Abuse | Individ. Cases | Sanctions |
|---|---|---|---|---|---|---|---|---|
| | **Sum** | **633** | **0** | **54** | **0** | **477** | **2** | **90** |
| AMERICAN EXPRESS CO | Mean | 48.67 | 0 | 4.17 | 0 | 36.67 | 0.19 | 6.92 |
| | Median | 5.79 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 80.18 | 0 | 15.04 | 0 | 65.44 | 0.68 | 23.28 |
| | **Sum** | **113** | **0** | **0** | **0** | **112** | **0** | **1** |
| BANCO SANTANDER SA | Mean | 8.70 | 0 | 0 | 0 | 8.61 | 0 | 0.09 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 12.53 | 0 | 0 | 0 | 12.34 | 0 | 0.31 |
| | **Sum** | **43144** | **26426** | **461** | **892** | **14439** | **1** | **31** |
| BANK OF AMERICA CORP | Mean | 3318.79 | 2032.74 | 35.49 | 68.61 | 1110.69 | 0.11 | 2.38 |
| | Median | 507.81 | 0 | 0 | 0 | 3.33 | 0 | 0 |
| | S.d. | 5834.65 | 5163.73 | 118.39 | 139.15 | 3433.88 | 0.39 | 5.47 |
| | **Sum** | **671** | **0** | **202** | **1** | **57** | **31** | **0** |
| BANK OF NEW YORK MELLON CORP | Mean | 51.65 | 0 | 15.56 | 0.10 | 4.36 | 2.39 | 0 |
| | Median | 16.21 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 79.66 | 0 | 53.38 | 0.37 | 10.94 | 8.62 | 0 |
| | **Sum** | **5119** | **326** | **91** | **4141** | **325** | **221** | **3** |
| BARCLAYS PLC | Mean | 393.76 | 25.04 | 7.03 | 318.56 | 24.97 | 16.96 | 0.20 |
| | Median | 50.49 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 688.13 | 87.85 | 18.54 | 654.17 | 50.70 | 41.79 | 0.73 |
| | **Sum** | **118** | **90** | **1** | **0** | **0** | **19** | **0** |
| BB&T CORP | Mean | 9.06 | 6.90 | 0.08 | 0 | 0 | 1.43 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 29.88 | 24.87 | 0.29 | 0 | 0 | 5.15 | 0 |
| | **Sum** | **10516** | **0** | **2** | **212** | **19** | **0** | **10186** |
| BNP PARIBAS | Mean | 808.93 | 0 | 0.18 | 16.33 | 1.45 | 0 | 783.52 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 2845.94 | 0 | 0.66 | 40.17 | 4.72 | 0 | 2825.02 |
| | **Sum** | **319** | **0** | **4** | **0** | **234** | **0** | **0** |
| CAPITAL ONE FINANCIAL CORP | Mean | 24.53 | 0 | 0.28 | 0 | 17.98 | 0 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 59.42 | 0 | 1.01 | 0 | 57.56 | 0 | 0 |
| | **Sum** | **24744** | **16055** | **89** | **3347** | **5121** | **104** | **17** |
| CITIGROUP INC | Mean | 1903.39 | 1234.98 | 6.85 | 257.44 | 393.92 | 7.99 | 1.28 |
| | Median | 848.29 | 145.24 | 2.66 | 6.54 | 7.96 | 0 | 0 |
| | S.d. | 2657.29 | 2535.73 | 9.19 | 542.50 | 665.74 | 20.41 | 4.61 |
| | **Sum** | **1268** | **0** | **15** | **277** | **0** | **0** | **976** |
| CREDIT AGRICOLE SA | Mean | 97.54 | 0 | 1.18 | 21.31 | 0 | 0 | 75.05 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 239.88 | 0 | 4.24 | 52.40 | 0 | 0 | 241.85 |
| | **Sum** | **3799** | **2180** | **20** | **64** | **422** | **651** | **334** |
| CREDIT SUISSE GROUP | Mean | 292.20 | 167.71 | 1.55 | 4.95 | 32.43 | 50.09 | 25.68 |
| | Median | 210.22 | 13.54 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 355.21 | 284.94 | 4 | 13.98 | 116.92 | 121.98 | 65.13 |
| | **Sum** | **17268** | **10552** | **109** | **3929** | **288** | **320** | **335** |
| DEUTSCHE BANK AG | Mean | 1328.28 | 811.67 | 8.39 | 302.23 | 22.13 | 24.60 | 25.76 |
| | Median | 306.47 | 0 | 1.39 | 0 | 0 | 0 | 0 |
| | S.d. | 3575.85 | 2694.74 | 21.67 | 930.51 | 72.48 | 88.71 | 83.91 |
| | **Sum** | **137** | **101** | **1** | **0** | **35** | **0** | **0** |
| FIFTH THIRD BANCORP | Mean | 10.51 | 7.74 | 0.10 | 0 | 2.67 | 0 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 27.67 | 27.89 | 0.37 | 0 | 5.88 | 0 | 0 |
| | **Sum** | **8049** | **7153** | **102** | **334** | **378** | **3** | **0** |
| GOLDMAN SACHS GROUP INC | Mean | 619.14 | 550.21 | 7.82 | 25.68 | 29.07 | 0.25 | 0 |
| | Median | 88.98 | 8.58 | 1.94 | 0 | 0 | 0 | 0 |
| | S.d. | 1533.55 | 1545.79 | 11.97 | 43.75 | 91.63 | 0.62 | 0 |

