

Bank Liquidity Creation and Supervisory Enforcement Actions

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Abstract

We investigate how formal enforcement actions imposed on US banks from 2001:Q1 to 2024:Q4, for misconduct related to various infringements, affect banks' liquidity creation. We document that, on average, banks' liquidity creation is curtailed by the enactment of an enforcement action, primarily on the liability and off-balance-sheet sides in the quarter following the sanction. Interestingly, our results show that formal enforcement actions constrain even the asset-side liquidity creation from the third quarter post the misconduct sanction is made public. Additionally, monetary penalties divert bank resources, thereby instantly curbing liquidity creation on the asset side as well. The nature of misconduct appears to be the most critical determinant of reduced liquidity creation. Our findings suggest that Class 1 actions, cease-and-desist orders, and misconduct sanctions by the FDIC have a more damaging effect on banks' capacity to create liquidity. Additionally, we find that opacity and social capital act as important moderators by impacting liquidity creation through bank misconduct in opposite directions due to factors such as public trust, bank reputation, and the opportunistic behaviour of bank management. Furthermore, we also show that bank size, equity capital and funding structure influence the link between formal enforcement actions and liquidity creation. We also implement a staggered quasi-natural experiment with a one-quarter anticipation period to reinforce our findings. Finally, we detect that the funding liquidity multiplier and bank profitability mediate the path from formal enforcement actions to bank liquidity creation.

Keywords: Bank liquidity creation, enforcement actions, social capital, opacity

JEL Classification: G20, G21

1. Introduction

The banking sector is one of the most strictly regulated industries, yet there are cases of fraudulent activities and excessive risk-taking by banks that impose heavy economic costs and generate negative externalities (Alexander and Cumming, 2020; Gowin et al., 2021; Pereira et al., 2019; Stulz, 2016; Zingales, 2015). Wider recognition of the potential adverse consequences of bank misconduct, coupled with its increasing frequency and scale, contributed to international initiatives by the Financial Stability Board³ to develop measures to reduce misconduct risk and a toolkit to mitigate misconduct risk. The dual goals of banking supervision are to assess the financial health of banks and evaluate their adherence to banking rules and policies. Inadequate regulation oversight plays a pivotal role in creating the conditions for a financial crisis, underscoring the need for effective and efficient regulatory actions to ensure a robust supervisory process. The Global Financial Crisis of 2008 reinforced the notion that "fraud has become a feature and not a bug" of the financial system (Zingales, 2015). In the banking industry, regulation is indispensable for preventing, mitigating, and addressing the adverse real effects of financial crises. However, such regulations are rendered ineffective in the absence of supervision and rigorous enforcement. Therefore, regulatory enforcement actions serve the purposes of having a disciplinary effect (Bhattacharya et al., 2002), fostering a culture of ethical banking practices (BCBS, 2015), and serving as a warning to institutions that are not yet sanctioned (Caiazza et al., 2018). Generally, enforcement actions have both financial and social repercussions for the sanctioned banks as well as the broader economy (Cardillo et al., 2024). These sanctions often remain in effect for extended periods, which can cause financial harm and reputational loss for the banks.

Banks often report that their common equity tier 1 ratios and net revenues are negatively impacted by misconduct provisions (Morrison, 2018; Nicholas, 2019). Even the proportion of bank demand deposits declines, whereas the proportion of core deposits increases following enforcement actions, reflecting a shift toward more stable funding sources and an improvement in the risk-bearing capacity of banks (Pereira et al., 2019). Along the same lines, Delis et al. (2017) find that total bank risk is reduced post an enforcement action by lowering risky loans and increasing the lending standards. All these actions impact the core bank activity of liquidity creation. Banks create liquidity by providing funds to the non-bank public. They finance relatively illiquid assets with relatively liquid liabilities and also create liquidity through off-

³ The Financial Stability Board is an international body established in the 2009 G20 Summit as a successor to the Financial Stability Forum to monitor and make recommendations about the global financial system.

balance sheet activities. Given that liquidity creation is a core function of banks, it is essential to understand how misconduct by banks affects this primary function. Therefore, this paper studies misconduct in the banking sector and links it to bank liquidity creation.

Supervisory bodies levy enforcement actions on banks for violations of rules, laws, regulations, unsafe or unsound practices, breaches of fiduciary duty, and orders violations (Fed, 2015). These actions can be informal or formal. Informal actions are applied to relatively less severe cases of misconduct and are not legally enforceable or publicly available (FDIC, 2012; OCC, 2007). These are usually voluntary commitments undertaken by the bank's board members to address identified discrepancies through commitment letters, memoranda of understanding, and approved safety and soundness plans. In contrast, formal enforcement actions are statutorily authorised or mandated, legally enforceable, and subject to public disclosure. A formal supervisory enforcement action, hereafter FEA, signals the bank's level of distress to the public. It provides stakeholders with new credible information regarding its financial health, internal weaknesses, and compliance issues, thereby reducing informational asymmetry and allowing stakeholders to make informed decisions.

To study how misconduct affects bank liquidity creation, hereafter BLC, we empirically examine two alternative hypotheses – the "Cost View" and the "Reputational View"- for a sample of 996 US commercial banks from 2001:Q1 to 2024:Q4. On one hand, the cost view suggests that FEAs-related restrictions, higher regulatory monitoring, and increased public scrutiny have an adverse effect on liquidity creation by banks. On the other hand, the reputational view suggests that sanctioned banks put in extra effort to avoid losing business due to the reputational stigma of misconduct, which can increase bank liquidity creation.

To test the above views, we collect first hand data on FEAs against commercial banks and create three measures to identify bank misconduct: dummy, count, and monetary penalty, using information reported on the websites of the three main banking supervisors in the US: the Federal Reserve (FR), the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC). Our dummy measure indicates whether a bank engages in misconduct, which equals one for the quarter during which an enforcement action is imposed on a bank and zero otherwise. The count measure captures the intensity of misconduct by considering the number of misconduct instances for a bank in a quarter. Finally, the penalty measure represents the direct costs of misconduct and is constructed by calculating the total penalty amount paid by a bank in a quarter.

Subsequently, we match the misconduct banks with our liquidity creation data constructed from the call reports available on the Bank Regulatory Data by WRDS. Our main

measure of BLC is validated with the liquidity creation measure of [Berger and Bouwman \(2009\)](#). Controlling for bank characteristics and bank and quarter fixed effects, we document a negative relationship between formal supervisory regulatory actions and bank liquidity creation. Our baseline results indicate that when an FEA is imposed on a bank, the liquidity created in the quarter following the sanction contracts by 0.66 percentage points of the bank's total gross assets. This result aligns with the cost view hypothesis, suggesting that the direct and indirect costs of misconduct hinder the liquidity creation process of banks. The negative relation is driven by a reduction in liability-side and off-balance-sheet-side activities. Additionally, this negative relationship is also consistent with the count and monetary penalty measures of misconduct, which indicates that bank misconduct constrains banks' ability to create liquidity. In cases of monetary penalty sanctions, the negative impact is attributed to a reduction in liquidity creation from the asset side due to resource constraints. For robustness, we construct bank liquidity hoarding (BLH) as an alternate specification to liquidity creation and document a positive association with monetary penalties. Our results indicate that the monetary sanctions curtail liquidity creation in the same quarter in which they are imposed, as such penalties directly constrain banks' available funds.

Furthermore, we also examine which class, action type, and regulatory body exerts the greatest influence on liquidity creation, and through which sides of the balance sheet. We find that the nature of misconduct plays the most important role in curbing liquidity creation. We also test the contributions of their interaction terms on BLC and its components. Our findings suggest that Class 1 actions, Cease and Desist orders, and sanctions by the FDIC have a more damaging effect on banks' capacity to create liquidity, primarily from the liability and off-balance sheet sides. When supervisory bodies sanction banks for maintaining inadequate capital and provisions and poor asset quality, banks reduce their risky activities by reducing their exposure to off-balance sheet activities and move their focus from demand deposits to core deposits and other stable sources of funds. This impact on liquidity creation is also noticed for sanctions, which require banks to stop unsafe, unsound, or illegal banking practices and correct deficiencies diagnosed in their balance sheets to maintain financial stability. Additionally, monetary sanctions for unsafe and unsound practices related to internal controls and bank secrecy (*Class 2*CMP*), FEAs imposed by the FR for misconduct related to capital adequacy and asset quality (*Class 1*FR*), and fitness and propriety of institution-affiliated parties (*Class 3*FR*) lead to a prominent reduction in the liquidity created by banks. Moreover, since written agreements regarding infringements of specific laws (*Class 4*WA*) are the least

severe FEAs, banks can create more liquidity without the fear of reputational stigma or the costs associated with severe enforcement actions.

Our results show that the link between FEA and liquidity creation is influenced by the banks' size, equity capital and funding structure. Since the civil money penalty amount is determined by factors such as asset size, capital level and overall financial condition (FDIC, 2024), monetary penalties impact the BLC of larger banks the most. We also note the heterogeneous impact of banks that face more than one misconduct provision and banks that face just one FEA on the level of liquidity created. From this perspective, our data and analysis provide both depth and breadth to the empirical design, yielding compelling results. Moreover, using path analysis, we report that the path from FEAs to BLC is mediated by the funding liquidity multiplier and bank profitability, with around 36% of the total path being attributed to this mediated path.

In addition, we investigate two moderators – Opacity (an internal moderator) and Social Capital (an external moderator) – to check if these factors impact the negative association between misconduct and BLC. Specifically, we document that the negative effect of FEAs on liability and off-balance sheet sides of liquidity creation is more pronounced for banks that are more opaque due to high information asymmetry and weakened public trust. In contrast, social capital is seen to have a mitigating effect on bank liquidity, created on both the liability and off-balance sheet sides of the balance sheet, which can be attributed to the public's increased trust in their banking institutions and their management. Furthermore, opacity and social capital moderate the negative association between misconduct and asset-side bank liquidity creation in opposing directions; while opacity strengthens the negative impact, social capital mitigates it. Thus, the results demonstrate that opacity and social capital are important moderators through which misconduct affects the main role of banks.

Finally, our baseline results remain robust to a battery of additional tests, including controlling for additional bank-level variables, treatment effects model propensity score matching, entropy balancing and the staggered quasi-natural experimental study. Following the literature, we identify a list of instruments such as examiners' salaries, tenure, number of examiners, property crime rates, and educational attainment (Delis et al., 2019; Thornton et al., 2025). Using these IVs, the negative effect of misconduct on BLC becomes more potent compared to our baseline estimates. Beyond this, we utilise a sample of sanctioned and non-sanctioned banks to conduct an event study based on the staggered quasi-natural experiment. Since banks are initially subjected to informal actions when minor problems are detected, we

assume a one-quarter anticipation period for FEAs. Consistent with our previous results, we find that misconduct banks decreased liquidity creation after being imposed with an FEA.

We contribute to the literature in a number of ways. First, unlike [Danisewicz et al. \(2018\)](#), we measure misconduct in three distinct ways: a dummy measure indicates whether a bank engages in misconduct or not; a count measure captures the intensity of misconduct; and a penalty measure represents the direct costs of misconduct. These three measures enable us to capture various dimensions by which a bank's most important function is curtailed. Second, we create bank liquidity hoarding as an alternate specification to liquidity creation to test the robustness of our results. Third, to gain an in-depth understanding of which specific components of misconduct play a crucial role in reducing BLC, we dissect misconduct by action type, class, and the supervisory body imposing the FEA, reporting their differential impact and how they interact with each other to impair a bank's liquidity creation. This examination provides a thorough picture of the bearing that the types of FEAs have on BLC. Fourth, our results also provide new evidence suggesting that opacity and social capital are important internal and external moderators through which misconduct impacts BLC. Finally, through subsample analyses, we document that bank size, equity capital and funding structure also influence the strength of the linkage between misconduct provisions and BLC.

Our analysis complements the extensive literature on bank misconduct, focusing on the creation of liquidity by commercial banks in the US. We contribute to the understanding of the determinants of bank liquidity creation. Bank misconduct adversely results in societal costs as banks incur financial and reputational penalties that diminish their ability to create liquidity. While most previous studies focus on a single dimension of misconduct ([Bertsch et al, 2020](#); [Boni et al., 2021](#); [Papadimitri et al., 2019](#); [Roman, 2020](#)), we examine various types of FEAs and capture their differential impact. Our findings have potential importance for regulators concerned about the differential effects of various types of FEAs on banks' ability to create liquidity. Our study is notable for understanding the cost of operational risk for banks ([Chernobai et al., 2011](#)). For bank management, our results provide insights into evaluating which type of misconduct would be most detrimental to the bank's functioning. Furthermore, bank misconduct can also impact the real economy, as restrictive sanctions imposed on such banks curtail their financial intermediation process. Hence, our findings inform policymakers about the implications of different FEAs on banks' role as liquidity creators in the economy.

The rest of the essay proceeds as follows. [Section 2](#) reviews the related literature and develops hypotheses, and [Section 3](#) provides background information on the supervisory regulatory bodies. [Section 4](#) motivates our study through a case study. [Section 5](#) presents the

data and variable description. Preliminary analysis and empirical strategy are described in [Section 6](#). [Section 7](#) presents the empirical results. Finally, [Section 8](#) concludes the study.

2. Related literature and hypotheses development

2.1. Bank misconduct and liquidity creation

Our empirical analysis builds upon two emerging streams of research. First, our work adds to the relatively small body of literature on bank liquidity creation, and second, it enhances the literature on bank misconduct. Given that banks exist to perform the qualitative asset transformation ([Bhattacharya and Thakor, 1993](#)), papers have empirically examined the role of bank liquidity creation in economic growth and the macroeconomy. [Berger and Sedunov \(2017\)](#) and [Davydov et al. \(2018\)](#) document that liquidity creation is positively related to economic output, growth, and fluctuations in the business cycle. Furthermore, [Fungacova et al. \(2015\)](#), using data from Russian banks for the period 2000-2007, find that banks with liquidity creation ratios exceeding the 90th percentile in four subsequent quarters have a higher probability of failure. The more liquidity a bank creates, the more sensitive it becomes to liquidity risk ([Allen and Gale, 2004](#); [Allen and Santomero, 1997](#)), and the more vulnerable it is to bank runs. In contrast, [Zheng et al. \(2019\)](#), using a sample of FDIC-insured U.S. institutions between the period 2003:Q1-2014:Q4, show that banks that create less liquidity are more likely to fail. In the same vein, [Chatterjee \(2018\)](#) documents that declining on-balance sheet liquidity creation serves as an early indicator of crisis by signalling recessions four quarters into the future. This suggests that the inability of banks to perform their core function signals trouble, as such banks have extremely low capital buffers to absorb the liquidity risk. Additionally, [Davydov et al. \(2021\)](#) examine the link between bank liquidity creation and systemic risk using quarterly data on US BHCs from 2003 to 2016, and find that liquidity creation curtails the contribution of individual banks to systemic risk.

Prior studies also document several determinants of bank liquidity creation within four broad areas in the literature. First, the bank-specific variables literature documents that higher capital increases liquidity creation in large banks but shrinks liquidity creation in small banks ([Berger and Bouwman, 2009](#)). In addition, higher disclosure quality provides higher transparency and reduces the likelihood of bank runs, thereby increasing the liquidity created by banks ([Khoo et al., 2024](#)). Similarly, [Wang \(2022\)](#) demonstrates that accounting restatements lead to a significant reduction in bank liquidity creation, as banks increase their liquid assets and decrease illiquid assets on their balance sheet. Moreover, banks increase their

liability-side liquidity creation but reduce asset-side and off-balance sheet liquidity creation when entering stress tests to avoid failing them (Nguyen et al., 2020). Second, the market structure literature indicates that heightened bank competition increases the fragility of banks by eroding profits, thereby weakening the capital buffer that absorbs adverse shocks and leading to decreased bank liquidity due to limited risk-taking capacity (Horvath et al., 2016; Jiang et al., 2019). Third, the literature on market conditions reports that banks create lower liquidity, especially from the liability side, when labour market conditions are weak (Niu, 2022). Similarly, bank liquidity creation is reduced in the presence of home-country guarantees (Berger et al, 2024), but is largely unaffected by monetary policy (Berger and Bouwman, 2017). Furthermore, greater ESG performance leads to increased liquidity creation, with higher prominence in countries that face increased geopolitical and corruption risks, as well as reduced levels of democratization (Lee et al., 2024). Fungacova et al. (2017) document that high-liquidity-creating banks are larger in size, less capitalized, riskier, with a lower Z-score, a higher loans-to-assets ratio, a lower liquid assets-to-total assets ratio, and rely on deposits from firms rather than households, with a greater gear towards corporate than individual loans. This shows that financial fragility is an inherent characteristic of bank liquidity creation. Finally, the literature on bank regulation posits that banks with better governance (Díaz and Huang, 2017), optimistic CEOs (Huang et al., 2018), managers with higher ability (Andreou et al., 2017), or common ownership (Khoo et al., 2024) tend to create higher levels of liquidity. In addition, Fungacova et al. (2017) suggest that bank regulators should jointly consider deposit insurance and bank capital, as the impact of bank capital on liquidity creation in the presence of deposit insurance is weakened for banks with high household deposits.

A weak form of governance can lead to bank misconduct. Increased awareness of the potential adverse consequences of bank misconduct, along with its increasing frequency and scale, has prompted stronger supervision and regulation. The literature on bank supervision presents a diverse range of conclusions. Kladakis et al. (2022) demonstrate that banks in countries with stronger supervision exhibit higher liquidity, whereas banks in countries with tighter regulatory regimes display lower liquidity, as a more stringent regulatory framework limits banks' exposure to excessive risk. Supervisory intervention is found to reduce risk only for the riskiest banks (Klomp and de Haan, 2012). Restricting banks from engaging in activities unrelated to their core business, such as underwriting of securities, investments in real estate and insurance, can reduce their exposure to unwarranted risks associated with these activities (Allen and Carletti, 2006; Boyd et al., 1998).

Moreover, researchers and policymakers view bank misconduct risk as a significant threat to both the sound management of banking institutions and the stability of the entire banking system. According to a cross-country study by [Conlon et al. \(2024\)](#), approximately 55% of the global losses due to misconduct are borne by banks with US headquarters. [Koster and Pelster \(2018\)](#) investigate how sanctions imposed on banks for misconduct between 2007 and 2008 affect their profitability and stock performance, and find that offenses occur when the expected benefits outweigh the potential costs. Therefore, to test the impact of enforcement actions, which are the key tools of bank supervision, various studies examine their direct effect. [Peek and Rosengren \(1995\)](#) find that loan portfolios and overall lending of the banks of New England are reduced when enforcement actions are imposed. Similarly, [Curry \(1997\)](#) reports that FEAs lead to strained banks experiencing larger declines in asset growth, dividend payouts, and external capital infusions. In the same vein, [Curry et al. \(1999\)](#) document that FEAs exert a stronger impact on areas under managerial control than those primarily influenced by external factors. FEAs are found to reduce bank risk ([Delis and Staikouras, 2011](#)) due to a reduction in their risk-weighted assets and non-performing loans ([Delis et al., 2016](#)).

While extensive research has examined the impact of bank misconduct on capital adequacy and risk exposure ([Delis et al., 2017](#); [Kandrac and Schlusche, 2019](#); [Klomp and de Haan, 2012](#); [Sakalauskait, 2017](#); [Thornton et al., 2025](#)), lending activity ([Bertsch et al., 2020](#); [Caiazza et al., 2018](#); [Danisewicz et al., 2018](#); [Koster and Pelster, 2017](#); [Jiang et al., 2010](#)), CEO tenure ([Altunbas et al., 2018](#)), bank market power ([Cardillo et al., 2024](#)), board composition and monitoring ([Cotugno et al., 2021](#); [Nguyen et al., 2016](#)), bank deposits ([Delis et al., 2019](#)), stock performance ([Armour et al., 2017](#); [Koster and Pelster, 2017](#)), systemic risk ([Berger et al., 2022](#); [Broz and Kocenda, 2022](#)), mergers and acquisitions ([Papadimitri et al., 2019](#)), social capital ([Martin-Flores, 2024](#)), bank lobbying ([Lambert, 2019](#)), election outcomes ([Mehta and Zhao, 2020](#); [Neukirchen et al., 2023](#)), there is limited knowledge on how bank misconduct impacts liquidity creation. Thus, in addition to bank liquidity creation, our work provides insights about bank misconduct.