**Table 3 Continued**

| Bank | | Total | Underwr. | Compl. | Manipul. | Abuse | Individ. Cases | Sanctions |
|---|---|---|---|---|---|---|---|---|
| | **Sum** | **2602** | **626** | **11** | **1020** | **806** | **0** | **16** |
| HSBC HLDGS PLC | Mean | 200.15 | 48.18 | 0.82 | 78.47 | 62.01 | 0 | 1.19 |
| | Median | 35.57 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 397.58 | 172.84 | 2 | 187.66 | 173.09 | 0 | 3.99 |
| | **Sum** | **25** | **0** | **1** | **0** | **23** | **0** | **0** |
| ING GROEP NV | Mean | 1.90 | 0 | 0.09 | 0 | 1.80 | 0 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 6.04 | 0 | 0.34 | 0 | 6.06 | 0 | 0 |
| | **Sum** | **46166** | **29672** | **110** | **3196** | **10341** | **28** | **98** |
| JPMORGAN CHASE & CO | Mean | 3551.23 | 2282.46 | 8.45 | 245.85 | 795.47 | 2.17 | 7.53 |
| | Median | 1305.37 | 80.50 | 0 | 13.61 | 55.53 | 0 | 0 |
| | S.d. | 7225.87 | 6873.32 | 17.93 | 449.35 | 1741.28 | 6.80 | 27.14 |
| | **Sum** | **677** | **0** | **0** | **407** | **209** | **0** | **0** |
| LLOYDS BANKING GROUP PLC | Mean | 52.04 | 0 | 0 | 31.31 | 16.09 | 0 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 120.43 | 0 | 0 | 112.89 | 55.23 | 0 | 0 |
| | **Sum** | **6496** | **5210** | **147** | **59** | **971** | **19** | **0** |
| MORGAN STANLEY | Mean | 499.69 | 400.75 | 11.33 | 4.52 | 74.73 | 1.47 | 0 |
| | Median | 153.13 | 5.19 | 2.19 | 0 | 0 | 0 | 0 |
| | S.d. | 887.62 | 867 | 14.49 | 14.29 | 158.57 | 3.16 | 0 |
| | **Sum** | **374** | **8** | **0** | **0** | **366** | **0** | **0** |
| PNC FINANCIAL SVC GROUP INC | Mean | 28.78 | 0.61 | 0 | 0 | 28.18 | 0 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 55.27 | 2.18 | 0 | 0 | 55.56 | 0 | 0 |
| | **Sum** | **4757** | **1245** | **16** | **3207** | **120** | **0** | **169** |
| ROYAL BANK OF SCOTLAND GROUP | Mean | 365.90 | 95.79 | 1.20 | 246.70 | 9.23 | 0 | 12.98 |
| | Median | 55.25 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 619.61 | 226.24 | 2.71 | 456.92 | 20.25 | 0 | 31.80 |
| | **Sum** | **410** | **0** | **2** | **0** | **408** | **0** | **0** |
| SCHWAB (CHARLES) CORP | Mean | 31.57 | 0 | 0.19 | 0 | 31.38 | 0 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 113.08 | 0 | 0.47 | 0 | 113.14 | 0 | 0 |
| | **Sum** | **826** | **0** | **11** | **726** | **12** | **77** | **0** |
| SOCIETE GENERALE GROUP | Mean | 63.52 | 0 | 0.81 | 55.83 | 0.94 | 5.94 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 189.70 | 0 | 1.99 | 185.10 | 3.39 | 17.40 | 0 |
| | **Sum** | **684** | **0** | **0** | **0** | **0** | **0** | **414** |
| STANDARD CHARTERED PLC | Mean | 52.61 | 0 | 0 | 0 | 0 | 0 | 31.88 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 130.87 | 0 | 0 | 0 | 0 | 0 | 113.89 |
| | **Sum** | **534** | **0** | **2** | **0** | **517** | **1** | **0** |
| STATE STREET COR | Mean | 41.06 | 0 | 0.13 | 0 | 39.80 | 0.08 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 102.09 | 0 | 0.46 | 0 | 102.17 | 0.28 | 0 |
| | **Sum** | **1772** | **328** | **5** | **0** | **1438** | **0** | **0** |
| SUNTRUST BANKS INC | Mean | 136.28 | 25.22 | 0.41 | 0 | 110.65 | 0 | 0 |
| | Median | 1.70 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 407.87 | 70.16 | 0.79 | 0 | 341.72 | 0 | 0 |
| | **Sum** | **730** | **0** | **15** | **0** | **311** | **1** | **0** |
| TORONTO DOMINION BANK | Mean | 56.19 | 0 | 1.17 | 0 | 23.91 | 0.08 | 0 |
| | Median | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 124.75 | 0 | 3.55 | 0 | 68 | 0.30 | 0 |
| | **Sum** | **703** | **369** | **2** | **0** | **309** | **0** | **0** |
| US BANCORP | Mean | 54.09 | 28.38 | 0.16 | 0 | 23.76 | 0 | 0 |
| | Median | 14 | 0 | 0 | 0 | 0 | 0 | 0 |
| | S.d. | 81.08 | 60.81 | 0.59 | 0 | 67.09 | 0 | 0 |
| | **Sum** | **7488** | **2011** | **143** | **3279** | **1137** | **4** | **860** |
| UBS GROUP AG | Mean | 576.02 | 154.70 | 11.02 | 252.26 | 87.44 | 0.30 | 66.17 |
| | Median | 120.89 | 13.34 | 5.31 | 0 | 0 | 0 | 0 |
| | S.d. | 792.49 | 273.96 | 20.74 | 472.15 | 272.70 | 1.10 | 233.93 |
| | **Sum** | **11816** | **2173** | **14** | **0** | **9394** | **13** | **2** |
| WELLS FARGO & CO | Mean | 908.94 | 167.13 | 1.06 | 0 | 722.62 | 0.98 | 0.14 |
| | Median | 241.43 | 0 | 0 | 0 | 185.31 | 0 | 0 |
| | S.d. | 1562.66 | 420.59 | 1.56 | 0 | 1538.48 | 3.53 | 0.49 |

## Table 4

Notes: This table presents the descriptive statistics of the variables used in data analysis for the sample of 30 banks during 1998-2010. *ln(total assets)* is the natural logarithm of the value of bank's assets in millions of US dollars, *ROA* is the ratio of bank's net income to total assets (in %), *leverage* is the ratio of bank's total liabilities to total assets (in %), all retrieved from Compustat Global or North America databases. The variable *CEO bonus/salary* is the ratio of the bank's CEO bonus to salary, $ln(totalCEOcompensation)$ is the natural logarithm of total CEO compensation in thousands of US dollars, *ln(ceo stock)* is the natural logarithm of the value of bank shares held by the CEO calculated by multiplying the number of CEO shares owned (in thousands) by their price at the end of the year, available from the Execucomp database. Detrended GDP is the value of the de-trended GDP index in the country in which a bank is headquartered available from OECD short-term indicators database. The variables used for measuring the intensity of misconduct are natural logarithms of (1+the real value of misconduct starting each year in millions of US dollars). The bank-year level statistics for the number of misconduct cases reported are grouped to avoid over-weighting misconduct that results in actions from multiple parties. All continuous variables are deflated to 2010 values and winsorized at 1% and 99% of their distributions.

| | Obs. | mean | median | sd | min | max |
|---|---|---|---|---|---|---|
| *Bank balance sheet* | | | | | | |
| ln(total assets) | 390 | 12.99 | 13.19 | 1.19 | 9.60 | 14.92 |
| ROA (%) | 339 | 0.93 | 0.85 | 0.70 | -1.04 | 2.91 |
| leverage (%) | 390 | 93.18 | 93.35 | 3.00 | 84.33 | 97.83 |
| *CEO compensation* | | | | | | |
| CEO bonus/salary | 193 | 4.34 | 1.32 | 7.96 | 0.00 | 48.87 |
| CEO total compensation | 207 | 19493 | 16022 | 17776 | 71 | 113919 |
| ln(CEO total compensation) | 207 | 9.45 | 9.68 | 1.16 | 4.26 | 11.64 |
| No. shares owned by CEO | 203 | 11066 | 1021 | 44927 | 42 | 261358 |
| Value of shares held by CEO | 203 | 114165 | 48516 | 154662 | 7882 | 500559 |
| ln(Value of shares held by CEO) | 203 | 10.89 | 10.79 | 1.23 | 8.97 | 13.12 |
| *Business Cycle* | | | | | | |
| Detrended GDP Index | 390 | 100.09 | 99.98 | 1.33 | 96.86 | 103.56 |
| *Misconduct* | | | | | | |
| ln(1+total conduct costs) | 390 | 2.75 | 2.36 | 2.81 | 0 | 9.24 |
| ln(1+underwriting costs) | 390 | 1.05 | 0 | 2.26 | 0 | 8.85 |
| ln(1+abuse costs) | 390 | 1.17 | 0 | 2.11 | 0 | 7.63 |
| ln(1+individual case costs) | 390 | 0.17 | 0 | 0.72 | 0 | 4.22 |
| ln(1+compliance costs) | 390 | 0.47 | 0 | 0.98 | 0 | 4.22 |
| ln(1+market manipulation costs) | 390 | 0.77 | 0 | 1.89 | 0 | 7.31 |
| ln(1+sanctions costs) | 390 | 0.24 | 0 | 0.99 | 0 | 6.02 |
| total number of cases | 390 | 1.50 | 1 | 1.81 | 0 | 10 |
| number of underwriting cases | 390 | 0.27 | 0 | 0.66 | 0 | 4 |
| number of abuse cases | 390 | 0.42 | 0 | 0.78 | 0 | 6 |
| number of individual cases | 390 | 0.10 | 0 | 0.37 | 0 | 3 |
| number of compliance cases | 390 | 0.35 | 0 | 0.72 | 0 | 5 |
| number of market manipulation cases | 390 | 0.14 | 0 | 0.40 | 0 | 2 |
| number of sanctions cases | 390 | 0.07 | 0 | 0.27 | 0 | 2 |