Turning to the arguments, we find opposing predictions on the link between FEAs and bank liquidity creation. One set of theories, which we collectively refer to as the "cost view" hypothesis, predicts that FEA reduces liquidity creation. [Peek and Rosengren \(1995\)](#) documented that banks facing FEAs shrink their loan portfolio faster than those not facing FEAs. This can be because banks have incentives to avoid risky projects that can lead to losses and outweigh their charter value ([Galloway et al., 1997](#); [Keeley, 1990](#)), thereby creating lower liquidity. Restrictions imposed by FEAs, such as increased capital requirements and reduced

risk-weighted assets, can lead to a reduction in the credit supply. Pursuant to FEAs, sanctioned banks adopt safer strategies, resulting in reduced liquidity creation. Furthermore, FEAs can erode a bank's reputation and weaken investor confidence by diminishing the bank's ability to attract deposits (Babar et al., 2021) and resulting in negative stock market returns (Jordan et al., 2000; Nourayi, 1994). This indicates that banks' ability to create liquidity is constrained by the combined pressures of rising funding costs and deposit withdrawals (Carretta et al., 2025; Delis et al., 2019). Moreover, Delis et al. (2019) find that the contraction in deposits following the FEAs is primarily driven by the demand-side effect of penalized banks reducing asset expansion by curtailing credit to deposit-holding borrowers. FEAs impose immediate and tangible costs on the bank's management, thus constraining excessive risk-taking. It is evident that financial fragility is a necessary characteristic for liquidity creation; thus, when the FEAs limit the risk-taking capacity of banks, their ability to generate liquidity is compromised. This leads to the following hypothesis:

H1a. *Cost view: Formal enforcement actions decrease bank liquidity creation.*

Contrary to the “cost view” hypothesis, the “reputational view” hypothesis argues that FEA leads to higher liquidity creation. Delis et al. (2019) demonstrate that sanctioned banks offer more favorable loan terms and increase their share in syndicated loans to mitigate reputational stigma and avoid losing business. In a similar vein, Roman (2020) documents that banks increased credit supply to large businesses and provided favourable credit terms after the imposition of FEAs. Increased lending activities enhance banks' liquidity creation. Tracey et al. (2025) find that sanctioned banks with reduced capital restore the capital ratios by increasing lending activities and decreasing non-lending activities. Even though misconduct imposes monetary costs on banks and hinders their credit intermediation functions, if the benefits of engaging in risky activities exceed the costs, banks would continue to bear high liquidity risks to create more liquidity. Simpson (2002) suggests that offence occurs when expected benefits outweigh the potential costs. Koster and Pelster (2017) find a positive relation between financial penalties and buy-and-hold returns, indicating that investors are satisfied that the financial penalty levied is lower relative to the profits accrued from the misconduct activity. Therefore, if the net present value of taking a higher risk to create more liquidity is positive, then liquidity creation would be higher even after the regulatory sanctions. This leads to the following hypothesis:

H1b. *Reputational view: Formal enforcement actions increase bank liquidity creation.*

Our study empirically tests the link between bank misconduct and liquidity creation to discover which view dominates.

2.2. Bank misconduct and opacity

When corporate outsiders, such as shareholders or creditors, are unable to value bank assets transparently, it is referred to as bank opacity (Flannery et al., 2004). This creates an information asymmetry between bank insiders and outsiders, as financial disclosures by banks lack information. While many financial economists support the idea of banks being more transparent (Acharya and Ryan, 2016; Flannery et al., 2013), some believe that banks should be inherently opaque (Dang et al., 2017; Holmstrom, 2015). Regardless of whether bank opacity is beneficial or harmful, it plays a crucial role in influencing banks' operations and management.

Empirical evidence suggests that bank insiders support and engage in concealing misconduct-related actions (Bergstresser and Philippon, 2006). Due to the substantial informational advantages possessed by bank managers, they are able to curtail or obliterate the informativeness of bank disclosures to conceal their delinquency. This makes monitoring complex for bank outsiders (Bushman and Williams, 2012) as they are unable to assess the true quality of bank assets. This amplifies the concerns about a bank's financial standing, which can cause panic and bank runs due to lower trust and further restrict the bank's access to funds. Both retail and wholesale fund providers can withdraw their funds or stop providing additional funding if they are concerned about the financial standing of the banks (Goldsmith-Pinkham and Yorulmazer, 2010; Huang and Ratnovski, 2011; Shin, 2009). Additionally, even bank managers can be wary of a run by these depositors and fund providers in times of stress and therefore reduce the demand for funds. Zheng (2020) finds that a higher degree of opacity is associated with a decline in wholesale deposits and also retail deposits during financial crises. Furthermore, a reduction in these funds can shrink bank lending, loan growth (Cornett et al., 2011), and other bank activities, thereby decreasing bank liquidity creation. Imposing FEAs on banks that are already opaque can alarm the public and cause widespread concern among bank stakeholders due to high information asymmetry and the risk of a bank run. Therefore, we expect the presence of opacity in misconduct banks to curtail bank liquidity creation on the liability and off-balance sheet sides due to reduced trust among stakeholders. However, we expect that more opaque banks will increase liquidity creation on the asset side when faced

with an FEA. This is because information uncertainty already negatively impacts bank liquidity creation; therefore, to avoid losing business, banks will increase their lending activities (Delis et al., 2019; Roman, 2020). Considering the distinct influences of bank opacity, we set up our second hypothesis.

H2. *The presence of opacity in misconduct banks curtails (increases) liquidity creation on the liability and off-balance-sheet sides (asset-side).*

2.3. Bank misconduct and social capital

Studies define social capital as an environmental factor that affects the behaviour of individuals and organizations (Bloom et al., 2012; Guiso et al., 2004; La Porta et al., 1997; Rupasingha et al., 2006). Common civic norms and institutions influence the behavior of individuals, and these individuals, in turn, shape the culture of the organization they work with (Hilary and Hui, 2009). Given this influence, it is likely that the cultural norms of the region in which a bank operates impact the bank's culture, economic incentives, and risk-taking capabilities (Guiso et al., 2011). Martin-Flores (2024) finds that banks headquartered in areas with high social capital have a lower probability of facing formal enforcement actions. There could be two ways through which social capital interacts with misconduct banks to impact the subcomponents of bank liquidity creation. On the one hand, shared civic norms and denser social networks increase trust within society and lead to greater cooperation due to increased information sharing and interpersonal communication, thereby reducing information asymmetry (Coleman, 1988; Martin-Flores, 2024; Putnam, 2000). Therefore, we posit that when a bank operating in high social capital areas faces a formal enforcement action, stakeholders will still trust and support the bank management, ensuring that the bank's liability-side liquidity creation is not hampered and more deposits are raised.

On the other hand, social capital affects the tone set for a bank to engage in risky activities as society employs open criticism and withdrawal of social support as control mechanisms (Hechter and Opp, 2001; Horne, 2009). An et al. (2022) and Clark et al. (2021) show that individuals in tightly knit communities (stronger ties among community members) are more concerned about the societal costs caused by their actions and are fearful of the social stigma they may face for deviant actions. In a similar vein, Jin et al. (2017) find that bank managers in a community with higher social capital behave less opportunistically. Armed with

this literature, we posit that banks operating in high social capital counties will reduce their involvement in risky activities following the introduction of a misconduct provision, because they are more likely to be concerned about the negative externalities imposed on others due to their actions, thereby leading to reduced asset-side bank liquidity creation. Thus, we hypothesize that:

H3. *High social capital will mitigate (pronounce) the negative effect of misconduct on the liability and off-balance-sheet sides (asset-side) of liquidity creation.*

3. Federal supervision of U.S. commercial banks: an overview

Banking supervision of the United States' commercial banks is shared among three federal banking agencies, along with other state supervisory bodies. Amongst the federal banking agencies, the Office of the Comptroller of the Currency (OCC) supervises federally/nationally chartered banks, including federal branches of foreign banks; the Federal Reserve (FR) oversees and regulates bank holding companies, state-chartered banks and state-chartered branches of foreign banks; and the Federal Deposit Insurance Corporation (FDIC) is responsible for insured state banks that are not part of FR and foreign banks with an insured branch.

The three federal agencies regulate the safety and soundness of US commercial banks by combining both off-site and on-site examinations. Off-site evaluation involves assessment of quarterly Reports of Condition and Income (Call Reports) that banks file with their supervisors. This evaluation forms the basis for scheduling the timing and scope of on-site examinations by promptly identifying risky activities undertaken by a bank ([Cole et al., 1995](#)). Supervisors verify the information provided in the call reports through on-site examinations at least once every 12 to 18 months. Moreover, supervisors engage in inspections of three types: 1) Full scope assessment to assess the competence of bank management, quality of bank assets and loans and compliance with federal banking regulations; 2) Reviewing focus areas (limited scope) related to risk, operations or technical aspects to ensure legal obligations are met; and 3) Follow-up assessments to check the bank's progress on previous supervisory recommendations. The full scope on-site evaluation audits the bank's capital adequacy (C), asset quality (A), management (M), earnings (E), liquidity (L), and sensitivity to market risk (S). These six components are part of the Uniform Financial Institutions Rating System

(UFIRS) or CAMELS rating system, which assigns component and composite ratings on a numerical scale of 1 to 5 for all depository institutions. A rating of 1 and 2 indicates relatively strong performance, with adequate risk management practices, and any identified weaknesses are minor and can be handled by management through routine procedures. In contrast, a rating of 3 and 4 indicates moderate to weak performance and risk management practices. A rating of 5 indicates severely unsafe and unsound practices that are beyond the management's capability or eagerness to control or correct.

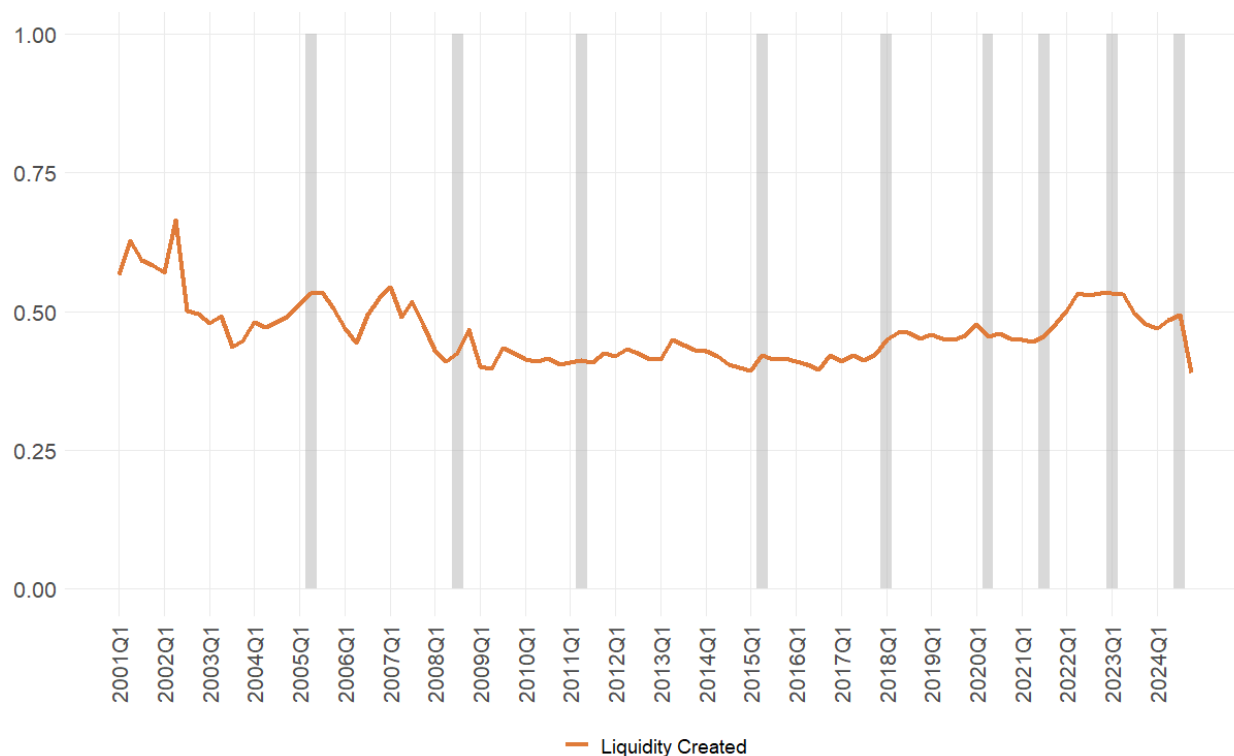
When off-site and on-site bank examinations uncover problems, the supervisory bodies can take informal and formal actions against these banks for misconduct. Informal actions include written commitments, board resolutions, and memoranda of understanding, which are not legally enforceable or publicly available. By contrast, formal actions are legal decrees that are publicly disclosed and enforceable in courts. Formal enforcement actions (FEA) are used when informal actions are ineffective in rectifying the bank's practices. These actions can be imposed regardless of the completion of the examiner's report or the application of informal actions ([Delis et al., 2017](#)). The most prevalent ones are written agreements (WAs), cease and desist orders (CDs), prompt corrective actions (PCAs), and civil money penalties (CMPs). When supervisors impose formal enforcement actions (FEA) to rectify bank practices, they typically start by issuing written agreements. If the written agreements are ineffective in improving bank practices, the supervisory procedure is progressively intensified by imposing a cease-and-desist order. A cease-and-desist order primarily requires banks to cease engaging in specific problematic practices or violations or to take corrective measures. Prompt corrective actions are imposed on undercapitalised banks and require the management to restore the bank's capital within a predetermined time period. Civil money penalties can be imposed for violation of any law or regulation, final or temporary orders issued, or any agreement or condition enforced in writing by the supervisors. These actions are imposed to curb unsafe banking practices. Previously, supervisors conducted surprise bank examinations, especially for smaller-sized and problem banks. Now, supervisors notify banks of the pending examinations and provide them time to compile the required information. On the backdrop of different measure of federal supervisors, actions and class types, our study focuses solely on how publicly disclosed actions, i.e., formal enforcement actions, which expose underlying issues within a bank, affect bank liquidity creation.

4. Case study on bank misconduct and liquidity creation

We examine a recent instance of severe bank misconduct and its impact on liquidity creation. We take the case of Wells Fargo, which is long-reputed for sound financials and management. The bank was lauded for emerging from the global crisis almost unscathed. However, this positive perception was overturned when OCC in June 2015 levied a CD order for unsafe sales practices. The bank was found to have an overly aggressive approach to cross-selling, resulting in customers being enrolled and charged fees for services they never received or consented to. By 2016, regulators found that from 2002 onward, the bank's employees had opened millions of unauthorized or fraudulent accounts and other financial products to meet excessive sales goals. Additionally, the bank's loan software had miscalculated escrow accounts. In February 2018, the FR restricted the bank's growth by imposing a \$1.95 trillion asset cap. The bank paid more than \$5 billion in penalties and faced a lot of enforcement actions. While its competitors expanded significantly, Wells Fargo was unable to compete at full capacity, resulting in a loss of around \$36 billion in potential profits. The asset growth restriction was finally removed in June 2025, enabling the bank to grow its balance sheet for the first time in seven years.

In an attempt to examine how these FEAs affected Wells Fargo's BLC, we plot the indication of an FEA levied with the $(-4,+4)$ quarter window and the liquidity created between 2001:Q1 and 2024:Q4 in [Fig. 1](#). We observe a fall in liquidity creation in most cases just before the formal actions are enforced, which might be indicative of its response to informal enforcement actions. Specifically, we note that after the asset growth restriction, the bank increased its liquidity creation, which may have been done to avoid losing business, stabilize its reputation, and retain its profitability.

Fig. 1. Timeline of FEAs levied on Wells Fargo and its liquidity creation



Note: Grey bars represent FEAs levied on Wells Fargo with the (-4, +4) quarter window, and the orange line depicts the liquidity created by the bank from 2001:Q1 through 2024:Q4.

5. Data, sample and variables

5.1 Sample selection

Our sample includes commercial banks in the United States. Bank-level quarterly variables are taken from the FFIEC 031/041/051 Call Reports available from the Bank Regulatory Data by WRDS from 2001:Q1 to 2024:Q4. We exclude bank observations that have (1) no commercial real estate (CRE) loans or commercial and industrial (C&I) loans outstanding; (2) no deposits; (3) zero or negative equity capital in the current or lagged quarter; (4) fewer than 4 quarters of data. We winsorise all accounting data at the 1st and 99th percentiles to moderate the effects of extreme observations and outliers. Our final sample contains 61,285 bank-quarter observations for 996 misconduct banks. [Table 1](#) provides definitions for all the variables used in our study.

Table 1: List of variables, definitions, and sources

Variable	Definition	Source
<i>Dependent variables</i>		
BLC	Total bank liquidity creation divided by gross total assets (GTA), where GTA equals total assets plus the allowance for loan and lease losses and the allocated transfer risk reserve (a reserve for certain foreign loans)	Bank Regulatory by WRDS and authors' calculation
BLH	Total bank liquidity hoarding divided by GTA	Bank Regulatory by WRDS and authors' calculation
BLC _{Asset}	Amount of liquidity created from the asset side divided by GTA	Bank Regulatory by WRDS and authors' calculation
BLC _{Liability}	Amount of liquidity created from the liability side divided by GTA	Bank Regulatory by WRDS and authors' calculation
BLC _{OBS}	Amount of liquidity created from the off-balance sheet side, divided by GTA	Bank Regulatory by WRDS and authors' calculation
BLH _{Asset}	Amount of liquidity hoarded from the asset side divided by GTA	Bank Regulatory by WRDS and authors' calculation
BLH _{Liability}	Amount of liquidity hoarded from the liability side divided by GTA	Bank Regulatory by WRDS and authors' calculation
BLH _{OBS}	Amount of liquidity hoarded from the off-balance sheet side divided by GTA	Bank Regulatory by WRDS and authors' calculation
<i>Misconduct variables</i>		
FEA _{Dummy}	Dummy variable that is equal to 1 for the quarter during which a formal enforcement action (FEA) is levied on a bank, provided no other enforcement action is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
FEA _{Count}	Count variable that is equal to the total number of FEA levied on a bank during a quarter	Regulators' websites
FEA _{Penalty}	Aggregate amount of penalties levied on a bank through the FEA in a quarter, divided by GTA	Regulators' websites
<i>Type of Severity of Misconduct</i>		
Class1	Dummy variable that is equal to 1 for the quarter during which a Class1 FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
Class2	Dummy variable that is equal to 1 for the quarter during which a Class2 FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
Class3	Dummy variable that is equal to 1 for the quarter during which a Class3 FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
Class4	Dummy variable that is equal to 1 for the quarter during which a Class4 FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
<i>Type of Formal Action</i>		
WA	Dummy variable that is equal to 1 for the quarter during which a Formal Agreement FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
PCA	Dummy variable that is equal to 1 for the quarter during which a Prompt Corrective Action FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
CD	Dummy variable that is equal to 1 for the quarter during which a Cease and Desist FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites

CMP	Dummy variable that is equal to 1 for the quarter during which a Civil Money Penalty FEA is levied on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
<i>Type of Supervisory Body</i>		
FR	Dummy variable that is equal to 1 for the quarter during which the Federal Reserve levies an FEA on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
FDIC	Dummy variable that is equal to 1 for the quarter during which the Federal Deposit Insurance Corporation levies an FEA on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
OCC	Dummy variable that is equal to 1 for the quarter during which the Office of the Comptroller of the Currency levies an FEA on a bank, provided no other FEA is levied on the bank within the (-4,+4) quarter window and 0 otherwise	Regulators' websites
<i>Independent variables</i>		
Size	Natural log of GTA	Bank Regulatory by WRDS
EQ	Total equity as a proportion of GTA	Bank Regulatory by WRDS
ADZP	Distance to default, measured as a bank's average return on assets plus average total equity divided by total assets/standard deviation of return on assets	Bank Regulatory by WRDS
NIM	Ratio of net interest income to interest-bearing assets	Bank Regulatory by WRDS
CIR	Ratio of operating expense to the sum of net interest income and fee income	Bank Regulatory by WRDS
Earnings Quality	Standard deviation of a bank's net earnings by total assets over a four-quarter rolling window	Bank Regulatory by WRDS
Negative Earnings	Indicator variable for whether the bank had negative earnings that quarter	Bank Regulatory by WRDS
HHI	Herfindahl-Hirschman Index, which is measured as the square of each bank's share of total deposits	Bank Regulatory by WRDS
Opacity	Absolute value of residuals obtained from the estimation of Eq. (1) following Zheng (2020)	Authors' Calculation
Social Capital	Interpolated social capital index created using principal component analysis using census response rate, voter turnout in Presidential elections, number of social clubs or civic clubs or associations per capita and number of NGOs per capita, following Martin-Flores (2024)	NERCRD and Authors' Calculation
FLC	Natural log of total deposits divided by cash assets, following Thakor and Yu (2024)	Bank Regulatory by WRDS
ROA	Ratio of the bank's net income to total assets	Bank Regulatory by WRDS
<i>Instrumental variables</i>		
Examiners' Salary	Natural log of the average salary of bank examiners for the FDIC and OCC by state and year (quarter from 2009Q3 onward).	FedScope by U.S. Office of Personnel Management
Examiners' Tenure	Natural log of the average length of service of bank examiners for the FDIC and OCC by state and year (quarter from 2009Q3 onward).	FedScope by U.S. Office of Personnel Management
Number of Examiners	Natural log of the total number of bank examiners for the FDIC and OCC by state and year (quarter from 2009Q3 onward).	FedScope by U.S. Office of Personnel Management
Property Crime	Natural log of the number of annual property crime offences reported per 100,000 of the population by state.	Federal Bureau of Investigation
Educational Attainment	Percentage of people aged 25 years and over who have completed a graduate or professional degree annually by state.	Federal Reserve Bank of St. Louis

5.2 Liquidity creation

To measure bank liquidity creation (BLC), we follow the three-step procedure outlined by [Berger and Bouwman \(2009\)](#). First, all bank activities are classified into three categories: liquid, semi-liquid, or illiquid. Second, all the activities identified in the previous step are assigned weights of $\frac{1}{2}$ and $-\frac{1}{2}$, attributed to the source or use of funds. Finally, the previous two steps are combined by multiplying the dollar amount of each activity by its respective weight to obtain our BLC measure. This procedure is briefly outlined in [Appendix A.1](#).

To ensure that our computation aligns with the original calculation of liquidity creation (catfat) by Berger and Bouwman (2009), we retain only those banks that have a correlation of at least 0.90 with the data reported by [Berger and Bouwman \(2009\)](#)⁴.

Our primary measure of BLC classifies assets and liabilities by category and also includes off-balance sheet items. We divide total liquidity created by gross total assets (BLC), where gross total assets (GTA) equal the sum of total assets, allowance for loan and lease losses, and the allocated transfer risk reserve. This adjustment facilitates comparability across banks and ensures that the largest institutions do not dominate our regression outcomes. As an extension, we also explore the effects of bank misconduct on the sub-components of bank liquidity creation: the Asset-Side (BLC_{Asset}), the Liquidity-Side ($BLC_{Liability}$), and the Off-Balance-Sheet side (BLC_{OBS}).

5.3 Liquidity hoarding

As an alternate specification to liquidity creation, we measure bank liquidity hoarding (BLH) as outlined by [Berger et al. \(2022\)](#). The detailed procedure is provided in [Appendix A.2](#). While BLC is the liquidity provided to the public, BLH denotes the liquidity retained by the bank. Our primary measure of bank liquidity hoarding is the total dollar amount of hoarded liquidity divided by the GTA (BLH). We also construct the sub-components of BLH: Asset-side BLH (BLH_{Asset}), Liability-side BLH ($BLH_{Liability}$), and Off-balance sheet-side (BLH_{OBS}).

⁴ Data on bank liquidity creation, ranging from 1984:Q1 to 2016:Q4 is available on Christa Bowman's website: <https://sites.google.com/a/tamu.edu/bouwman/data-forms-and-links-to-websites-for-u-s-banking-research>.

5.4 Misconduct

We hand-collect information on formal enforcement actions (FEAs) against commercial banks reported on the websites of the three main banking supervisors in the US: The Federal Reserve System (FR), the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC). The supervisory decisions that do not involve a reprimand for legal or regulatory violations, such as modifications or terminations of prohibition orders, denials of acquisition of control, voluntary terminations of insurance, interlocutory reviews, terminations of cease-and-desist orders, etc., are excluded from our sample. Subsequently, we match the name and address of each bank exposed to an FEA with our liquidity creation sample banks. Because the call report data is available quarterly, we match the date an FEA becomes effective or is signed with the relevant quarter.

Further, on a one-by-one basis, we review the texts of each of the FEAs in our sample and examine their underlying rationales to detect the specific breach of law. We divide the FEAs into four different classes based on the severity and nature of misconduct (Delis et al., 2019): Class 1 covers actions against capital adequacy and liquidity, asset quality, provisions, and reserves, large exposures and exposures to related parties; Class 2 includes actions for internal control and audit systems, money laundering, bank secrecy, consumer protection and foreign assets control; Class 3 encompasses actions for breaches of the requirements concerning the fitness and propriety of 'banks' board members and senior management, as well as other persons closely associated with banks (institution affiliated parties); Class 4 comprises of actions against typical infringements of specific laws such as Home Mortgage Disclosure Act, Flood Insurance Act, Flood Disaster Protection Act, etc.

Because a number of FEAs of various classes and types can be sanctioned on the same bank within the $(-4,+4)$ quarter frame around the event, we keep only those FEAs that have a clean $(-4,+4)$ quarter event window, provided that the financial data is available for this event window. This approach enables us to examine the impact of the FEA event on bank characteristics, which is free from the other concurrent FEAs.

We construct three key bank misconduct measures. First, FEA_{Dummy} indicates whether a bank engages in misconduct, represented by a dummy variable that equals one for the quarter during which an FEA is imposed on a bank and zero otherwise, while no other FEA of the same or different class has been imposed on the same bank within the $(-4,+4)$ quarter window around the event. Second, FEA_{Count} captures the number of misconduct instances for a bank in a quarter. This variable captures the misconduct intensity as it yields information on the relative

commitment of wrongdoing across banks. Third, $FEAPenalty$ considers the total penalty amount paid by a bank in a quarter divided by GTA. This variable represents the direct cost of enforcement actions on banks.

[Table 2](#) aggregates data for every two quarters and provides the descriptive statistics for FEAs with a clean (-4, +4) quarter event window for: (1) the entire sample (Panel A), (2) the number of FEAs by each supervisory body (Panel B), (3) the number of FEAs per class (Panel C), and (4) the number of FEAs for each action type (Panel D). In conclusion, our working sample comprises 1,247 FEAs imposed by the FR, FDIC, and OCC, with a clean (-4, +4) event window, spanning the 2001:Q1–2024:Q4 period. Misconduct peaked during the 2008–2009 financial crisis, remained above pre-crisis levels until 2012, and declined thereafter. This finding aligns with Srinivas et al. (2015), who noted that supervisors have been quite active following the Global Financial Crisis, and the number of FEAs has escalated significantly. Roughly 38% of the FEAs are due to acts of bank misconduct related to capital adequacy and asset quality. Some of the banks in our sample are repeat offenders, even with the clean (-4, +4) quarter frame, with around 17% of them facing more than one FEA.

[Fig. 2](#) plots the average liquidity created by the banks in our sample and the total number of FEAs they faced in the 2001:Q1 to 2024:Q4 period. We observe that the average bank liquidity creation and total enforcement actions (FEACount) tend to move in opposite directions, with a correlation coefficient of -0.41. We specifically note that during the 2008 global financial crisis and the 2020 COVID pandemic, BLC was higher than its pre-crisis levels. This was because policymakers prioritised banks' liquidity-creating ability during crisis times, and the government provided explicit support to reinforce this critical function ([Acharya and Mora, 2015](#); [Bai et al., 2018](#)). Moreover, between 2008:Q1 and 2010:Q2, FEAs increased more than nine times and then dropped to fewer than 10 instances after 2016.

In [Fig. 3](#), we present the fluctuations in the mean of our total bank liquidity creation variable (BLC) for sanctioned banks over the 16 quarters preceding and following the enactment of FEAs, along with the fluctuations in the corresponding medians for banks that faced only one FEA (punished banks with a clean 33 quarters window). $q=0$ denotes the quarter when the FEA becomes effective. We note a reduction in liquidity created one quarter prior to the FEA, which may reflect the influence of informal enforcement actions. [Figs. 2 and 3](#) provide an initial indication of the changes in our response variable due to the enactment of FEAs.

Additionally, we map the state-level distributions of BLC (Panel A) and occurrences of FEAs (Panel B) in [Fig. 4](#). We find that generally (California being the notable exception),

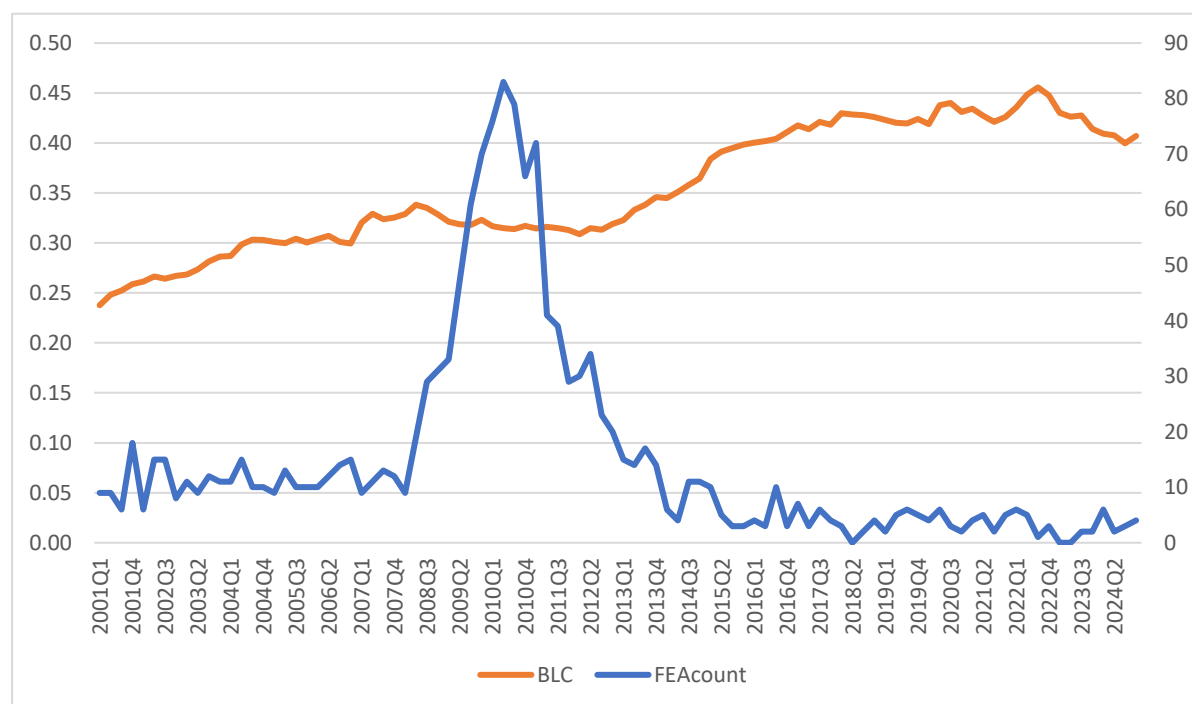
banks in states with higher FEAs create lower liquidity. Moreover, Western states are seen to have higher opacity (Panel C) and lower social capital (Panel D). This indicates that these bank and region-specific characteristics may moderate the relationship between FEAs and BLC.

Table 2: Formal enforcement actions (FEAs) with a clean (-4, +4) quarter event window

Period	Panel A: Total FEA	Panel B: Number of FEA by Supervisory Body			Panel C: Number of FEA by class				Panel D: Number of FEA by action type			
		FR	FDIC	OCC	CLASS 1	CLASS 2	CLASS 3	CLASS 4	FA	PCA	CD	CMP
2001Q4	42	3	30	9	15	11	1	15	10	0	13	19
2002Q4	44	3	24	17	17	17	1	9	17	0	17	10
2003Q4	40	7	16	17	11	12	3	14	11	0	13	16
2004Q4	41	3	28	10	10	17	3	11	9	0	14	18
2005Q4	37	3	19	15	9	14	1	13	12	0	9	16
2006Q4	49	4	33	12	11	13	0	25	7	0	10	32
2007Q4	44	6	32	6	3	9	0	32	5	0	8	31
2008Q4	86	4	60	22	28	18	2	38	19	1	24	42
2009Q4	177	12	119	46	104	20	5	48	35	3	92	47
2010Q4	245	20	177	48	127	41	17	60	44	5	132	64
2011Q4	129	15	100	14	60	16	6	47	13	8	60	48
2012Q4	86	2	75	9	34	15	2	35	3	5	41	37
2013Q4	55	6	42	7	11	12	4	28	1	0	22	32
2014Q4	30	8	15	7	10	11	0	9	3	2	13	12
2015Q4	19	2	11	6	2	12	0	5	2	0	11	6
2016Q4	19	3	12	4	4	12	0	3	3	0	11	5
2017Q4	17	3	11	3	3	3	0	11	3	0	4	10
2018Q4	7	3	4	0	0	2	0	5	0	0	2	5
2019Q4	17	3	12	2	5	8	0	4	1	1	9	6
2020Q4	15	5	7	3	2	8	0	5	2	0	7	6
2021Q4	16	5	7	4	3	3	0	10	4	0	0	12
2022Q4	15	2	13	0	2	3	0	10	0	0	4	11
2023Q4	4	0	4	0	0	3	1	0	0	0	3	1
2024Q4	13	2	8	3	3	4	0	6	2	0	5	6
Total	1247	124	859	264	474	284	46	443	206	25	524	492

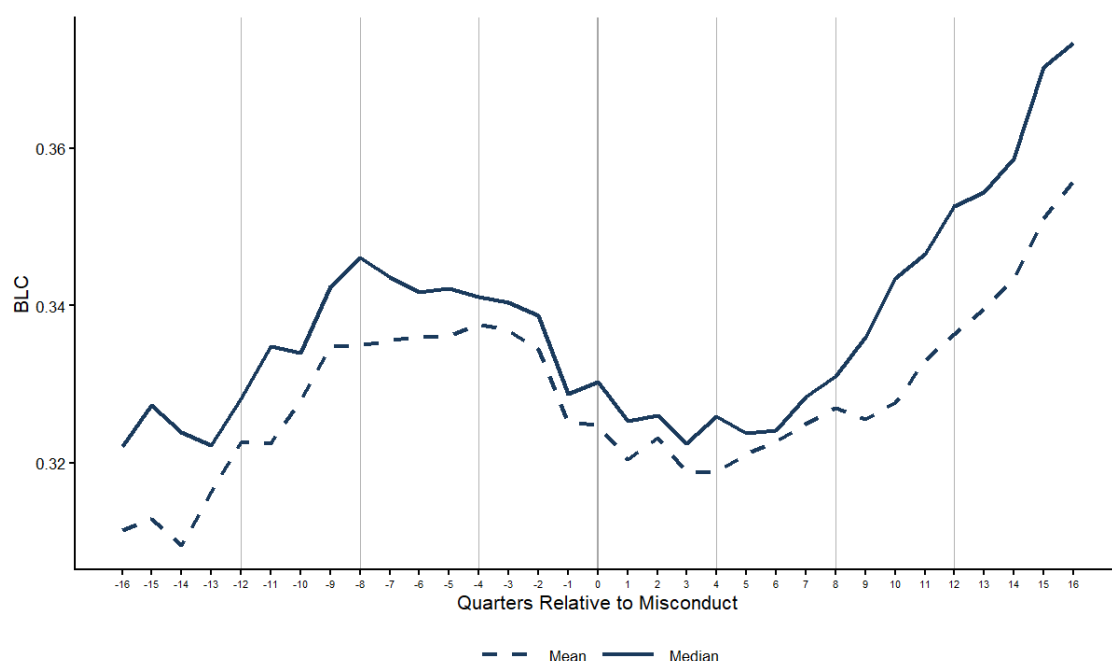
Note: This table aggregates data for every four quarters and provides the descriptive statistics for FEAs with a clean (-4, +4) quarter event window for: Panel A - the entire sample; Panel B - the number of FEAs by each supervisory body; Panel C - the number of FEAs per class; Panel D - the number of FEAs for each action type.

Fig. 2: Trend of average bank liquidity creation and number of formal enforcement actions



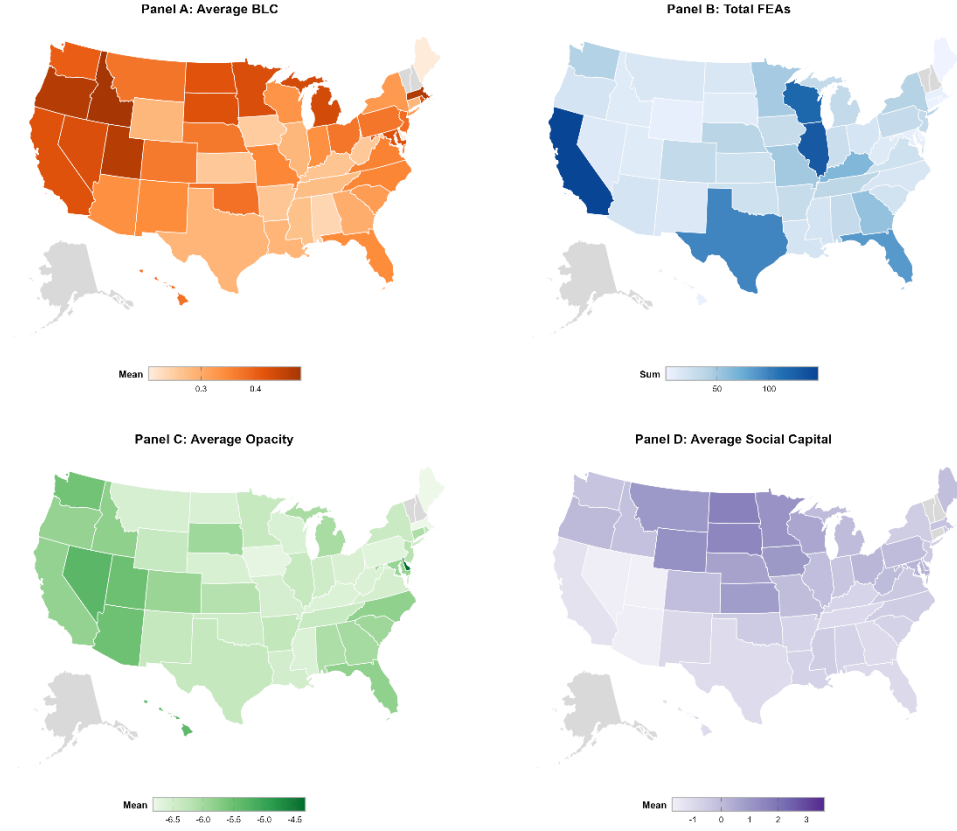
Note: The above figure depicts the dynamics of average bank liquidity creation and the number of formal enforcement actions over time (2001:Q1 - 2024:Q4)

Fig. 3: Total bank liquidity creation around FEA



Note: The above figure displays the movements of the cross-sectional mean in the 16 quarters before and after an FEA is enacted ($q=0$).