## Table 5 - Total Misconduct Initiation

Notes: This table uses the sample of 30 banks over 1998-2010 in column 1 and a sample of 16 banks in columns 2-11. The dependent variable is the natural logarithm of the value of all misconduct cases starting in a given year. $cycle_t$ is de-trended GDP index in the country in which the bank is headquartered. *CEO bonus/salary*$_{t-1}$ is the ratio of CEO bonus to salary in the preceding year, *avg.CEO bonus/salary* is the average ratio of CEO bonus to total CEO remuneration over the sample period). *ln(CEO stock)*$_{t-1}$ is the natural logarithm of value of bank shares held by CEO calculated by multiplying the number of CEO shares owned ((in thousands) by their price at the end of the year. $leverage_t$ is bank leverage measured as the ratio of total bank liabilities to total bank assets (in %). *ln(assets)* is the natural logarithm of total bank assets in million US dollars and $ROA_{t-1}$ is the ratio of bank's net income to total assets. *reg. investig.*$_{t-1}$ is the number of investigations initiated by regulators against a given bank in the preceding year (grouped so that cases are not over-counted in cases of multiple regulators) that resulted in disciplinary actions against banks during 2000-2016. All variables are deflated to 2010 values and winsorized at 1% and 99% of their distributions. Standard errors clustered at the bank level are reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

| Dep. var - ln(1+total misconduct costs) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $cycle_t$ | 0.272*** | 0.248** | 0.240** | 0.192* | 0.212* | 0.137 | 0.050 | 0.135 | 0.230* | 0.234** | 0.196* |
| | (0.079) | (0.115) | (0.112) | (0.107) | (0.119) | (0.127) | (0.125) | (0.548) | (0.112) | (0.108) | (0.108) |
| CEO bonus/salary$_{t-1}$ | | 0.0002 | | | 0.001 | -2.323*** | | | -1.668*** | | |
| | | (0.019) | | | (0.019) | (0.653) | | | (0.554) | | |
| avg.CEO bonus/salary | | | 0.019 | | | | -4.608*** | | | -0.492 | |
| | | | (0.032) | | | | (1.561) | | | (0.891) | |
| ln(CEO stock)$_{t-1}$ | | | | 0.138 | 0.148 | | | -0.369 | | | -2.846 |
| | | | | (0.105) | (0.102) | | | (4.769) | | | (2.518) |
| $cycle_t$ x CEO bonus/salary$_{t-1}$ | | | | | | 0.023*** | | | | | |
| | | | | | | (0.007) | | | | | |
| $cycle_t$ x avg.CEO bonus/salary | | | | | | | 0.046*** | | | | |
| | | | | | | | (0.015) | | | | |
| $cycle_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | 0.005 | | | |
| | | | | | | | | (0.048) | | | |
| $leverage_t$ x CEO bonus/salary$_{t-1}$ | | | | | | | | | 0.018*** | | |
| | | | | | | | | | (0.006) | | |
| $leverage_t$ x avg.CEO bonus/salary | | | | | | | | | | 0.005 | |
| | | | | | | | | | | (0.009) | |
| $leverage_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | | | | 0.033 |
| | | | | | | | | | | | (0.027) |
| ln(assets)$_t$ | 1.604*** | 1.753*** | 1.755*** | 1.478*** | 1.655*** | 1.652*** | 1.740*** | 1.471*** | 1.662*** | 1.768*** | 1.509*** |
| | (0.318) | (0.320) | (0.146) | (0.231) | (0.331) | (0.316) | (0.147) | (0.240) | (0.319) | (0.151) | (0.234) |
| ROA$_{t-1}$ | -0.166 | -0.342 | 0.001 | -0.513* | -0.576* | -0.274 | 0.010 | -0.513* | -0.229 | 0.006 | -0.503* |
| | (0.221) | (0.288) | (0.228) | (0.248) | (0.302) | (0.295) | (0.235) | (0.249) | (0.303) | (0.228) | (0.258) |
| $leverage_t$ | 0.161* | 0.138 | 0.016 | 0.232** | 0.210* | 0.130 | 0.004 | 0.232** | 0.078 | 0 | -0.121 |
| | (0.080) | (0.084) | (0.050) | (0.102) | (0.115) | (0.088) | (0.046) | (0.103) | (0.090) | (0.052) | (0.361) |
| no. regulator investig.$_{t-1}$ | -0.153 | -0.119 | -0.083 | -0.074 | -0.101 | -0.169 | -0.055 | -0.074 | -0.190 | -0.083 | -0.088 |
| | (0.189) | (0.256) | (0.221) | (0.233) | (0.246) | (0.245) | (0.225) | (0.233) | (0.242) | (0.219) | (0.233) |
| Bank effects | Yes | Yes | No | Yes | Yes | Yes | No | Yes | Yes | No | Yes |
| N | 333 | 193 | 208 | 200 | 187 | 193 | 208 | 200 | 193 | 208 | 200 |
| $R^2$ | 0.137 | 0.106 | 0.525 | 0.122 | 0.110 | 0.120 | 0.534 | 0.122 | 0.119 | 0.526 | 0.124 |