Fig. 4: Distributions across US states



5.5 Opacity

Bank opacity can be measured by capturing the informativeness of bank financial statements through loan loss provisions, which represent a bank's expected or future loan losses. The vagueness of estimating these provisions affects the informativeness of the financial statements (Dechow et al., 2010; Huizinga and Laeven, 2019). Therefore, following Jiang et al. (2016), we measure opacity as the absolute values of the residuals from the following regression model:

$$LLP_{i,q} = \alpha_0 + \alpha_1 \Delta NPL_{i,q+1} + \alpha_2 \Delta NPL_{i,q} + \alpha_3 \Delta NPL_{i,q-1} + \alpha_4 Size_{i,q-1} + \alpha_5 Loangrowth_{i,q} + \alpha_6 \Delta GDP_{i,q} + \alpha_7 CSHPI_{i,q} + \alpha_8 \Delta Unemployment_{i,q} + \theta_i + \epsilon_{i,q} \quad (1)$$

Here, $LLP_{i,q}$ is the LLP of bank i in quarter q , $\Delta NPL_{i,q}$ is the quarterly change in the non-performing loans to total loans ratio, $Size$ is the natural log of total assets, and $Loangrowth_{i,q}$ is the quarter-on-quarter loan growth. The model includes concurrent, one-quarter lagged, and leading non-performing loans (NPLs) as bank management may consider

NPLs from the three periods to estimate the current period's LLP. The model also controls for three macro-economic variables that can affect LLPs: $\Delta GDP_{i,q}$, measured as the change in the national gross domestic product; $CSHPI_{i,q}$, the Case-Shiller House Price Index; and $\Delta Unemployment_{i,q}$, the change in unemployment. Absolute residuals are considered to account for the magnitude of residuals.

5.6 Social capital

The country-level index of social capital in the US is prepared using principal component analysis by [Rupasingha et al. \(2006\)](#). The index is the first principal component in the analysis of 4 variables: census response rate and voter turnout in presidential elections (2 proxies for civic norms); number of social or civic associations or clubs per capita multiplied by 1000, and number of NGOs per capita multiplied by 10000 (2 measures of social networks). We use data provided by the NRCRD at Pennsylvania State University to measure the level of social capital in US counties in 1997, 2005, 2009, and 2014. Since data is available only for 4 periods, following [Martin-Flores \(2024\)](#), we use linear interpolation to fill in the data for the periods 2001-2004, 2006-2008, and 2010-2013.

5.7 Control variables

To examine the connection between misconduct and the BLC, we control for factors that may affect a bank's liquidity creation, such as bank size (*SIZE*), capital ratio (*EQ*), Z-score (*ADZP*), net interest margin (*NIM*), and cost-income ratio (*CIR*).

We control for bank size using the natural log of gross total assets, denoted as $\log(\text{GTA})$. GTA is the simplest measure of bank size and equals the sum of total assets, allowance for loan and lease losses, and allocated transfer risk reserve, which is a reserve for certain foreign loans ([Berger and Bouwman, 2009](#)). This measure of bank size ensures that the full value of the loans funded and the asset-side liquidity created by the bank is included. GTA can be considered a superior measure of size over total assets, as it includes all items on the balance sheet that must be financed.

Furthermore, to control for a bank's capital, we calculate the ratio of equity capital to total gross assets (*EQ*). Various studies have documented the importance of bank capital on lending activities ([Berger and Bouwman, 2009](#); [Bernanke and Lown, 1991](#); [Casu et al., 2019](#); [Fungacova et al., 2017](#); [Horvath et al., 2014](#); [Peek and Rosengren, 1995](#)).

To control for the insolvency risk or the failure risk of banks, we create the *ADZP* measure of Z-score (Lepetit et al., 2007). This measure is inversely related to the probability of bank failure; therefore, a higher Z-score indicates lower insolvency risk. It is essential to control for insolvency risk, as higher risk would necessitate higher capital to absorb it, which may impact the liquidity creation process of banks (Diamond and Dybvig, 1983; Zheng et al., 2019).

Additionally, we control for the net interest margin (*NIM*), which is calculated as the ratio of net interest income to interest-bearing assets (Lambert, 2025; Papadimitri et al., 2019). It is evident that a decrease in interest income leads to increased bank risk, which can further lower bank performance (Davydov et al., 2021; Lepetit et al., 2008), thereby impacting the bank's ability to create liquidity.

Finally, to control for cost efficiency, we include the ratio of operating costs to the sum of net interest income and fee income (*CIR*). Previous studies have documented a negative relationship between cost efficiency and credit risk (Caiazza et al., 2018). Thus, a bank's cost efficiency may affect the way liquidity is created.

6. Preliminary analysis and empirical strategy

6.1. Descriptive statistics and correlations

Table 3 presents the summary statistics for all variables used in our baseline regressions. The average liquidity created (or hoarded) by the banks in our main sample is 34.30% (9.57%) of their total gross assets. The maximum number of FEAs is 2 per bank per quarter, and the average penalty amount imposed is 0.07 as a percentage of their GTA. The mean of (log) size is 12.48. Our bank sample's capital ratio (EQ) ranges from 1.48% to 58.51% of their GTA, and the median Z-score is 31.44. Banks' average net interest income is 47.93 times their interest-bearing assets, indicating that, on average, banks are efficient and generate profits from their lending activities. Additionally, these banks incur a maximum operating cost of 8.24 times their net interest income and fee income, indicating that, in general, banks operate efficiently.

Table 4 presents the correlations between measures of BLC and BLH (Panel A) and the main variables used in our baseline regression (Panel B). As expected, BLC and BLH are negatively correlated with a coefficient of -0.5467. Not surprisingly, the asset and OBS components of BLC and BLH have a correlation of -1 as they are direct opposites. $BLH_{Liability}$ is positively correlated with $BLC_{Liability}$, as on the one hand, liquid liabilities are funds provided

to the public in liquid form, and on the other hand, they can also be used to raise funds to hoard liquidity (Berger et al., 2022). Thus, liquid liabilities are given positive weights while constructing both BLC and BLH. More importantly, we observe negative and significant correlations between BLC and all three measures of misconduct.

Table 3: Descriptive statistics

Variable	N	Mean	Std. Dev	Min	p25	Median	p75	Max
<i>Dependent variable</i>								
BLC	68399	0.343	0.169	-0.416	0.238	0.352	0.459	0.782
BLC _{Asset}	68399	0.089	0.129	-0.371	0.009	0.102	0.179	0.393
BLC _{Liability}	68399	0.191	0.083	-0.157	0.133	0.191	0.252	0.426
BLC _{OBS}	68399	0.062	0.039	0.000	0.032	0.055	0.083	0.266
BLH	68399	0.096	0.166	-0.372	-0.021	0.087	0.204	0.653
BLH _{Asset}	68399	-0.089	0.129	-0.393	-0.179	-0.102	-0.009	0.371
BLH _{Liability}	68399	0.247	0.078	0.045	0.189	0.245	0.306	0.453
BLH _{OBS}	68399	-0.062	0.039	-0.266	-0.083	-0.055	-0.032	0.000
<i>Misconduct variables</i>								
FEADummy	68399	0.018	0.134	0.000	0.000	0.000	0.000	1.000
FEACount	68399	0.021	0.148	0.000	0.000	0.000	0.000	2.000
FEAPenalty	68399	0.001	0.034	0.000	0.000	0.000	0.000	5.778
<i>Independent variables</i>								
SIZE	68208	12.475	1.337	9.333	11.565	12.329	13.226	17.721
EQ	68208	0.104	0.038	0.015	0.084	0.097	0.115	0.585
ADZP	68037	41.349	37.000	-0.507	22.260	31.442	46.442	349.163
NIM	62446	47.932	273.231	0.005	0.290	1.073	8.307	6904.000
CIR	68200	1.317	0.623	0.435	0.952	1.178	1.497	8.237
Earnings Quality	65338	0.004	0.004	0.001	0.002	0.003	0.005	0.025
Negative Earnings	68399	0.138	0.344	0.000	0.000	0.000	0.000	1.000
HHI	68316	0.014	0.022	0.000	0.000	0.001	0.018	0.163
Opacity	64845	-6.267	1.250	-11.864	-6.919	-6.159	-5.485	-2.422
Social Capital	45918	-0.250	1.121	-3.449	-1.040	-0.321	0.414	4.730
FLC	54382	2.902	0.763	0.480	2.390	2.981	3.447	5.033
ROA	68399	0.004	0.009	-0.098	0.002	0.005	0.008	0.038
<i>Instrumental variables</i>								
Examiners' Salary	57793	11.542	0.198	10.957	11.389	11.533	11.674	12.315
Examiners' Tenure	57793	2.727	0.163	1.825	2.646	2.760	2.845	3.100
Number of Examiners	57793	4.270	0.764	2.485	3.738	4.249	4.949	5.981
Property Crime	58633	7.983	0.267	6.555	7.823	7.986	8.190	8.762
Educational Attainment	49975	29.004	5.032	16.500	25.500	28.700	32.100	65.900

Note: This table reports the descriptive statistics for all variables used in our empirical analyses. We present the number of observations, mean, minimum and maximum values, values at 25th, 50th and 75th percentiles, and the standard deviation. The variables are defined in Table 1. The sample includes 996 banks from 2001:Q1 through 2024:Q4. The observations are on a bank-calendar quarter level. All bank-specific continuous variables are winsorized at the 1% and 99% levels.

Table 4: Correlation matrix

Panel A: Correlation between BLC and BLH measures								
	BLC	BLC _{Asset}	BLC _{Liability}	BLC _{OBS}	BLH	BLH _{Asset}	BLH _{Liability}	BLH _{OBS}
BLC	1							
BLC _{Asset}	0.805***	1						
BLC _{Liability}	0.493***	-0.058***	1					
BLC _{OBS}	0.601***	0.330***	0.218***	1				
BLH	-0.547***	-0.886***	0.446***	-0.382***	1			
BLH _{Asset}	-0.805***	-1.000	0.058***	-0.330***	0.886***	1		
BLH _{Liability}	0.468***	-0.084***	0.969***	0.249***	0.472***	0.084***	1	
BLH _{OBS}	-0.601***	-0.330***	-0.218***	-1.000***	0.382***	0.330***	-0.249***	1

Panel B: Correlation between BLC and other variables of interest																				
	BLC	FEA _{Dummy}	FEA _{Count}	FEA _{Penalty}	SIZE	EQ	ADZP	NIM	CIR	Earnings Quality	Negative Earnings	HHI	Opacity	Social Capital	FLC	ROA	Examiners' Salary	Examiners' Tenure	No. of Examiners	Property Crime
BLC	1																			
FEA _{Dummy}	-0.014***	1																		
FEA _{Count}	-0.014***	0.922***	1																	
FEA _{Penalty}	-0.012***	0.091***	0.170***	1																
SIZE	0.376***	-0.005	-0.004	0.003	1															
EQ	-0.156***	-0.040***	-0.052***	-0.003	-0.112***	1														
ADZP	-0.061***	-0.015***	-0.022***	-0.004	-0.089***	0.210***	1													
NIM	-0.004	-0.005	-0.007*	-0.002	0.045***	-0.017***	-0.017***	1												
CIR	-0.274***	0.040***	0.046***	0.021***	-0.244***	0.163***	0.067***	0.021***	1											
Earnings Quality	-0.105***	0.097***	0.117***	0.016***	-0.196***	0.099***	0.002	-0.028***	0.426***	1										
Negative Earnings	-0.030***	0.087***	0.112***	0.023***	-0.065***	0.065***	-0.206***	-0.009**	0.257***	0.407***	1									
HHI	0.097***	-0.005	-0.005	-0.002	0.224***	-0.084***	-0.062***	0.035***	-0.116***	-0.089***	-0.012***	1								
Opacity	-0.015***	0.045***	0.054***	0.007*	-0.057***	0.042***	0.029***	-0.018***	0.151***	0.290***	0.196***	-0.034***	1							
Social Capital	0.010**	-0.015***	-0.018***	0.014***	-0.140***	-0.047***	-0.038***	-0.001	-0.077***	-0.133***	-0.079***	0.049***	-0.107***	1						
FLC	0.013***	-0.027***	-0.033***	-0.005	0.026***	-0.063***	-0.039***	0.143***	-0.013***	-0.128***	-0.119***	0.030***	-0.113***	0.082***	1					
ROA	0.121***	-0.085***	-0.104***	0.000	0.170***	-0.084***	-0.057***	0.040***	-0.424***	-0.610***	-0.326***	0.096***	-0.353***	0.129***	0.126***	1				
Examiners' Salary	0.304***	-0.018***	-0.015***	0.003	0.331***	0.023***	0.019***	-0.123***	-0.226***	-0.013***	0.011***	0.022***	-0.021***	-0.202***	-0.213***	0.011***	1			
Examiners' Tenure	-0.076***	-0.014***	-0.018***	-0.004	-0.084***	0.027***	-0.001	0.053***	0.067***	0.003	-0.021***	-0.107***	-0.036***	-0.166***	0.070***	-0.013***	0.225***	1		
Number of Examiners	0.021***	0.010**	0.014***	-0.003	0.065***	0.033***	0.033***	-0.010**	-0.026***	0.055***	0.018***	-0.115***	0.022***	-0.211***	-0.082***	-0.040***	0.452***	0.351***	1	
Property Crime	-0.204***	0.002	0.000	-0.005	-0.236***	-0.020***	-0.015***	0.078***	0.206***	0.078***	0.050***	-0.014***	0.062***	-0.283***	0.050***	-0.071***	-0.497***	0.197***	-0.082***	1
Educational Attainment	0.276***	-0.030***	-0.033***	0.003	0.227***	-0.000	-0.011**	-0.061***	-0.162***	-0.046***	-0.003	0.026***	-0.035***	0.131***	-0.110***	0.053***	0.731***	0.186***	0.280***	-0.456***

Note: This table presents the pairwise correlations between measures of BLC and BLH (Panel A) and BLC and the variables used in our analyses (Panel B). All variables are defined in [Table 1](#). The sample includes 996 banks from 2001:Q1 through 2024:Q4. The observations are on a bank-calendar quarter level. All bank-specific continuous variables are winsorized at the 1% and 99% levels.

6.2. Empirical strategy: baseline specification

To examine whether the "reputational view" or the "cost view" effect empirically dominates, we use the following regression frameworks:

$$BLC_{i,q} = \beta_0 + \beta_1 FEA_{Dummy\ i,q-1} + \beta_2 X_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (2)$$

$$BLC_{i,q} = \beta_0 + \beta_1 FEA_{Count\ i,q-1} + \beta_2 X_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (3)$$

$$BLC_{i,q} = \beta_0 + \beta_1 FEA_{Penalty\ i,q} + \beta_2 X_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (4)$$

where the dependent variable $BLC_{i,q}$ is the total dollar amount of liquidity created divided by GTA for bank i in quarter q . FEA is our main independent variable, which takes on the three measures of misconduct: $FEA_{Dummy\ i,q-1}$ (Eq. 2), $FEA_{Count\ i,q-1}$ (Eq. 3), and $FEA_{Penalty\ i,q}$ (Eq. 4). $X_{i,q-1}$ is the vector of control variables as outlined in Section 5.7. All the control variables in Eqs. (2-4) are lagged by one quarter to mitigate potential simultaneity problems.

Furthermore, we include bank fixed effects to control for time-invariant differences across banks that are not captured by the other exogenous variables and also to mitigate correlations in the error terms. Quarter fixed effects are included to capture unobserved time-varying factors affecting liquidity creation that are not captured by the other exogenous variables, thereby alleviating concerns of serial correlation. To control for heteroskedasticity and potential correlation among observations of the same bank across different quarters, all regressions are estimated with robust standard errors clustered by bank. We also standardise all continuous variables to a mean of zero and a standard deviation of one.

6.3. Endogeneity concerns

A significant concern is that endogeneity can arise from at least three potential sources. First, reverse causality may arise because excessive liquidity creation exposes banks to liquidity crunch and bank runs as they take on higher risk, which may trigger regulatory enforcement actions. Second, omitted variable bias may arise as some unobservable factors have the potential to influence both bank liquidity creation and misconduct. Third, self-selection bias can arise as a bank's activities lead to it being sanctioned by an FEA. Thus, we address the endogeneity biases using the treatment effects model, propensity matching, entropy balancing and the staggered quasi-natural experimental approach.

We use the following treatment effects model, which is estimated with maximum likelihood:

$$FEA_{i,q} = \beta_0 + \beta_1 Z_{i,q} + \beta_2 X'_{i,q-1} + \epsilon_{i,q} \quad (5)$$

$$BLC_{i,q} = \beta_0 + \beta_1 \widehat{FEA}_{Dummy\ i,q-1} + \beta_2 X_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (6)$$

$$BLC_{i,q} = \beta_0 + \beta_1 \widehat{FEA}_{Count\ i,q-1} + \beta_2 X_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (7)$$

$$BLC_{i,q} = \beta_0 + \beta_1 \widehat{FEA}_{Penalty\ i,q} + \beta_2 X_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (8)$$

Eq. (5) is the treatment equation (Probit model for dummy measure, Poisson or Negative Binomial models for count measure and Tobit model for monetary penalty measure), where FEA is identified from an instrumental variable Z and the vector of variables X' that may or may not include the same variables as X , as treatment effect models don't mandate the use of the same set of controls in the first and second stages of the regressions (Delis et al., 2019). Therefore, the variables in X' can be a subset or the whole set of the controls used in our baseline regression. Eqs. (6-8) are the response equations, accompanied by the full set of controls and quarter dummies. The treatment and response equations are simultaneously estimated, and the error terms in Eqs. (5-8) are assumed to be normally distributed.

For the variable Z , we follow Delis et al. (2019) and consider the total number of examiners, examiners' salary, and examiners' tenure as three different instruments for the dummy and count models. This data is taken from the FedScope Employment Cube, provided by the U.S. Office of Personnel Management, on a yearly basis from 2001 and on a quarterly basis from 2009:Q3 for the FDIC and OCC. Additionally, following Thornton et al. (2025), we consider property crime rates and educational attainment as instruments for the monetary penalty measure. The property crime rate is the number of property crime offences per 100,000 population by state and includes offences of burglary, larceny-theft, motor vehicle theft, and arson. The Federal Bureau of Investigation discloses this data on an annual basis, and the last available data is for 2019. Furthermore, educational attainment refers to the number of people aged 25 and over who have completed a bachelor's degree, collected for each state. The Federal Reserve Bank of Saint Louis reports this data annually from 2006 to 2023.

We postulate that these five instruments satisfy the exclusion restriction criterion, as they impact FEAs given the set of controls included in Eq. (5), but do not have a direct impact on a bank's liquidity creation. The existing accounting literature provides the rationale for using these instruments and suggests that higher number of auditors are positively associated with audit quality (Zerni, 2012); auditors' independence is questionable when their remuneration is high (Kinney and Libby, 2002; Larcker and Richardson, 2004; Li and Liu, 2024), and long auditor tenure leads to less timely discovery and correction of misstatements (Singer and Zang, 2018). Thus, we expect that, ceteris paribus, higher salaries and tenure of examiners would lead to lower FEAs, whereas a greater number of examiners would yield more FEAs. Additionally, crime rates indicate the local economic conditions in the state where a bank operates and can influence the behavior of customers residing there (Levitt, 1997), thereby indirectly impacting BLC. Educated human capital contributes to better governance and increased ethical practices within a bank (Egan et al., 2016; Rajan and Zingales, 1998). These instruments satisfy the criteria of relevance and exogeneity, as they only indirectly influence BLC through the endogenous explanatory variables.

7. Results

7.1. Baseline results

In this section, we report our baseline regression results. [Table 5](#) presents regressions of BLC on the three measures of misconduct: $FEADummy$ (columns 1-3), $FEACount$ (columns 4-6), and $FEAPenalty$ (columns 7-9). Columns (1), (4), and (7) present specifications without controls, whereas columns (2), (5), and (8) present specifications with financial soundness controls, and columns (3), (6), and (9) present specifications with financial soundness and performance controls. The coefficient estimates for all three misconduct measures in all the specifications are negative and statistically highly significant. This finding suggests that banks' total liquidity creation decreases in response to the imposed supervisory FEAs. The magnitude of the coefficient on the dummy measure in column (3), -0.0393, suggests that FEA reduces bank liquidity creation in the following quarter by 0.66 percentage points⁵ of a bank's GTA, all else equal, which appears to be a notable effect. Moreover, column (6) reports that for one additional instance of an FEA, the total liquidity created as a proportion of their GTA decreases by 0.59 percent⁶ in the following quarter. Additionally, monetary penalties also have a negative effect on the liquidity created by banks. One standard deviation increase in the monetary penalty ratio leads to an economically significant 0.28%⁷ reduction in liquidity creation as a proportion of the bank's GTA relative to its average value. Monetary penalties negatively impact liquidity creation within the quarter in which they are imposed on banks. These results are consistent with the cost view hypothesis ([H1_a](#)), suggesting that FEA can impose direct and indirect costs on a bank's resources (e.g., limiting management's decision making, diversion of funds and time, and reputation loss), which leads to lower BLC. Additionally, the adjusted R-squared values of our models indicate that our bank and quarter fixed-effects panel regressions explain approximately 32% of the variation in the liquidity created by banks.

The estimated coefficients on the controls are broadly consistent with expectations and demonstrate their importance as determinants of BLC. Larger banks create more liquidity per dollar of assets. Better-capitalised banks tend to reduce liquidity creation, as their lower risk appetite prioritises stability over financial intermediation. Consequently, greater stability comes at the expense of lower liquidity creation ([Boyd et al., 1998](#); [Allen and Carletti, 2006](#); [Kladakis et al., 2022](#)). Moreover, banks with lower levels of cost efficiency are capable of creating higher liquidity.

Panels A, B, and C of [Table 6](#) present regressions of the components of BLC on $FEADummy$, $FEACount$, and $FEAPenalty$, respectively, along with the controls, to provide insights into the mechanism underlying the baseline results. The components of BLC are: asset-side liquidity creation (column 1), liability-side liquidity creation (column 2), and off-balance-sheet side liquidity creation (column 3). We find that FEAs impede the liquidity creation process from the liability and off-balance sheet sides. Imposing FEA erodes a bank's reputation and investors' confidence, which can impair its ability to attract deposits ([Babar et al., 2021](#)), thereby reducing

⁵ $-0.0393 * 0.1686 = -0.0066$

⁶ $-0.0352 * 0.1686 = -0.0059$

⁷ $-0.0057 * 0.1686/0.3430 = -0.0028$

the liability-side liquidity creation. Additionally, banks might shift their focus from demand deposits to core deposits and other stable sources of funds (Pereira et al., 2019). Moreover, the negative impact on BLC is largely driven by a reduction in off-balance sheet activities, which are considered to be riskier than on-balance sheet activities. This depicts that FEAs impose restrictions on bank activities that curtail banks' exposure to high-risk activities (Kladakis et al., 2022).

Additionally, we observe that in cases of monetary penalty sanctions (Tables 6, Panel C), banks constrain liquidity creation on the asset side, as fines impact banks' resources (Cardillo et al., 2024). The banks' resources are diverted to settle fines, thereby diminishing the funds available for creating liquidity. This finding suggests that supervisory FEAs prompt banks to retain liquidity rather than extend it to the non-bank public, consistent with the cost view hypothesis (H1_a). Our sub-component analyses reinforce the baseline findings. Hence, the observed negative correlation between FEAs and BLC carries significant economic implications.

7.2. Persistence Checks

Further to examine the potential long-term effects of FEAs on BLC, we follow Danisewicz et al. (2018) and Zhang et al. (2024) and employ the FEA dummy, lagged 1–4 quarters, as the main regressors.

$$BLC_{i,q} = a_{q-n}FEADummy_{i,q-n} + bX_{i,q-5} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (9)$$

where, $FEADummy_{i,q-n}$ are dummies for n -1,2,3 and 4 quarters prior to an FEA on bank i in quarter q. The control variables are lagged by five quarters to avoid any endogeneity and to estimate the expected impact during the q-n quarters.

Table 7 shows that the impact of FEAs on BLC is persistent over the 4 quarters after these sanctions are made public. Interestingly, we also find that asset-side liquidity creation gets constrained from the third quarter onwards as banks begin to reduce their risk-weighted assets post the misconduct sanctions (Delis. et al., 2017). Moreover, the increased negative impact of FEA on BLC from the third quarter can be attributed to the significant decline in asset-side BLC.

7.3. Estimations with alternative specification models

To substantiate the above results, we use the alternative specification of BLC, i.e. BLH. Panels A, B, and C of Table 8 present regressions of total BLH and its subcomponents on $FEADummy$, $FEACount$, and $FEAPenalty$, respectively. Column 4 presents results for total liquidity hoarding, and its components are: asset-side liquidity hoarding (Column 1), liability-side liquidity hoarding (Column 2), and off-balance-sheet-side liquidity hoarding (Column 3). In column 2, we note that the coefficient of misconduct on the liability-side BLH is negative and highly significant. This is because our measure of liability-side BLH considers banks to hoard liquid funds by raising more deposits and other liquid liabilities and keeping their illiquid liabilities unchanged, as these are difficult to change in the short term (Berger et al., 2022). Since $BLH_{Liability}$ considers only the liquid liabilities, the negative coefficient on this measure is consistent with our findings that deposits and other liquid funds decline in the event of an enforcement action.

Furthermore, results from the alternative specification models also reinforce our baseline tests for cases of monetary penalty sanctions and indicate that misconduct is positively associated with total liquidity hoarding. We find that punished banks restrict expansion on both the asset side of the balance sheet and the off-balance-sheet side due to the diversion of bank funds. Our alternative model analyses reinforce the baseline findings and show that FEAs curtail punished banks' overall risk-taking incentives. Thus, our policy implications suggest that FEAs for safety and soundness reasons may lead banks to pass enforcement costs to the non-bank public.

7.4. Robustness with additional controls

The robustness of the baseline relationship between FEAs and liquidity creation in the presence of additional controls is examined in Table 9. Panel A controls for the banks' earnings quality. We measure *earnings quality* as the standard deviation of a bank's net earnings by total assets over a rolling window of four-quarters. We find that the coefficient on earnings quality is significantly negative, suggesting that lower earnings quality decreases a bank's capacity to create liquidity. In the same vein, any instance of *negative earnings*⁸ (Panel B) significantly reduces BLC from both asset and liability sides of the balance sheet, as well as from the off-balance sheet side. Panel C incorporates the market concentration variable measured by the Herfindahl–Hirschman Index (*HHI*). Results show that banks operating in highly concentrated markets are able to provide the non-bank public with greater liquidity, suggesting that reduced competition enables banks to extend liquidity more broadly. Finally, in Panel D, we include a dummy variable that takes the value of one for crisis periods as defined by the NBER⁹ to capture the effects on bank liquidity creation of the crises. The coefficient on the crisis dummy is significantly negative, indicating that, on average, during periods of turmoil, banks reduce the amount of liquidity created as a percentage of their assets. This finding is in line with Thakor and Yu (2024), who show that the quantitative easing program by the Federal Reserve during the Great Financial Crisis led to increases in bank reserves and cash holdings. Thus, after including additional control variables, the coefficient on FEA remains negative and statistically significant with magnitudes similar to those in the baseline results, suggesting that FEAs affect BLC and its components without any serious concern about omitted-variable bias.

7.5. Endogeneity Concerns

Furthermore, to confirm the validity of our results, we re-estimate our baseline model using three stronger empirical designs to ensure that our findings are not biased by endogeneity from reverse causality, omitted variable bias or selection bias. We first address the reverse causality and omitted variable biases using the treatment effects model. Table 10 reports the results obtained from running equations (5-8). The first-stage treatment equation (Panel B) runs a Probit model for the dummy measure (FEA_{Dummy}: columns 1-5), a Poisson model for the count measure (FEA_{Count}: columns 6-10), and a Tobit model for the monetary penalty measure (FEA_{Penalty}: columns 11-15).

⁸ We control for negative earnings by including a dummy variable that takes the value of one if a bank's earnings before extraordinary items in a quarter is negative, and zero otherwise.

⁹ The website of the National Bureau of Economic Research (NBER) reports quarters of recessionary periods for the United States. <https://www.nber.org/research/business-cycle-dating>

We find that examiners' salaries, tenure, property crime rate, and education are negatively associated with FEAs, whereas the total number of examiners is positively related to FEAs. The coefficients of interest, FEA_{Dummy} , FEA_{Count} , and $FEA_{Penalty}$, from the treatment effects model remain negative and significant at the 1% level, with greater magnitudes compared to the coefficients in the baseline results. The second-stage results ([Panel A](#)) show that the negative effect of FEAs on BLC is considerably more pronounced compared to our baseline specification. We also find that the estimates on our control variables are in line with expectations. Thus, our results are robust to the treatment effects model.

Furthermore, in order to mitigate any selection bias concerns, we conduct propensity score matching (PSM) and entropy balancing (EB) tests. These tests help mitigate the concern that observable characteristics of sanctioned and non-sanctioned banks may lead to differences in the relationship between FEA and BLC. To implement the PSM methodology, we create a dummy variable, *Repeated_Offender*, that equals one if a bank is prosecuted for misconduct on more than one occasion and zero otherwise. We then classify observations into treatment (*Repeated_Offender* = 1) and control (*Repeated_Offender* = 0) groups. Next, we use a logistic model that regresses the *Repeated_Offender* variable on the set of controls used in the baseline regression to estimate propensity scores. We then run a one-to-one match without replacement of observations on propensity scores, keeping matches that fall within a caliper distance of 0.01¹⁰. Finally, we estimate the average treatment effect on the matched sample, including all controls from the baseline regression as well as bank and quarter fixed effects. Results reported in [Table 11](#) document a significantly negative coefficient on FEA, suggesting that FEAs are associated with reduced liquidity creation in the quarter following the sanction on the liability-side of the balance sheet and the off-balance-sheet side.

Additionally, following the methodology proposed by [Hainmueller \(2012\)](#), we also adopt the EB approach. Here too, we use the *Repeated_Offender* dummy variable to identify banks that have faced an FEA more than once. [Table 12 Panel B](#) reports differences in covariates before and after balancing based on their distributional moments (mean, variance and skewness) across *Repeated_Offender* banks and banks that have been prosecuted for misconduct only once. Consistent with our baseline result, [Panel A](#) shows that FEA reduces liquidity creation by banks.

¹⁰ Our results continue to hold for caliper distances from 0.01 to 0.10.

Table 5: Effects of misconduct on bank liquidity creation: baseline model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable:	BLC _q			BLC _q			BLC _q		
FEA _{Dummy q-1}	-0.0334** (0.0138)	-0.0632*** (0.0136)	-0.0393*** (0.0137)						
FEA _{Count q-1}				-0.0314** (0.0138)	-0.0627*** (0.0135)	-0.0352** (0.0137)			
FEA _{Penalty q}							-0.0079*** (0.0024)	-0.0081*** (0.0027)	-0.0057** (0.0023)
SIZE _{q-1}		0.1086*** (0.0323)	0.0700** (0.0354)		0.1085*** (0.0323)	0.0700** (0.0354)		0.1084*** (0.0323)	0.0698** (0.0354)
EQ _{q-1}		-0.1056*** (0.0099)	-0.0829*** (0.0121)		-0.1057*** (0.0099)	-0.0830*** (0.0121)		-0.1053*** (0.0099)	-0.0826*** (0.0121)
ADZP _{q-1}		-0.0043 (0.0057)	-0.0121** (0.0061)		-0.0044 (0.0057)	-0.0121** (0.0061)		-0.0042 (0.0057)	-0.0120* (0.0061)
NIM _{q-1}			0.0026 (0.0058)			0.0026 (0.0058)			0.0026 (0.0058)
CIR _{q-1}			-0.1256*** (0.0147)			-0.1256*** (0.0147)			-0.1257*** (0.0147)
Constant	-0.5606*** (0.0214)	-0.4683*** (0.0304)	-0.3677*** (0.0367)	-0.5606*** (0.0214)	-0.4683*** (0.0304)	-0.3678*** (0.0367)	-0.6329*** (0.0229)	-0.4690*** (0.0304)	-0.3685*** (0.0368)
Observations	74,053	73,732	61,285	74,053	73,732	61,285	75,384	73,732	61,285
Number of banks	1,108	1,104	996	1,108	1,104	996	1,108	1,104	996
R ²	0.2893	0.3151	0.3217	0.2893	0.3151	0.3217	0.2838	0.3151	0.3217
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from Eqs. 2-4 for analysing the effect of misconduct on bank liquidity creation. The three measures of misconduct are: FEA_{Dummy} (columns 1-3), FEA_{Count} (columns 4-6), and FEA_{Penalty} (columns 7-9). All controls are lagged by one quarter. The dependent variable is the dollar amount of the total bank liquidity creation divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at 1 and 99 percentiles and standardised to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 6: Effects of bank misconduct on the components of liquidity creation

Panel A: Dummy measure			
	(1)	(2)	(3)
Variables	BLC _{Asset q}	BLC _{Liability q}	BLC _{OBS q}
FEADummy _{q-1}	0.0041 (0.0149)	-0.0436*** (0.0126)	-0.1041*** (0.0147)
SIZE _{q-1}	0.1378*** (0.0357)	-0.0908*** (0.0339)	0.0533 (0.0484)
EQ _{q-1}	-0.0192 (0.0136)	-0.1697*** (0.0117)	0.0730*** (0.0130)
ADZP _{q-1}	-0.0047 (0.0070)	-0.0182*** (0.0059)	0.0024 (0.0064)
NIM _{q-1}	0.0040 (0.0067)	-0.0026 (0.0054)	0.0016 (0.0077)
CIR _{q-1}	-0.1153*** (0.0154)	-0.0404*** (0.0154)	-0.0658*** (0.0128)
Constant	-0.1069*** (0.0391)	-0.5713*** (0.0326)	-0.0187 (0.0413)
Observations	61,285	61,285	61,285
Number of banks	996	996	996
R ²	0.1448	0.4817	0.1254
Bank FE	YES	YES	YES
Quarter FE	YES	YES	YES

Panel B: Count measure			
	(1)	(2)	(3)
Variables	BLC _{Asset q}	BLC _{Liability q}	BLC _{OBS q}
FEACount _{q-1}	0.0119 (0.0148)	-0.0475*** (0.0123)	-0.1066*** (0.0146)
SIZE _{q-1}	0.1378*** (0.0357)	-0.0908*** (0.0339)	0.0534 (0.0484)
EQ _{q-1}	-0.0191 (0.0136)	-0.1699*** (0.0117)	0.0728*** (0.0130)
ADZP _{q-1}	-0.0047 (0.0070)	-0.0183*** (0.0059)	0.0023 (0.0064)
NIM _{q-1}	0.0040 (0.0067)	-0.0026 (0.0054)	0.0015 (0.0077)
CIR _{q-1}	-0.1153*** (0.0154)	-0.0403*** (0.0154)	-0.0656*** (0.0128)
Constant	-0.1069*** (0.0391)	-0.5714*** (0.0325)	-0.0190 (0.0413)
Observations	61,285	61,285	61,285
Number of banks	996	996	996
R ²	0.1448	0.4817	0.1255
Bank FE	YES	YES	YES
Quarter FE	YES	YES	YES

Panel C: Monetary measure			
	(1)	(2)	(3)
Variables	BLC _{Asset q}	BLC _{Liability q}	BLC _{OBS q}
FEAPenalty _q	-0.0047*** (0.0015)	-0.0047*** (0.0015)	-0.0027* (0.0015)
SIZE _{q-1}	0.1378*** (0.0357)	0.1378*** (0.0357)	0.0529 (0.0484)
EQ _{q-1}	-0.0193 (0.0136)	-0.0193 (0.0136)	0.0738*** (0.0130)
ADZP _{q-1}	-0.0047 (0.0070)	-0.0047 (0.0070)	0.0027 (0.0064)
NIM _{q-1}	0.0040 (0.0067)	0.0040 (0.0067)	0.0017 (0.0078)
CIR _{q-1}	-0.1150*** (0.0154)	-0.1150*** (0.0154)	-0.0664*** (0.0128)
Constant	-0.1072*** (0.0392)	-0.1072*** (0.0392)	-0.0197 (0.0413)
Observations	61,285	61,285	61,285
Number of banks	996	996	996
R ²	0.1448	0.1448	0.1248
Bank FE	YES	YES	YES
Quarter FE	YES	YES	YES

Note: This table reports regression coefficient estimates from Eqs. 2-4 for analysing the effect of misconduct on the components bank liquidity creation. The three measures of misconduct are: FEADummy (Panel A), FEACount (Panel B), and FEAPenalty (Panel C). The three subcomponents of BLC are asset-side liquidity creation (column 1), liability-side liquidity creation (column 2) and off-balance-sheet-side liquidity creation (column 3). All controls are lagged by one quarter. The dependent variables are the dollar amounts of the components of liquidity creation divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 7: Persistent effects of bank misconduct on liquidity creation and its components

	(1)	(2)	(3)	(4)
Variables	BLC _q	BLC _{Asset q}	BLC _{Liability q}	BLC _{OBS q}
FEADummy q-1	-0.0479*** (0.0164)	-0.0107 (0.0177)	-0.0293** (0.0148)	-0.1241*** (0.0168)
FEADummy q-2	-0.0469*** (0.0164)	-0.0101 (0.0177)	-0.0329** (0.0150)	-0.1219*** (0.0164)
FEADummy q-3	-0.0788*** (0.0168)	-0.0505*** (0.0182)	-0.0306** (0.0150)	-0.1203*** (0.0170)
FEADummy q-4	-0.0788*** (0.0161)	-0.0572*** (0.0177)	-0.0254* (0.0143)	-0.1096*** (0.0170)
SIZE _{q-5}	0.0528 (0.0353)	0.1247*** (0.0345)	-0.0933*** (0.0328)	0.0299 (0.0465)
EQ _{q-5}	-0.0279** (0.0125)	0.0191 (0.0140)	-0.1165*** (0.0125)	0.0655*** (0.0133)
ADZP _{q-5}	-0.0079 (0.0065)	0.0011 (0.0074)	-0.0154** (0.0060)	-0.0033 (0.0062)
NIM _{q-5}	0.0027 (0.0053)	0.0066 (0.0061)	-0.0046 (0.0053)	-0.0014 (0.0071)
CIR _{q-5}	-0.0745*** (0.0159)	-0.0803*** (0.0174)	-0.0075 (0.0165)	-0.0337*** (0.0123)
Constant	-0.3133*** (0.0375)	-0.0777* (0.0400)	-0.4722*** (0.0326)	-0.0909** (0.0386)
Observations	56,714	56,714	56,714	56,714
Number of banks	993	993	993	993
R ²	0.2929	0.1285	0.4676	0.1263
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from [Eq. 9](#) for analysing the persistent effects of misconduct on the bank liquidity creation. The main independent variable is FEADummy q-n , where n = 1,2,3 and 4 quarters before FEA is sanctioned at quarter q. All controls are lagged by five quarters to prevent endogeneity. The dependent variables are the dollar amounts of the liquidity creation and its components divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 8: Effects of bank misconduct on liquidity hoarding and its components