## Table 6 - Misconduct in underwriting activities

Notes: This table uses the sample of 30 banks over 1998-2010 in column 1 and a sample of 16 banks in columns 2-11. The dependent variable is the natural logarithm of the value of misconduct cases related to bank underwriting activities starting in a given year. Examples of such events are the underwriting of technology firms during the dot-com boom, helping fraudulent firms such as WorldCom and Enron to raise finance, and issuing securities backed by low-quality mortgages or getting those insured. $cycle_t$ is de-trended GDP index in the country in which the bank is headquartered. *CEO bonus/salary*$_{t-1}$ is the ratio of CEO bonus to salary in the preceding year, *avg.CEO bonus/salary* is the average ratio of CEO bonus to total CEO remuneration over the sample period). *ln(CEO stock)*$_{t-1}$ is the natural logarithm of value of bank shares held by CEO calculated by multiplying the number of CEO shares owned ((in thousands) by their price at the end of the year. $leverage_t$ is bank leverage measured as the ratio of total bank liabilities to total bank assets (in %). *ln(assets)* is the natural logarithm of total bank assets in millions of US dollars and $ROA_{t-1}$ is the ratio of bank's net income to total assets. *reg. investig.*$_{t-1}$ is the number of investigations initiated by regulators against a given bank in the preceding year (grouped so that cases are not over-counted in cases of multiple regulators) that resulted in disciplinary actions against banks during 2000-2016. All variables are deflated to 2010 values and winsorized at 1% and 99% of their distributions. Standard errors clustered at the bank level are reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

| Dep. var - ln(1+ underwriting costs) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $cycle_t$ | 0.379*** | 0.518** | 0.536*** | 0.472** | 0.498** | 0.331* | 0.107 | -0.775 | 0.503** | 0.501*** | 0.481** |
| | (0.127) | (0.183) | (0.170) | (0.178) | (0.185) | (0.170) | (0.138) | (0.935) | (0.179) | (0.161) | (0.171) |
| CEO bonus/salary$_{t-1}$ | | 0.035 | | | 0.032 | -3.878*** | | | -1.416* | | |
| | | (0.025) | | | (0.025) | (0.898) | | | (0.679) | | |
| avg.CEO bonus/salary | | | 0.063* | | | | -10.394*** | | | -3.190*** | |
| | | | (0.033) | | | | (1.475) | | | (1.021) | |
| ln(CEO stock)$_{t-1}$ | | | | 0.161 | 0.165 | | | -10.973 | | | -7.493* |
| | | | | (0.167) | (0.189) | | | (8.769) | | | (4.002) |
| $cycle_t$ x CEO bonus/salary$_{t-1}$ | | | | | | 0.039*** | | | | | |
| | | | | | | (0.009) | | | | | |
| $cycle_t$ x avg.CEO bonus/salary | | | | | | | 0.105*** | | | | |
| | | | | | | | (0.015) | | | | |
| $cycle_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | 0.112 | | | |
| | | | | | | | | (0.088) | | | |
| $leverage_t$ x CEO bonus/salary$_{t-1}$ | | | | | | | | | 0.015** | | |
| | | | | | | | | | (0.007) | | |
| $leverage_t$ x avg.CEO bonus/salary | | | | | | | | | | 0.035*** | |
| | | | | | | | | | | (0.011) | |
| $leverage_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | | | | 0.084* |
| | | | | | | | | | | | (0.045) |
| ln(assets)$_t$ | 0.326 | 0.576 | 0.997*** | 0.382 | 0.511 | 0.406 | 0.962*** | 0.230 | 0.496 | 1.075*** | 0.460 |
| | (0.206) | (0.368) | (0.175) | (0.312) | (0.388) | (0.334) | (0.170) | (0.335) | (0.342) | (0.190) | (0.317) |
| ROA$_{t-1}$ | 0.121 | -0.088 | 0.040 | -0.131 | -0.197 | 0.027 | 0.062 | -0.128 | 0.010 | 0.073 | -0.106 |
| | (0.269) | (0.381) | (0.274) | (0.306) | (0.362) | (0.394) | (0.262) | (0.303) | (0.406) | (0.260) | (0.301) |
| $leverage_t$ | 0.136* | 0.117 | 0.104 | 0.159 | 0.140 | 0.103 | 0.078 | 0.165 | 0.065 | 0.007 | -0.747 |
| | (0.078) | (0.101) | (0.060) | (0.110) | (0.111) | (0.102) | (0.054) | (0.106) | (0.098) | (0.054) | (0.508) |
| no. regulator investig.$_{t-1}$ | -0.170 | -0.210 | -0.228 | -0.189 | -0.210 | -0.294 | -0.165 | -0.189 | -0.271 | -0.228 | -0.224 |
| | (0.241) | (0.286) | (0.311) | (0.330) | (0.287) | (0.271) | (0.276) | (0.323) | (0.282) | (0.281) | (0.320) |
| Bank effects | Yes | Yes | No | Yes | Yes | Yes | No | Yes | Yes | No | Yes |
| N | 333 | 193 | 208 | 200 | 187 | 193 | 208 | 200 | 193 | 208 | 200 |
| $R^2$ | 0.105 | 0.142 | 0.382 | 0.128 | 0.145 | 0.180 | 0.443 | 0.142 | 0.151 | 0.402 | 0.141 |