Panel A: Dummy Measure				
	(1)	(2)	(3)	(4)
Variables	BLH _{Asset q}	BLH _{Liability q}	BLH _{OBS q}	BLH _q
FEADummy _{q-1}	-0.0041 (0.0149)	-0.0551*** (0.0121)	0.1041*** (0.0147)	-0.0038 (0.0142)
SIZE _{q-1}	-0.1378*** (0.0357)	-0.0896*** (0.0342)	-0.0533 (0.0484)	-0.1617*** (0.0374)
EQ _{q-1}	0.0192 (0.0136)	-0.0183* (0.0106)	-0.0730*** (0.0130)	-0.0098 (0.0132)
ADZP _{q-1}	0.0047 (0.0070)	-0.0154** (0.0061)	-0.0024 (0.0064)	-0.0028 (0.0069)
NIM _{q-1}	-0.0040 (0.0067)	-0.0040 (0.0057)	-0.0016 (0.0077)	-0.0060 (0.0070)
CIR _{q-1}	0.1153*** (0.0154)	-0.0458*** (0.0151)	0.0658*** (0.0128)	0.0793*** (0.0158)
Constant	0.1069*** (0.0391)	-0.6123*** (0.0326)	0.0187 (0.0413)	-0.1957*** (0.0380)
Observations	61,285	61,285	61,285	61,285
Number of banks	996	996	996	996
R ²	0.1448	0.4980	0.1254	0.1658
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Panel B: Count measure				
	(1)	(2)	(3)	(4)
Variables	BLH _{Asset q}	BLH _{Liability q}	BLH _{OBS q}	BLH _q
FEACount _{q-1}	-0.0119 (0.0148)	-0.0610*** (0.0123)	0.1066*** (0.0146)	-0.0122 (0.0141)
SIZE _{q-1}	-0.1378*** (0.0357)	-0.0895*** (0.0341)	-0.0534 (0.0484)	-0.1617*** (0.0374)
EQ _{q-1}	0.0191 (0.0136)	-0.0185* (0.0106)	-0.0728*** (0.0130)	-0.0099 (0.0132)
ADZP _{q-1}	0.0047 (0.0070)	-0.0155** (0.0061)	-0.0023 (0.0064)	-0.0029 (0.0069)
NIM _{q-1}	-0.0040 (0.0067)	-0.0040 (0.0057)	-0.0015 (0.0077)	-0.0060 (0.0070)
CIR _{q-1}	0.1153*** (0.0154)	-0.0457*** (0.0151)	0.0656*** (0.0128)	0.0794*** (0.0158)
Constant	0.1069*** (0.0391)	-0.6124*** (0.0326)	0.0190 (0.0413)	-0.1956*** (0.0380)
Observations	61,285	61,285	61,285	61,285
Number of banks	996	996	996	996
R ²	0.1448	0.4980	0.1255	0.1659
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Panel C: Monetary measure				
	(1)	(2)	(3)	(4)
Variables	BLH _{Asset q}	BLH _{Liability q}	BLH _{OBS q}	BLH _q
FEAPenalty _q	0.0047*** (0.0015)	-0.0005 (0.0020)	0.0027* (0.0015)	0.0040** (0.0016)
SIZE _{q-1}	-0.1378*** (0.0357)	-0.0898*** (0.0341)	-0.0529 (0.0484)	-0.1617*** (0.0374)
EQ _{q-1}	0.0193 (0.0136)	-0.0179* (0.0106)	-0.0738*** (0.0130)	-0.0097 (0.0132)
ADZP _{q-1}	0.0047 (0.0070)	-0.0153** (0.0061)	-0.0027 (0.0064)	-0.0028 (0.0069)
NIM _{q-1}	-0.0040 (0.0067)	-0.0039 (0.0057)	-0.0017 (0.0078)	-0.0060 (0.0070)
CIR _{q-1}	0.1150*** (0.0154)	-0.0462*** (0.0151)	0.0664*** (0.0128)	0.0791*** (0.0158)
Constant	0.1072*** (0.0392)	-0.6127*** (0.0326)	0.0197 (0.0413)	-0.1954*** (0.0380)
Observations	61,285	61,285	61,285	61,285
Number of banks	996	996	996	996
R ²	0.1448	0.4978	0.1248	0.1659
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from Eqs. 2-4 for analysing the effect of misconduct on bank liquidity hoarding and its components. The three measures of misconduct are: FEA_{Dummy} (Panel A), FEA_{Count} (Panel B), and FEA_{Penalty} (Panel C). The three subcomponents of BLH (column 4) are asset-side liquidity hoarding (column 1), liability-side liquidity hoarding (column 2) and off-balance-sheet-side liquidity hoarding (column 3). All controls are lagged by one quarter. The dependent variables are the dollar amounts of liquidity hoarding and its components divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 9: Robustness with additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	BLC _q			BLC _{Asset q}			BLC _{Liability q}			BLC _{OBS q}		
Panel (A) with Earnings Quality												
FEA _{Dummy q-1}	-0.0291** (0.0138)			0.0111 (0.0150)			-0.0374*** (0.0126)			-0.0930*** (0.0145)		
FEA _{Count q-1}		-0.0242* (0.0139)			0.0192 (0.0149)			-0.0404*** (0.0122)			-0.0948*** (0.0144)	
FEA _{Penalty q}			-0.0055** (0.0022)			-0.0048*** (0.0015)			-0.0027 (0.0028)			-0.0025* (0.0013)
Earnings Quality _{q-1}	-0.0194*** (0.0062)	-0.0194*** (0.0062)	-0.0196*** (0.0062)	-0.0033 (0.0066)	-0.0034 (0.0066)	-0.0031 (0.0066)	-0.0218*** (0.0063)	-0.0217*** (0.0063)	-0.0221*** (0.0063)	-0.0300*** (0.0072)	-0.0297*** (0.0072)	-0.0309*** (0.0072)
Observations	59,123			59,123			59,123			59,123		
R-squared	0.3057	0.3057	0.3058	0.1327	0.1327	0.1328	0.4829	0.4829	0.4828	0.1303	0.1304	0.1298
Panel (B) with Negative Earnings												
FEA _{Dummy q-1}	-0.0306** (0.0134)			0.0091 (0.0146)			-0.0382*** (0.0122)			-0.0932*** (0.0143)		
FEA _{Count q-1}		-0.0256* (0.0134)			0.0174 (0.0145)			-0.0415*** (0.0118)			-0.0946*** (0.0141)	
FEA _{Penalty q}			-0.0056** (0.0022)			-0.0046*** (0.0015)			-0.0031 (0.0026)			-0.0025* (0.0014)
Negative Earnings _{q-1}	-0.0888*** (0.0205)	-0.0887*** (0.0204)	-0.0895*** (0.0205)	-0.0501** (0.0238)	-0.0505** (0.0238)	-0.0497** (0.0238)	-0.0557*** (0.0202)	-0.0552*** (0.0202)	-0.0567*** (0.0202)	-0.1112*** (0.0230)	-0.1104*** (0.0230)	-0.1139*** (0.0231)
Observations	61,285			61,285			61,285			61,285		
R-squared	0.3230	0.3230	0.3231	0.1452	0.1453	0.1453	0.4822	0.4822	0.4821	0.1276	0.1277	0.1271
Panel (C): with HHI												
FEA _{Dummy q-1}	-0.0396*** (0.0137)			0.0041 (0.0149)			-0.0439*** (0.0126)			-0.1050*** (0.0148)		
FEA _{Count q-1}		-0.0354** (0.0138)			0.0117 (0.0149)			-0.0470*** (0.0123)			-0.1078*** (0.0147)	
FEA _{Penalty q}			-0.0056** (0.0023)			-0.0049*** (0.0015)			-0.0026 (0.0027)			-0.0027* (0.0015)
HHI _{q-1}	0.0686*** (0.0229)	0.0686*** (0.0229)	0.0685*** (0.0229)	0.0330 (0.0259)	0.0330 (0.0259)	0.0330 (0.0259)	0.0633*** (0.0191)	0.0633*** (0.0191)	0.0632*** (0.0191)	0.0647** (0.0269)	-0.1078*** (0.0147)	0.0646** (0.0269)
Observations	61,206											
R-squared	0.3235	0.3235	0.3235	0.1451	0.1452	0.1452	0.4832	0.4832	0.4831	0.1275	0.1276	0.1269
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from [Eqs. 2-4](#) for analysing the effect of misconduct on bank liquidity hoarding and its components. The three measures of misconduct are: FEADummy, FEACount, and FEAPenalty. The three subcomponents of BLC (columns 1-3) are asset-side liquidity hoarding (columns 4-6), liability-side liquidity hoarding (columns 7-9) and off-balance-sheet-side liquidity hoarding (columns 10-12). Additional controls added are: Earnings Quality (Panel A), Negative Earnings (Panel B) and HHI (Panel C). All controls are lagged by one quarter. The dependent variables are the dollar amounts of liquidity created and its components divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All variables are defined in [Table 1](#). All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 10: IV analysis – treatment effects model

Panel A: Second stage results															
Variables	BLC _q														
	FEA _{Dummy}					FEA _{Count}					FEA _{Penalty}				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Log(PropCrime)	Educaton	Log(Salary)	Log(Tenure)	Log(T_Exam)	Log(PropCrime)	Educaton	Log(Salary)	Log(Tenure)	Log(T_Exam)	Log(PropCrime)	Educaton	Log(Salary)	Log(Tenure)	Log(T_Exam)
$\widehat{FEA}$	-0.6488*** (0.2350)	-0.5632*** (0.1772)	-1.2120*** (0.4109)	-1.1623*** (0.3619)	-1.2862*** (0.3341)	-0.2584*** (0.0899)	-0.3661*** (0.1123)	-0.7122*** (0.2173)	-0.8036*** (0.1993)	-0.8146*** (0.1979)	-62.8587*** (16.3893)	-69.0377*** (15.4495)	-18.5603 (11.4150)	-9.3707 (19.8254)	-22.0512 (19.7621)
SIZE _{q-1}	0.0089* (0.0047)	0.0097* (0.0056)	0.0096* (0.0050)	0.0078 (0.0051)	0.0077 (0.0051)	0.0088* (0.0047)	0.0097* (0.0056)	0.0093* (0.0051)	0.0082 (0.0051)	0.0083 (0.0051)	0.0078* (0.0047)	0.0178*** (0.0053)	0.0109** (0.0050)	0.0120** (0.0057)	0.0122** (0.0052)
EQ _{q-1}	-0.4218*** (0.0677)	-0.4277*** (0.0755)	-0.5140*** (0.0764)	-0.5293*** (0.0792)	-0.5496*** (0.0749)	-0.3829*** (0.0661)	-0.4324*** (0.0767)	-0.5186*** (0.0776)	-0.5429*** (0.0766)	-0.5483*** (0.0757)	-0.7362*** (0.1142)	-0.7071*** (0.1044)	-0.4596*** (0.0817)	-0.3746*** (0.0610)	-0.3737*** (0.0610)
ADZP _{q-1}	-0.0000* (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0002*** (0.0001)	-0.0002*** (0.0000)	-0.0001** (0.0000)	-0.0001 (0.0001)	-0.0001** (0.0000)
NIM _{q-1}	0.0000 (0.0000)	0.0000* (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
CIR _{q-1}	-0.0301*** (0.0039)	-0.0291*** (0.0057)	-0.0300*** (0.0046)	-0.0299*** (0.0048)	-0.0300*** (0.0047)	-0.0299*** (0.0039)	-0.0303*** (0.0056)	-0.0296*** (0.0048)	-0.0292*** (0.0048)	-0.0293*** (0.0048)	-0.0283*** (0.0037)	-0.0214*** (0.0058)	-0.0289*** (0.0044)	-0.0269*** (0.0064)	-0.0291*** (0.0044)
Constant	0.2608*** (0.0575)	0.3025*** (0.0701)	0.2802*** (0.0641)	0.2990*** (0.0664)	0.3058*** (0.0658)	0.2553*** (0.0573)	0.3012*** (0.0699)	0.2774*** (0.0645)	0.2901*** (0.0647)	0.2905*** (0.0648)	0.3780*** (0.0667)	0.3082*** (0.0687)	0.2652*** (0.0669)	0.2146*** (0.0625)	0.2313*** (0.0626)
Observations	47,929	41,356	50,690	50,079	50,079	48,444	41,356	50,079	50,079	50,079	49,471	44,848	50,011	50,011	50,011
Number of banks	958	841	840	840	840	958	841	840	840	840	958	916	835	835	835
R ²	0.2890	0.2972	0.3226	0.3218	0.3217	0.2932	0.2975	0.3218	0.3224	0.3222	0.3026	0.3086	0.3313	0.3309	0.3309
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Panel B: First stage results															
Instrument	-0.2697 *** (0.0931)	-0.0170 *** (0.0022)	-0.6988 *** (0.1306)	-0.6423 *** (0.1592)	0.0952 *** (0.0292)	-0.6148 *** (0.2255)	-0.0407 *** (0.0056)	-1.8043 *** (0.3390)	-1.6764 *** (0.4331)	0.3213 *** (0.0830)	-0.1895 ** (0.0771)	-0.0114 *** (0.0035)	-0.6221 *** (0.1740)	-0.2130 * (0.1187)	-0.0044 (0.0242)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	48956	42022	55874	51052	51052	49478	42022	51052	51052	51052	54746	47182	54645	54638	50029
Wald chi2(3)/F-stat	875.44***	337.94***	119.60 ***	116.98 ***	101.77 ***	144991.19***	427.908***	155.75 ***	145.36 ***	129.07 ***	2.72 **	2.22 **	4.31 ***	1.74	1.65
Pseudo R ²	0.0729	0.0275	0.0131	0.0134	0.0128	0.0946	0.0386	0.0225	0.022	0.0215	0.0055	0.0114	0.0101	0.0031	0.002
Log pseudolikelihood	-4959.1448	-4560.002	-5141.1017	-4887.7092	-4891.0811	-5544.0587	-5191.0489	-5546.9711	-5550.0138	-5552.4545	-2303.9480	-1933.6756	-2159.0310	-2174.4420	-2078.5529

Note: The table reports results for the coefficients and standard errors (in parentheses) from the two-stage treatment effects model (Eqs. 5-8). The treatment equation runs a Probit model for the dummy measure (FEA_{Dummy} : columns 1-5), a Poisson model for the count measure (FEA_{Count} : columns 6-10), and a Tobit model for the monetary penalty measure ($FEA_{Penalty}$: columns 11-15). Bank liquidity creation is the main explanatory variable. In the first stage (Panel B), we use *property crime* (columns 1, 6, and 11), *educational attainment* (columns 2, 7, and 12), *examiners' salary* (columns 3, 8, and 13), *examiners' tenure* (columns 4, 9, and 14) and *total examiners* (columns 5, 10, and 15) as instruments to bank misconduct while controlling for other factors that may or may not include the same controls used in the second stage (Panel A). All variables are defined in Table 1. All bank-specific continuous variables are winsorized at 1 and 99 percentiles. Standard errors are clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 11: Propensity score matched sample analysis for the effects of FEAs on liquidity creation

Variables	(1) BLC _{Asset q}	(2) BLC _{Liability q}	(3) BLC _{OBS q}	(4) BLC _{Asset q}
FEADummy _{q-1}	-0.0435*** (0.0165)	-0.0043 (0.0175)	-0.0358** (0.0154)	-0.1091*** (0.0174)
SIZE _{q-1}	0.0469 (0.0387)	0.1177*** (0.0397)	-0.1179*** (0.0397)	0.0725 (0.0469)
EQ _{q-1}	-0.0662*** (0.0147)	-0.0060 (0.0168)	-0.1640*** (0.0150)	0.0831*** (0.0151)
ADZP _{q-1}	-0.0146** (0.0069)	-0.0103 (0.0082)	-0.0161** (0.0073)	0.0052 (0.0071)
NIM _{q-1}	0.0005 (0.0073)	-0.0025 (0.0078)	0.0033 (0.0061)	-0.0000 (0.0096)
CIR _{q-1}	-0.1227*** (0.0162)	-0.1108*** (0.0155)	-0.0418*** (0.0162)	-0.0644*** (0.0137)
Constant	-0.4061*** (0.0447)	-0.1205** (0.0482)	-0.6295*** (0.0404)	-0.0140 (0.0459)
Observations	36,026	36,026	36,026	36,026
Number of banks	994	994	994	994
R ²	0.2980	0.1379	0.4601	0.1290
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Note: This table reports the results of the propensity score matching approach based on one-to-one nearest neighbour matching without replacement and keeping a caliper distance of 0.01. Our treatment group includes banks that were prosecuted for misconduct on more than one occasion and control group includes banks that received only one misconduct sanction. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 12: Entropy balancing analysis for the effects of FEAs on liquidity creation

Panel A: Impact of FEA and liquidity creation after entropy balancing											
Variables	(1) BLC _{Asset q}			(2) BLC _{Liability q}			(3) BLC _{OBS q}			(4) BLC _{Asset q}	
FEADummy _{q-1}	-0.0372*** (0.0143)			0.0007 (0.0154)			-0.0366*** (0.0134)			-0.1054*** (0.0154)	
SIZE _{q-1}	0.0464 (0.0376)			0.1136*** (0.0389)			-0.1220*** (0.0394)			0.0727 (0.0468)	
EQ _{q-1}	-0.0734*** (0.0131)			-0.0131 (0.0148)			-0.1659*** (0.0137)			0.0765*** (0.0140)	
ADZP _{q-1}	-0.0158** (0.0062)			-0.0108 (0.0073)			-0.0180*** (0.0070)			0.0058 (0.0062)	
NIM _{q-1}	0.0028 (0.0064)			0.0011 (0.0064)			0.0016 (0.0061)			0.0024 (0.0095)	
CIR _{q-1}	-0.1187*** (0.0157)			-0.1077*** (0.0158)			-0.0426*** (0.0158)			-0.0629*** (0.0132)	
Constant	0.0488*** (0.0017)			0.0639*** (0.0019)			0.0039** (0.0016)			-0.0094*** (0.0017)	
Observations	65,020			65,020			65,020			65,020	
R ²	0.7380			0.7073			0.7673			0.6775	
Bank FE	YES			YES			YES			YES	
Quarter FE	YES			YES			YES			YES	

Panel B: Differences in covariates before and after entropy balancing											
		Mean		Variance			Skewness			Difference	
Covariate	Treated	Control (before)	Control (after)	Treated	Control (before)	Control (after)	Treated	Control (before)	Control (after)	Before	After
SIZE	12.472	12.559	12.472	1.808	1.737	1.807	0.723	0.655	0.722	-0.065	-0.001
EQ	0.101	0.104	0.101	0.001	0.001	0.001	3.532	3.071	3.529	-0.103	-0.001
ADZP	40.914	41.704	40.922	1385.666	1351.659	1386.018	3.269	3.451	3.272	-0.021	0.000
NIM	53.353	43.425	53.273	90221.613	63417.499	90040.651	11.963	13.201	11.973	0.033	0.000
CIR	1.336	1.263	1.335	0.362	0.335	0.362	2.850	3.545	2.859	0.121	0.001

Note: This table reports the results of the entropy balancing approach between the treatment group (banks that were prosecuted for misconduct on more than one occasion) and the control group (banks that received only one misconduct sanction). Panel A presents the results of the effect of FEAs on bank liquidity creation after employing entropy balancing. Panel B presents the summary statistics for the treatment and control samples before and after employing the entropy balancing approach. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8. Additional analyses

8.1. Effects by supervisory body, class, and action types

This section examines which supervisory body, class, or action type exerts the highest influence on curtailing bank liquidity creation when an FEA is imposed. The FR, FDIC, and OCC sanction banks with FEAs primarily of four types: WA, PCA, CD, and CMP. Furthermore, we categorize FEAs into four classes based on their underlying rationales, as described earlier in Section 5.4: Class 1, Class 2, Class 3, and Class 4. We analyse which types of FEAs matter for our results.

Table 13, Panel A, reports that FEAs imposed by the FR have the highest negative impact on liquidity-side BLC, whereas the total and off-balance-sheet side BLC are curtailed the most by the FEAs imposed by the FDIC. Additionally, we find in Panel B that even though only CD actions seem to impact the total liquidity created, it is the PCAs that have the highest impact on constraining liquidity creation from both liability and off-balance sheet sides, as these actions place restrictions on activities that diminish bank capital, thereby ensuring that the capital ratios are restored to adequate levels. Also, depositors react to the news of a bank being undercapitalised by withdrawing their funds (Carretta et al., 2025; Delis et al., 2019). In the same vein, Panel C shows that only Class 1 FEAs attenuate the total liquidity created by banks and liquidity created on the liability side of the balance sheet. Class 1 actions are considered to be severe enforcement actions (Delis et al., 2017) as they are primarily related to capital adequacy and asset quality. Any FEA restricting these activities reduces the risk-taking ability of banks, thereby limiting their capacity to create liquidity. Moreover, FEAs of classes 1, 2, and 3 are also found to curtail banks' risky off-balance-sheet activities. Overall findings suggest that CDs, FEAs imposed by the FDIC and FR, and class 1 actions have a more damaging effect on banks' capacity to create liquidity. Thus, bank liquidity creation declines more when the severity of the enforcement action is higher.

To advance the previous analyses, we want to determine whether any particular action type or supervisory body influences the impact of each of the four classes of FEAs. To test this influence, we include interaction terms *Class*Supervisory Body* (Table 14) and *Class*Action* (Table 15) in different regression models. We find that the interaction terms *Class 1*FR* and *Class 3*FR* are negative and significant at the 1% level, suggesting that the effect of FEAs imposed by the FR for misconduct related to capital adequacy, asset quality, and the fitness and propriety of institution-affiliated parties leads to a significant reduction in the liquidity created by banks. Additionally, we find that the coefficient on monetary sanctions for unsafe and unsound practices related to internal controls and bank secrecy (*Class 2*CMP*) is negative and significant at 1% level. This implies that class 2 FEAs negatively impact BLC only when CMP is imposed on the banks. In contrast, the coefficient on written agreements regarding infringements of specific laws, such as the Home Mortgage Disclosure Act, Flood Insurance Act, and Flood Disaster Protection Act (*Class 4*WA*), is positive and significant at the 1% level. These are the least severe actions imposed to rectify bank practices; hence, banks can continue to create liquidity without incurring much reputational stigma or costs.

Therefore, we find that the nature of misconduct plays a more important role in curbing the liquidity creation than which supervisor is enforcing these actions or what type of actions are being

enforced. These findings enhance our understanding of different types of FEAs and how these actions individually and in combination have differential impacts on various components of BLC.

Table 13: Effect of misconduct on bank liquidity creation and liquidity hoarding (component-wise)

Variables	(1) BLC _q	(2) BLC _{Asset q}	(3) BLC _{Liability q}	(4) BLC _{OBS q}	(5) BLH _q	(6) BLH _{Asset q}	(7) BLH _{Liability q}	(8) BLH _{OBS q}
Panel A: Supervisory Body								
FR_{q-1}	-0.0826*	-0.0171	-0.1068**	-0.0931*	-0.0252	0.0171	-0.1179***	0.0931*
	(0.0476)	(0.0462)	(0.0455)	(0.0526)	(0.0460)	(0.0462)	(0.0449)	(0.0526)
R ²	0.3216	0.1448	0.4817	0.1249	0.1658	0.1448	0.4979	0.1249
FDIC_{q-1}	-0.0453***	0.0068	-0.0554***	-0.1091***	-0.0089	-0.0068	-0.0657***	0.1091***
	(0.0167)	(0.0181)	(0.0155)	(0.0182)	(0.0174)	(0.0181)	(0.0147)	(0.0182)
R ²	0.3217	0.1448	0.4817	0.1252	0.1658	0.1448	0.4980	0.1252
OCC_{q-1}	0.0023	0.0052	0.0266	-0.0894***	0.0232	-0.0052	0.0115	0.0894***
	(0.0331)	(0.0373)	(0.0294)	(0.0327)	(0.0337)	(0.0373)	(0.0301)	(0.0327)
R ²	0.3216	0.1448	0.4816	0.1249	0.1658	0.1448	0.4978	0.1249
Panel B: Action Type								
WA_{q-1}	-0.0205	0.0400	-0.0407	-0.1234***	-0.0307	-0.0400	-0.0541	0.1234***
	(0.0392)	(0.0400)	(0.0357)	(0.0400)	(0.0363)	(0.0400)	(0.0364)	(0.0400)
R ²	0.3216	0.1448	0.4816	0.1249	0.1659	0.1448	0.4979	0.1249
PCA_{q-1}	-0.1586	0.0117	-0.2939**	-0.3343***	-0.0482	-0.0117	-0.3333***	0.3343***
	(0.1218)	(0.1539)	(0.1269)	(0.1253)	(0.1414)	(0.1539)	(0.0925)	(0.1253)
R ²	0.3216	0.1448	0.4817	0.1249	0.1658	0.1448	0.4979	0.1249
CD_{q-1}	-0.0501**	0.0259	-0.0740***	-0.1645***	-0.0265	-0.0259	-0.1001***	0.1645***
	(0.0231)	(0.0250)	(0.0229)	(0.0239)	(0.0242)	(0.0250)	(0.0221)	(0.0239)
R ²	0.3216	0.1448	0.4817	0.1254	0.1659	0.1448	0.4980	0.1254
CMP_{q-1}	-0.0298	-0.0327	-0.0026	-0.0224	0.0318	0.0327	0.0031	0.0224
	(0.0204)	(0.0232)	(0.0188)	(0.0224)	(0.0231)	(0.0232)	(0.0184)	(0.0224)
R ²	0.3216	0.1448	0.4816	0.1248	0.1659	0.1448	0.4978	0.1248
Panel C: Class								
CLASS1_{q-1}	-0.0754***	0.0175	-0.1047***	-0.1864***	-0.0301	-0.0175	-0.1414***	0.1864***
	(0.0234)	(0.0269)	(0.0241)	(0.0259)	(0.0258)	(0.0269)	(0.0243)	(0.0259)
R ²	0.3217	0.1448	0.4818	0.1255	0.1659	0.1448	0.4982	0.1255
CLASS2_{q-1}	-0.0227	0.0138	-0.0116	-0.1045***	-0.0026	-0.0138	-0.0228	0.1045***
	(0.0326)	(0.0328)	(0.0298)	(0.0308)	(0.0307)	(0.0328)	(0.0286)	(0.0308)
R ²	0.3216	0.1448	0.4816	0.1249	0.1658	0.1448	0.4978	0.1249
CLASS3_{q-1}	-0.0538	-0.0049	-0.0259	-0.2511***	0.0834	0.0049	0.0591	0.2511***
	(0.1230)	(0.1083)	(0.1060)	(0.0855)	(0.0978)	(0.1083)	(0.0687)	(0.0855)
R ²	0.3216	0.1448	0.4816	0.1249	0.1659	0.1448	0.4978	0.1249
CLASS4_{q-1}	-0.0099	-0.0145	-0.0015	-0.0019	0.0134	0.0145	0.0032	0.0019
	(0.0217)	(0.0250)	(0.0193)	(0.0238)	(0.0245)	(0.0250)	(0.0189)	(0.0238)
R ²	0.3216	0.1448	0.4816	0.1248	0.1658	0.1448	0.4978	0.1248
Observations	61285	61285	61285	61285	61285	61285	61285	61285
Number of banks	996	996	996	996	996	996	996	996
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from Eq. 2 for analysing the effect of the type of supervisory body (Panel A), action (Panel B) and class (Panel C) on the components of bank liquidity creation (columns 1-4) and bank liquidity hoarding (columns 5-8). All controls are lagged by one quarter. The dependent variables are the dollar amounts of the components of liquidity creation and liquidity hoarding divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All variables are defined in Table 1. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 14: Effects of the interactions of Class and Supervisor on total bank liquidity creation

	BLC _q						
	CLASS 1 _{q-1}	CLASS 2 _{q-1}	CLASS 3 _{q-1}	CLASS 4 _{q-1}	FR _{q-1}	FDIC _{q-1}	OCC _{q-1}
CLASS1	-0.0566** (0.0240)				-0.2487*** (0.0916)		
	-0.0970** (0.0428)					0.0328 (0.0520)	
	-0.0891*** (0.0276)						0.0515 (0.0553)
CLASS2		-0.0104 (0.0344)			-0.1113 (0.1085)		
		0.0165 (0.0549)				-0.0706 (0.0685)	
		-0.0654* (0.0371)					0.1273* (0.0745)
CLASS3			-0.0606 (0.1258)		0.2912** (0.1309)		
			-0.0554 (0.1549)			0.0023 (0.2231)	
			-0.0441 (0.1551)				-0.0376 (0.2281)
CLASS4				-0.0218 (0.0233)	0.0990 (0.0668)		
				0.0534 (0.0443)		-0.0778 (0.0511)	
				-0.0114 (0.0229)			0.0220 (0.0586)
Observations	61285	61285	61285	61285	61285	61285	61285
Number of banks	996	996	996	996	996	996	996
Controls	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from Eq. 2 for analyzing the effect of every combination (interaction) of class and supervisory body on total bank liquidity creation. There are three supervisory bodies: the Federal Reserve (FR), the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), and four classes: Class 1, Class 2, Class 3 and Class 4. All variables are defined in Table 1. All controls are lagged by one quarter. The dependent variable is the dollar amount of total bank liquidity creation divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

Table 15: Effect of the interactions of Class and Action types on total bank liquidity creation

BLC _q								
	CLASS 1 _{q-1}	CLASS 2 _{q-1}	CLASS 3 _{q-1}	CLASS 4 _{q-1}	WA _{q-1}	PCA _{q-1}	CD _{q-1}	CMP _{q-1}
CLASS1	-0.0726*** (0.0267) -0.0717*** (0.0238) -0.0969** (0.0443) -0.0747*** (0.0242)				-0.0133 (0.0612)	-0.0894 (0.1239)	0.0308 (0.0537)	-0.0142 (0.0967)
CLASS2		-0.0439 (0.0381) -0.0373 (0.0496) 0.0002 (0.0347)			0.0620 (0.0685)		0.0264 (0.0624)	- 0.2203** (0.1007)
CLASS3			-0.0778 (0.1407) 0.1010 (0.1411) -0.0668 (0.1303)		0.1702 (0.2074)		-0.1963 (0.2071)	0.1851 (0.3232)
CLASS4				-0.0142 (0.0215) -0.0113 (0.0218) 0.4789 (0.3904)	1.8335*** (0.0322)		0.1500 (0.3096)	-0.4945 (0.3920)
Observations	61285	61285	61285	61285	61285	61285	61285	61285
No. of banks	996	996	996	996	996	996	996	996
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports regression coefficient estimates for analyzing the effect of every combination (interaction) of class and action type on total bank liquidity creation. There are four action types: written agreement (WA), prompt corrective action (PCA), cease and desist (CD) and civil monetary penalty (CMP), and four classes: Class 1, Class 2, Class 3 and Class 4. All variables are defined in [Table 1](#). All controls are lagged by one quarter. The dependent variable is the dollar amount of total bank liquidity creation divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.2. Role of bank size

Given that banks of different sizes create liquidity differently (Berger and Bouwman, 2009), it is of interest to examine whether bank size influences the relationship between BLC and FEA. For this purpose, we divide our sample into two groups by median bank size and then examine the relationship between BLC and FEA in the below-median and above-median groups. Table 16 reports the regression coefficient estimates from equations 2-4 for these subsamples. We find that misconduct provisions have a greater adverse impact on the overall liquidity created by smaller banks. Our estimates indicate that an instance of FEA reduces total liquidity creation in smaller banks by 0.78 percentage points, compared to a reduction of only 0.55 percentage points in larger banks. However, we find that the decline in liquidity created from the liability side of the balance sheet and the off-balance-sheet side due to an FEA is greater for larger banks. These results are in line with Berger et al. (2005) and Kashyap et al. (2002), who find that large and small banks have different comparative advantages and hence extend different types of loans and have different relationships between commitments and transaction deposits. Additionally, we find that monetary penalties have a significant negative effect on smaller banks’ liquidity creation.

Table 16: Role of bank size

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Median							
	Below	Above	Below	Above	Below	Above	Below	Above
Variables	BLC _q	BLC _q	BLC _{Asset q}	BLC _{Asset q}	BLC _{Liability q}	BLC _{Liability q}	BLC _{OBS q}	BLC _{OBS q}
Panel A: Dummy measure								
FEADummy _{q-1}	-0.0454** (0.0199)	-0.0349* (0.0188)	-0.0059 (0.0224)	0.0107 (0.0194)	-0.0401** (0.0187)	-0.0447*** (0.0167)	-0.1029*** (0.0188)	-0.1068*** (0.0219)
SIZE _{q-1}	0.1623** (0.0636)	0.0336 (0.0419)	0.2068*** (0.0697)	0.1189*** (0.0399)	-0.0876* (0.0522)	-0.0995** (0.0446)	0.2246*** (0.0566)	-0.0231 (0.0657)
EQ _{q-1}	-0.0569*** (0.0154)	-0.1066*** (0.0201)	-0.0105 (0.0173)	-0.0178 (0.0232)	-0.1521*** (0.0160)	-0.2000*** (0.0184)	0.1167*** (0.0153)	0.0350 (0.0215)
ADZP _{q-1}	-0.0125 (0.0081)	-0.0087 (0.0090)	-0.0094 (0.0094)	0.0020 (0.0103)	-0.0173** (0.0081)	-0.0181** (0.0088)	0.0140* (0.0079)	-0.0046 (0.0102)
NIM _{q-1}	0.0182 (0.0123)	-0.0015 (0.0064)	0.0157 (0.0129)	-0.0002 (0.0074)	0.0050 (0.0117)	-0.0024 (0.0059)	0.0196 (0.0200)	-0.0040 (0.0084)
CIR _{q-1}	-0.1094*** (0.0183)	-0.1478*** (0.0264)	-0.1068*** (0.0187)	-0.1231*** (0.0267)	-0.0319 (0.0205)	-0.0581** (0.0236)	-0.0334** (0.0151)	-0.1083*** (0.0238)
Constant	-0.4818*** (0.0896)	-0.2053*** (0.0428)	-0.0923 (0.0986)	-0.0592 (0.0457)	-0.7643*** (0.0716)	-0.4227*** (0.0344)	-0.1370* (0.0806)	0.2095*** (0.0465)
R ²	0.3321	0.3212	0.1716	0.1333	0.4430	0.5142	0.1268	0.1404
Panel B: Monetary measure								
FEAPenalty _q	-0.0080*** (0.0011)	-0.0030 (0.0027)	-0.0069*** (0.0009)	-0.0023 (0.0024)	-0.0043* (0.0025)	-0.0018 (0.0037)	-0.0029*** (0.0008)	-0.0020 (0.0024)
SIZE _{q-1}	0.1619** (0.0636)	0.0336 (0.0419)	0.2066*** (0.0697)	0.1190*** (0.0399)	-0.0879* (0.0522)	-0.0997** (0.0446)	0.2240*** (0.0566)	-0.0235 (0.0658)
EQ _{q-1}	-0.0567*** (0.0154)	-0.1064*** (0.0201)	-0.0106 (0.0173)	-0.0178 (0.0232)	-0.1518*** (0.0160)	-0.1997*** (0.0183)	0.1176*** (0.0153)	0.0356* (0.0216)
ADZP _{q-1}	-0.0124 (0.0081)	-0.0087 (0.0090)	-0.0094 (0.0094)	0.0020 (0.0103)	-0.0172** (0.0081)	-0.0181** (0.0088)	0.0144* (0.0079)	-0.0045 (0.0102)
NIM _{q-1}	0.0183 (0.0123)	-0.0015 (0.0064)	0.0158 (0.0129)	-0.0002 (0.0074)	0.0050 (0.0117)	-0.0024 (0.0059)	0.0197 (0.0200)	-0.0039 (0.0084)
CIR _{q-1}	-0.1094*** (0.0183)	-0.1479*** (0.0264)	-0.1066*** (0.0186)	-0.1229*** (0.0268)	-0.0320 (0.0205)	-0.0583** (0.0237)	-0.0339** (0.0151)	-0.1089*** (0.0239)
Constant	-0.4838*** (0.0896)	-0.2054*** (0.0428)	-0.0932 (0.0986)	-0.0594 (0.0457)	-0.7658*** (0.0716)	-0.4227*** (0.0344)	-0.1398* (0.0806)	0.2096*** (0.0465)
R ²	0.3322	0.3212	0.1718	0.1333	0.4430	0.5142	0.1262	0.1399
Observations	26,635	34,650	26,635	34,650	26,635	34,650	26,635	34,650
No. of banks	498	498	498	498	498	498	498	498
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the estimates of Eqs. 2 and 4 based on subsamples of smaller and larger banks. The sample is divided into two groups by median bank size to examine the relationship between BLC and FEA in the below-median and above-median groups. The two measures of misconduct are: FEADummy (Panel A) and FEAPenalty (Panel B). The three subcomponents of BLC (cols. 1-2) are asset-side liquidity creation (cols. 3-4), liability-side liquidity creation (cols. 5-6) and off-balance-sheet-side liquidity creation (cols. 7-8). All controls are lagged by one quarter. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardised to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.3. Role of bank capital

Further, to extend our subsample analysis, we test whether the relationship between BLC and FEA is influenced by the level of bank capital. For this purpose, we again divide our sample into two groups based on the median of the equity capital ratio. Given that well-capitalised banks are less likely to face enforcement actions (Delis et al., 2017), we examine how their liquidity creation differs from that of less-capitalised banks in the case of a misconduct provision. Our results in Table 17 suggest that the adverse impact of an FEA on liquidity creation is greater for well-capitalised banks, and for these banks, an instance of a misconduct provision decreases BLC by 0.88 percentage points. This may be because, given all other bank characteristics are constant, a well-capitalised bank is better positioned to absorb greater risk and hence can create more liquidity than a less-capitalised bank. Therefore, a well-capitalised bank’s ability to create liquidity is impacted more when FEAs are imposed to restrict risky bank activities. Additionally, the amount of CMP assessed to a bank depends on its size and capital (FDIC, 2024), and hence we again see that monetary penalties significantly reduce the liquidity created by well-capitalised banks.