## Table 7 - Customer abuse

Notes: This table uses the sample of 30 banks over 1998-2010 in column 1 and a sample of 16 banks in columns 2-11. The dependent variable is the natural logarithm of the value of misconduct cases related to bank disadvantaging its clients systematically starting in a given year. Examples of such cases are overcharging for products, selling unsuitable services or products, predatory lending or foreclosure abuses that are not limited to a single event or a single counter-party. $cycle_t$ is de-trended GDP index in the country in which the bank is headquartered. *CEO bonus/salary*$_{t-1}$ is the ratio of CEO bonus to salary in the preceding year,*avg.CEO bonus/salary* is the average ratio of CEO bonus to total CEO remuneration over the sample period). *ln(CEO stock)*$_{t-1}$ is the natural logarithm of value of bank shares held by CEO calculated by multiplying the number of CEO shares owned ((in thousands) by their price at the end of the year. $leverage_t$ is bank leverage measured as the ratio of total bank liabilities to total bank assets (in %). *ln(assets)* is the natural logarithm of total bank assets in millions of US dollars and $ROA_{t-1}$ is the ratio of bank's net income to total assets. *reg. investig.*$_{t-1}$ is the number of investigations initiated by regulators against a given bank in the preceding year (grouped so that cases are not over-counted in cases of multiple regulators) that resulted in disciplinary actions against banks during 2000-2016. All variables are deflated to 2010 values and winsorized at 1% and 99% of their distributions. Standard errors clustered at the bank level are reported in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

| Dep. var - ln(1+cost of custom. abuse) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $cycle_t$ | 0.107 | 0.017 | -0.010 | -0.009 | -0.001 | -0.038 | 0.063 | 0.525 | 0.005 | -0.002 | -0.006 |
| | (0.095) | (0.132) | (0.126) | (0.139) | (0.148) | (0.145) | (0.141) | (0.567) | (0.132) | (0.129) | (0.141) |
| CEO bonus/salary$_{t-1}$ | | 0.014 | | | 0.016 | -1.124 | | | -1.021 | | |
| | | (0.017) | | | (0.016) | (1.078) | | | (1.050) | | |
| avg.CEO bonus/salary | | | -0.097** | | | | 1.681 | | | 0.592 | |
| | | | (0.038) | | | | (2.422) | | | (0.916) | |
| ln(CEO stock)$_{t-1}$ | | | | 0.002 | 0.017 | | | 4.769 | | | -2.674 |
| | | | | (0.122) | (0.126) | | | (4.673) | | | (3.556) |
| $cycle_t$ x CEO bonus/salary$_{t-1}$ | | | | | | 0.011 | | | | | |
| | | | | | | (0.011) | | | | | |
| $cycle_t$ x avg.CEO bonus/salary | | | | | | | -0.018 | | | | |
| | | | | | | | (0.024) | | | | |
| $cycle_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | -0.048 | | | |
| | | | | | | | | (0.047) | | | |
| $leverage_t$ x CEO bonus/salary$_{t-1}$ | | | | | | | | | 0.011 | | |
| | | | | | | | | | (0.011) | | |
| $leverage_t$ x avg.CEO bonus/salary | | | | | | | | | | -0.007 | |
| | | | | | | | | | | (0.010) | |
| $leverage_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | | | | 0.029 |
| | | | | | | | | | | | (0.039) |
| ln(assets)$_t$ | 0.927*** | 1.399*** | 1.025*** | 1.208*** | 1.489*** | 1.349*** | 1.031*** | 1.272*** | 1.342*** | 1.008*** | 1.235*** |
| | (0.192) | (0.317) | (0.214) | (0.216) | (0.321) | (0.347) | (0.217) | (0.256) | (0.325) | (0.207) | (0.204) |
| $ROA_{t-1}$ | -0.364 | -0.624* | -0.213 | -0.467 | -0.611 | -0.590* | -0.216 | -0.468 | -0.554* | -0.220 | -0.459 |
| | (0.243) | (0.296) | (0.218) | (0.283) | (0.367) | (0.303) | (0.218) | (0.282) | (0.276) | (0.219) | (0.289) |
| $leverage_t$ | 0.078 | 0.140 | 0.030 | 0.167 | 0.134 | 0.136 | 0.035 | 0.165 | 0.103 | 0.051 | -0.149 |
| | (0.085) | (0.113) | (0.049) | (0.130) | (0.144) | (0.116) | (0.049) | (0.131) | (0.119) | (0.052) | (0.416) |
| no. regulator investig.$_{t-1}$ | -0.015 | -0.131 | -0.060 | -0.088 | -0.140 | -0.156 | -0.070 | -0.088 | -0.175 | -0.060 | -0.101 |
| | (0.292) | (0.415) | (0.368) | (0.400) | (0.413) | (0.422) | (0.375) | (0.400) | (0.441) | (0.370) | (0.400) |
| Bank effects | Yes | Yes | No | Yes | Yes | Yes | No | Yes | Yes | No | Yes |
| N | 333 | 193 | 208 | 200 | 187 | 193 | 208 | 200 | 193 | 208 | 200 |
| $R^2$ | 0.063 | 0.079 | 0.202 | 0.075 | 0.085 | 0.082 | 0.204 | 0.077 | 0.083 | 0.203 | 0.076 |

## Table 8 - Market manipulation

Notes: This table uses the sample of 30 banks over 1998-2010 in column 1 and a sample of 16 banks in columns 2-11. The dependent variable is the natural logarithm of the value of misconduct cases related to a bank attempting to manipulate prices of assets or services starting in a given year. Examples of such cases are manipulation of benchmark interest rates or currency prices as well as collusion in prices of bank services. $cycle_t$ is de-trended GDP index in the country in which the bank is headquartered. *CEO bonus/salary*$_{t-1}$ is the ratio of CEO bonus to salary in the preceding year, *avg.CEO bonus/salary* is the average ratio of CEO bonus to total CEO remuneration over the sample period). *ln(ceo stock)*$_{t-1}$ is the natural logarithm of value of bank shares held by CEO calculated by multiplying the number of CEO shares owned ((in thousands) by their price at the end of the year. $leverage_t$ is bank leverage measured as the ratio of total bank liabilities to total bank assets (in %). *ln(assets)* is the natural logarithm of total bank assets in millions of US dollars and $ROA_{t-1}$ is the ratio of bank's net income to total assets. *reg. investig.*$_{t-1}$ is the number of investigations initiated by regulators against a given bank in the preceding year (grouped so that cases are not over-counted in cases of multiple regulators) that resulted in disciplinary actions against banks during 2000-2016. All variables are deflated to 2010 values and winsorized at 1% and 99% of their distributions. Standard errors clustered at the bank level are in parentheses. Statistical significance at the 1%, 5% and 10% level is indicated by ***, **, and *, respectively.

| Dep. var - ln(total cost of market manipulation) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $cycle_t$ | 0.223*** | 0.093** | 0.095** | 0.073* | 0.099** | -0.026 | 0.042 | 0.264 | 0.078** | 0.099** | 0.075** |
| | (0.061) | (0.037) | (0.043) | (0.038) | (0.042) | (0.039) | (0.043) | (0.248) | (0.036) | (0.046) | (0.035) |
| CEO bonus/salary$_{t-1}$ | | -0.004 | | | -0.006 | -2.498*** | | | -1.402 | | |
| | | (0.014) | | | (0.014) | (0.362) | | | (0.811) | | |
| avg.CEO bonus/salary | | | 0.035* | | | | -1.248 | | | 0.477 | |
| | | | (0.020) | | | | (0.931) | | | (0.925) | |
| ln(CEO stock)$_{t-1}$ | | | | -0.014 | 0.016 | | | 1.690 | | | -1.766 |
| | | | | (0.154) | (0.145) | | | (2.190) | | | (2.811) |
| $cycle_t$ x CEO bonus/salary$_{t-1}$ | | | | | | 0.025*** | | | | | |
| | | | | | | (0.004) | | | | | |
| $cycle_t$ x avg.CEO bonus/salary | | | | | | | 0.013 | | | | |
| | | | | | | | (0.009) | | | | |
| $cycle_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | -0.017 | | | |
| | | | | | | | | (0.021) | | | |
| $leverage_t$ x CEO bonus/salary$_{t-1}$ | | | | | | | | | 0.015 | | |
| | | | | | | | | | (0.009) | | |
| $leverage_t$ x avg.CEO bonus/salary | | | | | | | | | | -0.005 | |
| | | | | | | | | | | (0.010) | |
| $leverage_t$ x ln(CEO stock)$_{t-1}$ | | | | | | | | | | | 0.019 |
| | | | | | | | | | | | (0.032) |
| ln(assets)$_t$ | 1.004** | 0.930* | 0.590*** | 0.607 | 0.914* | 0.821 | 0.586*** | 0.631 | 0.853 | 0.580*** | 0.625* |
| | (0.390) | (0.486) | (0.180) | (0.358) | (0.474) | (0.498) | (0.182) | (0.379) | (0.502) | (0.168) | (0.349) |
| ROA$_{t-1}$ | -0.210 | -0.257 | -0.176 | -0.174 | -0.282 | -0.184 | -0.173 | -0.175 | -0.163 | -0.180 | -0.169 |
| | (0.190) | (0.219) | (0.176) | (0.178) | (0.194) | (0.193) | (0.178) | (0.180) | (0.165) | (0.178) | (0.184) |
| $leverage_t$ | 0.123 | 0.038 | -0.031 | 0.042 | 0.041 | 0.029 | -0.034 | 0.041 | -0.012 | -0.018 | -0.165 |
| | (0.077) | (0.077) | (0.037) | (0.063) | (0.078) | (0.069) | (0.039) | (0.064) | (0.071) | (0.031) | (0.362) |
| no. regulator investig.$_{t-1}$ | 0.142 | 0.125 | 0.105 | 0.162 | 0.112 | 0.072 | 0.113 | 0.162 | 0.066 | 0.105 | 0.154 |
| | (0.128) | (0.127) | (0.155) | (0.117) | (0.120) | (0.135) | (0.160) | (0.117) | (0.133) | (0.151) | (0.113) |
| Bank effects | Yes | Yes | No | Yes | Yes | Yes | No | Yes | Yes | No | Yes |
| N | 333 | 193 | 208 | 200 | 187 | 193 | 208 | 200 | 193 | 208 | 200 |
| $R^2$ | 0.123 | 0.102 | 0.283 | 0.068 | 0.098 | 0.140 | 0.285 | 0.068 | 0.123 | 0.284 | 0.069 |

## Appendix 1 - Misconduct Types

Notes: This table provides an overview of the different classes of misconduct used in this paper.

| Class | Description | Examples | Sample cases |
|---|---|---|---|
| Underwriting | Cases related to issuing or underwriting securities (own shareholder suits not included). | Mortgage backed securities fraud; underwriting the shares and bonds of fraudulent Enron and Worldcom and helping the firms to conceal their real financial situation; conflict of interest in investment banks related to underwriting and selling technology stock. | December 2016: Deutsche bank fined 7.2b US dollars by the DoJ for packaging and selling subprime mortgage backed securities.<br><br>December 2002: Major investment banks and regulators signed a settlement agreement and agreed to pay 1.4b US dollars for conflicts of interest between brokerage and research analyst businesses during the dot-com boom.<br><br>March 2005: Goldman Sachs settled a class action suit for 11m US dollars for helping WorldCom sell billions in bonds in the two years leading up to its bankruptcy. |
| Disadvantaging | Cases related to banks not acting in the best interest of clients, or abusing them on a systematic basis. Not included: individual cases that resulted from employee initiatives or individual cases involving a single firm, PPI provisions, market timing/proprietary trading cases. | Foreclosures; predatory lending; overcharging for services/products; issuing bad advice; selling too complex securities to inexperienced investors; overstating the liquidity of auction rate securities; abuses in IPO allocation processes. | April 2011: 14 largest U.S. mortgage servicers agreed to pay back homeowners their losses related to loan foreclosures.<br><br>January 2011: Barclays ordered to pay 67.7m GBP in fines and restitutions by FSA for selling risky assets to investors near retirement age and unsophisticated investors.<br><br>January 2011: Bank of America settled a 410m US dollar class action for manipulating debit transactions so as to maximise overdraft fees if customer account balance was exceeded.<br><br>August 2008: Citi bank fined 600m US dollars by regulators for marketing and selling auction rate securities as safe and liquid products when they faced increasing liquidity risk. |
| Manipulation | Attempts to collude and manipulate prices. | Include cases related to colluding when setting the costs of retail banking services; attempts to manipulate asset prices or benchmark rates. | December 2013: The European Commission imposed fines totaling 1.49b euro on a number of banks for participating in the interest rate derivatives cartels in various currencies.<br><br>September 2010: The French Competition Authority fined 11 firms including Crdit Agricole, BNP Paribas and Societe Generale 385m euros for colluding on the price for clearing checques electronically. |
| Compliance | Cases related to failings in compliance in reporting or adhering to regulations. These cases also encompass actions by regulators resulting from banks trading on client money or not training staff to give proper advice. | Reporting failures; failures in brokerage where the trades executed were not the most beneficial to the banks' clients; failing to segregate client money in trading accounts; failing to preserve emails; capital overstatements. | December 2013: FINRA fined Barclays 3.75m US dollars for allegedly failing to keep proper electronic records, emails and instant messages.<br><br>September 2015: SEC fined Credit Suisse 4.25m US dollars for submitting deficient information about trades by its customers.<br><br>March 2005: FINRA fined JP Morgan 2m US dollars for offering customers class B and C shares whereas class A shares might have been more suitable.<br><br>May 2005: Citigroup Inc, Morgan Stanley, UBS AG and Wells Fargo & Co fined and ordered restitution of 9.1m US dollars by FINRA for selling leveraged and inverse exchange-traded funds "without reasonable supervision." |

## Appendix 1 - Misconduct Types, continued

Notes: This table provides an overview of the different classes of misconduct used in this paper.

| Class | Description | Examples | Sample cases |
|---|---|---|---|
| Sanctions/ laundering/ taxes | Dealing with individuals or institutions in countries subject to US sanctions, money laundering, helping bank clients avoid taxation. | Cases related to doing business on behalf on entities from countries subject to US sanctions such as Cuba, Iran and Syria; cases related to helping laundering money; cases related to helping clients avoid taxes. | June 2014: BNP Paribas fined 8.97b US dollars by OFAC and Federal Reserve Board for processing transactions to or through U.S. financial institutions that involved countries, entities, and/or individuals subject to the sanctions programs administered by OFAC.<br>December 2012: HSBC was fined 1.92b US dollars for laundering Mexican drug money by the OCC, Federal Reserve Board and OFAC.<br>June 2015: Societe Generale fined 17.8m US dollars by the DoJ for helping U.S. taxpayers to hide foreign accounts and evade their U.S. tax obligations. |
| Individual cases | Cases resulting from bad judgement by bank employees, individual cases of disadvantaging a single firm/client. | Cases related to bank employees misappropriating funds from client accounts; rogue trading; cases that involved disadvantaging a single firm or client/breaking a contract. | October 2012: Citi fined 2m US dollars by SEC and Massachusetts Secretary of the Commonwealth for failing to supervise an employee that emailed some research to journalists who later published some of the information in a blog post.<br>February 2014: Barclays paid 141m US dollars to CITI for providing foreign exchange services to a unit of Lehman Brothers Holdings Inc soon after Lehman's bankruptcy, with Barclays promising to repay the losses but Barclays refused to honor it.<br>September 2005: Morgan Stanley fined 6m US dollars for failing to supervise a worker who misappropriated funds from clients for 13 years.<br>June 2006: Deutsche bank and Credit Suisse agreed to pay 316m US dollars each to settle a case in which they were accused by Huntsman corporation for its failed takeover deal. |
| Other cases | Cases that cannot be assigned to a specific category | Placing robo calls; recording calls; market timing/proprietary trading; involvement in Ponzi schemes. | July 2015: HSBC settled a class action related to recording debt-collection calls without consent of consumers for 5.5m US dollars.<br>March 2004: Bank of America was fined 375m US dollars by the Sec and NY Attorney General for market timing and improper trading.<br>November 2012: BNY Mellon paid 210m US dollars for suggesting investors to invest with Bernard L. Madoff. |