Table 17: Role of bank capital

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(Median)							
	Below	Above	Below	Above	Below	Above	Below	Above
VARIABLES	BLC _q	BLC _q	BLC _{Asset q}	BLC _{Asset q}	BLC _{Liability q}	BLC _{Liability q}	BLC _{OBS q}	BLC _{OBS q}
Panel A: Dummy measure								
FEADummy _{q-1}	-0.0246 (0.0169)	-0.0491** (0.0215)	0.0189 (0.0185)	-0.0049 (0.0234)	-0.0295* (0.0165)	-0.0566*** (0.0188)	-0.1013*** (0.0197)	-0.1056*** (0.0218)
SIZE _{q-1}	0.0068 (0.0520)	0.0944** (0.0474)	0.0711 (0.0500)	0.1432*** (0.0505)	-0.1316** (0.0552)	-0.0443 (0.0417)	0.1116 (0.0939)	0.0258 (0.0534)
EQ _{q-1}	0.0190 (0.0237)	-0.1034*** (0.0133)	0.0728** (0.0297)	-0.0352** (0.0148)	-0.1301*** (0.0278)	-0.1794*** (0.0130)	0.1229*** (0.0229)	0.0553*** (0.0153)
ADZP _{q-1}	-0.0212** (0.0084)	-0.0078 (0.0086)	-0.0172 (0.0106)	0.0009 (0.0094)	-0.0168** (0.0081)	-0.0187** (0.0082)	0.0019 (0.0083)	0.0038 (0.0093)
NIM _{q-1}	0.0062 (0.0056)	-0.0000 (0.0099)	0.0014 (0.0064)	0.0079 (0.0115)	0.0043 (0.0080)	-0.0093 (0.0071)	0.0042 (0.0109)	-0.0015 (0.0110)
CIR _{q-1}	-0.1117*** (0.0254)	-0.1198*** (0.0183)	-0.0818*** (0.0309)	-0.1182*** (0.0173)	-0.0619** (0.0242)	-0.0266 (0.0196)	-0.0879*** (0.0214)	-0.0527*** (0.0157)
Constant	-0.3611*** (0.0518)	-0.3639*** (0.0557)	-0.1761*** (0.0559)	-0.0679 (0.0597)	-0.4754*** (0.0468)	-0.6212*** (0.0481)	0.0634 (0.0649)	-0.0406 (0.0587)
R ²	0.3284	0.3241	0.1291	0.1708	0.5338	0.4405	0.1451	0.1152
Panel B: Monetary measure								
FEAPenalty _q	-0.0016 (0.0037)	-0.0074*** (0.0016)	-0.0007 (0.0020)	-0.0063*** (0.0008)	-0.0027 (0.0050)	-0.0035 (0.0031)	0.0013 (0.0015)	-0.0043*** (0.0010)
SIZE _{q-1}	0.0066 (0.0520)	0.0943** (0.0474)	0.0712 (0.0500)	0.1432*** (0.0505)	-0.1319** (0.0552)	-0.0444 (0.0417)	0.1109 (0.0939)	0.0255 (0.0535)
EQ _{q-1}	0.0193 (0.0237)	-0.1032*** (0.0133)	0.0725** (0.0297)	-0.0353** (0.0148)	-0.1298*** (0.0278)	-0.1791*** (0.0130)	0.1240*** (0.0229)	0.0560*** (0.0153)
ADZP _{q-1}	-0.0211** (0.0084)	-0.0077 (0.0086)	-0.0172 (0.0106)	0.0009 (0.0094)	-0.0168** (0.0081)	-0.0186** (0.0082)	0.0022 (0.0083)	0.0041 (0.0093)
NIM _{q-1}	0.0062 (0.0056)	0.0000 (0.0099)	0.0014 (0.0064)	0.0079 (0.0115)	0.0043 (0.0080)	-0.0092 (0.0071)	0.0042 (0.0109)	-0.0014 (0.0110)
CIR _{q-1}	-0.1119*** (0.0254)	-0.1196*** (0.0183)	-0.0816*** (0.0309)	-0.1178*** (0.0172)	-0.0621** (0.0242)	-0.0266 (0.0196)	-0.0888*** (0.0214)	-0.0529*** (0.0157)
Constant	-0.3611*** (0.0518)	-0.3652*** (0.0557)	-0.1761*** (0.0559)	-0.0685 (0.0597)	-0.4756*** (0.0468)	-0.6223*** (0.0481)	0.0635 (0.0649)	-0.0424 (0.0587)
R-squared	0.3284	0.3242	0.1291	0.1709	0.5338	0.4404	0.1445	0.1148
Observations	30,904	30,381	30,904	30,381	30,904	30,381	30,904	30,381
No. of banks	498	498	498	498	498	498	498	498
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the estimates of Eqs. 2 and 4 based on subsamples of less-capitalised and well-capitalised banks. The sample is divided into two groups by median equity-to-assets ratio to examine the relationship between BLC and FEA in the below-median and above-median groups. The two measures of misconduct are: FEADummy (Panel A) and FEAPenalty (Panel B). The three subcomponents of BLC (cols. 1-2) are asset-side liquidity creation (cols. 3-4), liability-side liquidity creation (cols. 5-6) and off-balance-sheet-side liquidity creation (cols. 7-8). All controls are lagged by one quarter. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardised to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.4. Role of bank funding structure

In a traditional bank business model, lending activities are primarily funded by deposits, and [Delis et al. \(2019\)](#) find that FEAs reduce total bank deposits. Therefore, it is of interest to examine whether banks’ funding structures influence the relationship between FEA and BLC. We split our sample into two subsamples based on the median deposit-to-assets ratio. Banks with deposits-to-assets ratio below (above) the median are regarded as banks that depend more on market-based (deposit-based) funding. [Table 18](#) reports the regression results for the two funding-structure subsamples and indicates that the linkage between FEA and liquidity creation is influenced by bank funding structure. When faced with an FEA, banks that are more dependent on market-based funding are found to reduce their dependence on demand deposits and overnight funds, and move to more stable sources of funds, and even reduce their off-balance-sheet exposure, thereby creating less liquidity as compared to banks that are more dependent on deposit-based funding. The magnitudes of the estimated coefficients suggest that an instance of an FEA leads to a decline in the liability-side (off-balance-sheet side) liquidity creation for more market-based funding banks by around 0.46 (0.48) percentage points, as compared to 0.25 (0.37) percentage points for more deposit-based funding banks.

Table 18: Role of bank funding structure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Median							
	Below	Above	Below	Above	Below	Above	Below	Above
Variables	BLC _q	BLC _q	BLC _{Asset q}	BLC _{Asset q}	BLC _{Liability q}	BLC _{Liability q}	BLC _{OBS q}	BLC _{OBS q}
Panel A: Dummy measure								
FEADummy _{q-1}	-0.0467** (0.0220)	-0.0314* (0.0161)	0.0023 (0.0222)	0.0087 (0.0196)	-0.0554*** (0.0194)	-0.0314** (0.0158)	-0.1133*** (0.0230)	-0.1024*** (0.0177)
SIZE _{q-1}	0.0492 (0.0499)	0.0950* (0.0505)	0.1458*** (0.0488)	0.1245** (0.0531)	-0.1169*** (0.0425)	-0.0530 (0.0511)	-0.0238 (0.0660)	0.1441** (0.0708)
EQ _{q-1}	-0.0994*** (0.0150)	-0.0530*** (0.0200)	-0.0296* (0.0160)	-0.0012 (0.0245)	-0.1785*** (0.0138)	-0.1528*** (0.0214)	0.0541*** (0.0170)	0.1050*** (0.0196)
ADZP _{q-1}	-0.0103 (0.0092)	-0.0144* (0.0078)	0.0001 (0.0095)	-0.0121 (0.0104)	-0.0200** (0.0088)	-0.0137* (0.0074)	-0.0001 (0.0096)	0.0062 (0.0084)
NIM _{q-1}	0.0006 (0.0073)	0.0051 (0.0098)	0.0052 (0.0072)	0.0029 (0.0130)	-0.0082 (0.0068)	0.0043 (0.0089)	0.0041 (0.0113)	-0.0036 (0.0101)
CIR _{q-1}	-0.1258*** (0.0215)	-0.1223*** (0.0160)	-0.1192*** (0.0220)	-0.1031*** (0.0182)	-0.0277 (0.0214)	-0.0653*** (0.0176)	-0.0702*** (0.0166)	-0.0585*** (0.0201)
Constant	-0.3522*** (0.0490)	-0.3769*** (0.0550)	-0.0589 (0.0514)	-0.1700*** (0.0595)	-0.6609*** (0.0397)	-0.4562*** (0.0519)	0.0701 (0.0526)	-0.0699 (0.0676)
R ²	0.3023	0.3488	0.1520	0.1401	0.4379	0.5335	0.1292	0.1288
Panel B: Monetary measure								
FEAPenalty _q	-0.0053** (0.0025)	-0.0117 (0.0082)	-0.0041** (0.0016)	-0.0130** (0.0066)	-0.0033 (0.0028)	-0.0024 (0.0119)	-0.0027* (0.0015)	-0.0027 (0.0052)
SIZE _{q-1}	0.0492 (0.0499)	0.0947* (0.0505)	0.1458*** (0.0488)	0.1245** (0.0531)	-0.1170*** (0.0425)	-0.0533 (0.0511)	-0.0239 (0.0660)	0.1432** (0.0708)
EQ _{q-1}	-0.0991*** (0.0150)	-0.0527*** (0.0200)	-0.0297* (0.0160)	-0.0013 (0.0245)	-0.1782*** (0.0138)	-0.1526*** (0.0214)	0.0550*** (0.0170)	0.1059*** (0.0196)
ADZP _{q-1}	-0.0102 (0.0092)	-0.0144* (0.0078)	0.0001 (0.0095)	-0.0121 (0.0104)	-0.0199** (0.0088)	-0.0136* (0.0074)	0.0002 (0.0096)	0.0065 (0.0084)
NIM _{q-1}	0.0006 (0.0073)	0.0051 (0.0098)	0.0052 (0.0072)	0.0030 (0.0130)	-0.0082 (0.0068)	0.0043 (0.0089)	0.0043 (0.0113)	-0.0036 (0.0101)
CIR _{q-1}	-0.1257*** (0.0215)	-0.1226*** (0.0160)	-0.1189*** (0.0220)	-0.1030*** (0.0182)	-0.0277 (0.0214)	-0.0656*** (0.0176)	-0.0706*** (0.0166)	-0.0595*** (0.0201)
Constant	-0.3532*** (0.0490)	-0.3775*** (0.0550)	-0.0594 (0.0515)	-0.1702*** (0.0596)	-0.6617*** (0.0397)	-0.4566*** (0.0519)	0.0690 (0.0526)	-0.0709 (0.0676)
R-squared	0.3023	0.3488	0.1521	0.1401	0.4378	0.5334	0.1287	0.1282
Observations	30,655	30,630	30,655	30,630	30,655	30,630	30,655	30,630
No. of banks	498	498	498	498	498	498	498	498
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the estimates of [Eqs. 2 and 4](#) based on subsamples of market-based and deposit-based funding structure of banks. The sample is divided into two groups by median deposits-to-assets ratio to examine the relationship between BLC and FEA in the below-median and above-median groups. The two measures of misconduct are: FEADummy (Panel A) and FEAPenalty (Panel B). The three subcomponents of BLC (cols. 1-2) are asset-side liquidity creation (cols. 3-4), liability-side liquidity creation (cols. 5-6) and off-balance-sheet-side liquidity creation (cols. 7-8). All controls are lagged by one quarter. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardised to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.5. High-offender vs low-offender

Our results provide strong evidence that enforcement of formal actions on banks reduces the amount of liquidity created. Our baseline regressions include 996 misconduct banks, 303 (30%) of which were subject to more than one FEA and 104 (10%) of which were subject to more than two FEAs. To examine whether repeat-offender banks have a disproportionate impact on liquidity creation, we estimate two separate models, with dummy variables for high-offender and low-offender banks as the main regressors in each of the models. *High-offender* equals one if a bank faces more than one FEA in a quarter and zero otherwise, and *low-offender* equals one if a bank faces just one FEA in a quarter and zero otherwise. Table 19 reports the results for the high-offender and low-offender banks. We find that when banks face more than one FEAs in a quarter, the decline in their BLC is greater than that of low-offender banks, particularly for the liquidity created on the liability side. However, the reduction in liquidity created on the off-balance-sheet side is significant only when banks face a single FEA in a quarter. This is in line with Altunbas et al. (2018) and Dorminey et al. (2012), who find that repeated FEAs desensitise a bank, making the bank's misconduct more continuous over time.

Table 19: High vs low offender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Low BLC _q	High BLC _q	Low BLC _{Asset q}	High BLC _{Asset q}	Low BLC _{Liability q}	High BLC _{Liability q}	Low BLC _{OBS q}	High BLC _{OBS q}
FEA _{q-1}	-0.0320** (0.0146)	-0.1349** (0.0662)	0.0145 (0.0159)	-0.0345 (0.0664)	-0.0437*** (0.0129)	-0.1711** (0.0761)	-0.1089*** (0.0148)	-0.1508 (0.0974)
SIZE _{q-1}	0.0700** (0.0354)	0.0698** (0.0354)	0.1378*** (0.0357)	0.1378*** (0.0357)	-0.0908*** (0.0339)	-0.0910*** (0.0338)	0.0534 (0.0484)	0.0529 (0.0484)
EQ _{q-1}	-0.0829*** (0.0121)	-0.0826*** (0.0121)	-0.0191 (0.0136)	-0.0193 (0.0136)	-0.1698*** (0.0117)	-0.1695*** (0.0117)	0.0728*** (0.0130)	0.0738*** (0.0130)
ADZP _{q-1}	-0.0121** (0.0061)	-0.0120* (0.0061)	-0.0047 (0.0070)	-0.0047 (0.0070)	-0.0183*** (0.0059)	-0.0181*** (0.0059)	0.0023 (0.0064)	0.0027 (0.0064)
NIM _{q-1}	0.0026 (0.0058)	0.0026 (0.0058)	0.0040 (0.0067)	0.0040 (0.0067)	-0.0026 (0.0054)	-0.0025 (0.0054)	0.0016 (0.0077)	0.0017 (0.0078)
CIR _{q-1}	-0.1257*** (0.0147)	-0.1258*** (0.0147)	-0.1153*** (0.0154)	-0.1152*** (0.0154)	-0.0404*** (0.0154)	-0.0406*** (0.0154)	-0.0657*** (0.0128)	-0.0665*** (0.0128)
Constant	-0.3678*** (0.0367)	-0.3681*** (0.0367)	-0.1069*** (0.0391)	-0.1069*** (0.0391)	-0.5714*** (0.0325)	-0.5718*** (0.0325)	-0.0189 (0.0413)	-0.0196 (0.0413)
Observations	61,285	61,285	61,285	61,285	61,285	61,285	61,285	61,285
Number of banks	996	996	996	996	996	996	996	996
R ²	0.3216	0.3216	0.1448	0.1448	0.4817	0.4817	0.1255	0.1248
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the estimates of Eq. 2 based on subsamples of high offenders vs low offenders. *High-offender* (cols. 2,4,6 and 8) is a dummy variable which equals one if a bank faces more than one FEA in a given quarter, and *Low-offender* (cols. 1,3,5 and 7) is a dummy variable which equals one if a bank faces just one FEA in a quarter. The two measures of misconduct are: FEA_{Dummy} (Panel A) and FEA_{Penalty} (Panel B). The three subcomponents of BLC (cols. 1-2) are asset-side liquidity creation (cols. 3-4), liability-side liquidity creation (cols. 5-6) and off-balance-sheet-side liquidity creation (cols. 7-8). All controls are lagged by one quarter. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardised to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.6. Role of internal and external moderators

In this section, we aim to investigate how internal and external moderators influence the negative impact of misconduct on bank liquidity creation. First, we examine whether opacity moderates the negative association between misconduct and liquidity creation by focusing on the interaction term (β_3) between opacity and bank misconduct. Second, we analyse whether banks operating in high social capital counties are a significant moderator through which misconduct impacts bank liquidity creation. To test the moderating effect of these variables, we extend our baseline model by adding interaction terms $FEA*Opacity_{i,q-1}$ and $FEA*Social\ Capital_{i,q-1}$ in different models:

$$BLC_{GTA\ i,q} = \beta_0 + \beta_1 FEA_{Dummy\ i,q-1} + \beta_2 Z_{i,q-1} + \beta_3 FEA_{Dummy\ i,q-1} * Z_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (10)$$

$$BLC_{GTA\ i,q} = \beta_0 + \beta_1 FEA_{Count\ i,q-1} + \beta_2 Z_{i,q-1} + \beta_3 FEA_{Count\ i,q-1} * Z_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (11)$$

$$BLC_{GTA\ i,q} = \beta_0 + \beta_1 FEA_{Penalty\ i,q} + \beta_2 Z_{i,q-1} + \beta_3 FEA_{Penalty\ i,q} * Z_{i,q-1} + \theta_i + \gamma_q + \epsilon_{i,q} \quad (12)$$

The subscript $i = 1, \dots, N$ describes the misconduct banks considered over the quarters $q = 1, \dots, Q$. $Z_{i,q-1}$ represents the variables $Opacity_{i,q-1}$ and $Social\ Capital_{i,q-1}$.

8.6.1. Role of opacity

Table 20 presents results from the panel regressions of total BLC (column 1), asset side BLC (column 2), liability side BLC (column 3), and off-balance sheet side BLC (column 4) on misconduct and its interaction with opacity at the bank level from the first quarter of 2001 to the fourth quarter of 2024. Panels A, B, and C report models for the three different measures of misconduct, which are dummy, count, and monetary penalty, respectively. The estimated coefficient of bank opacity is negative and significant at 1% level, indicating that high information asymmetry and reduced trust result in lower bank liquidity creation. We next focus on the interaction term (β_3) between opacity and FEAs ($Opacity * FEA$) to explore whether bank opacity moderates the negative association between bank misconduct and liquidity creation. Overall, we find that bank opacity does exert different influences on the association between misconduct and the components of BLC. In column (3), the coefficients on the interaction terms between the three misconduct measures and opacity yield a negative and statistically significant relationship at the 1% level, indicating that the negative effect of bank misconduct on liability-side liquidity creation is more pronounced for banks with higher opacity. Additionally, this pronounced negative impact due to bank opacity is also reported for off-balance sheet side liquidity creation (column 4, Panels A and B). Moreover, the magnitude of the misconduct coefficient is also larger. These results suggest that the difficulty in valuing bank assets due to loan loss has a negative influence on the liquidity created on the liability and off-balance sheet sides. Reduced trust in banks due to opacity weakens banks' access to funds (Goldsmith-Pinkham and Yorulmazer, 2010; Huang and Ratnovski, 2011; Shin, 2009), resulting in a decrease in funds for non-traditional activities. In contrast, when opaque banks face misconduct actions, they are found to increase asset-side liquidity creation, as shown in column (2) (Panels A and B). This finding is consistent with the reputational effect hypothesis. The interaction term is positive and significant at the 1% level, suggesting that banks with high opacity increase their credit supply when faced with an FEA to avoid losing business and mitigate the reputational stigma. Our results are in line with the existing

literature, showing that opaque banks increase lending activities and decrease non-lending activities when faced with an FEA (Tracey et al., 2025).

In addition, results in Panel C show that when opaque banks face monetary penalties for violating any law, regulation, or order, the total liquidity created by banks declines. This indicates that high information asymmetry and weakened public trust during enforcement actions diminish banks' ability to attract deposits (Babar et al., 2021) and are the major reasons leading to a decline in liquidity creation. In summary, the results in Table 11 are consistent with our second hypothesis (H2). For banks with higher opacity, FEA has a more pronounced negative effect on the liquidity created from the liability and off-balance sheet sides of the balance sheet and a weakened negative effect on the asset-side BLC.

Table 20: Moderating effect of opacity on bank liquidity creation

	(1)	(2)	(3)	(4)
VARIABLES	BLC _q	BLC _{Asset q}	BLC _{Liability q}	BLC _{OBS q}
Opacity _{q-1}	-0.0260*** (0.0048)	-0.0217*** (0.0051)	-0.0079 (0.0046)	-0.0290*** (0.0052)
R ²	0.3255	0.1413	0.4970	0.1325
Panel A: Dummy Measure				
Opacity _{q-1}	-0.0255*** (0.0048)	-0.0224*** (0.0051)	-0.0063 (0.0046)	-0.0276*** (0.0052)
FEA _{Dummy q-1}	-0.1081* (0.0629)	0.1330** (0.0648)	-0.2972*** (0.0628)	-0.3075*** (0.0629)
FEA_{Dummy q-1} * Opacity_{q-1}	-0.0097 (0.0085)	0.0181** (0.0088)	-0.0360*** (0.0086)	-0.0284*** (0.0085)
R ²	0.3256	0.1414	0.4973	0.1332
Panel B: Count Measure				
Opacity _{q-1}	-0.0256*** (0.0048)	-0.0225*** (0.0051)	-0.0064 (0.0046)	-0.0275*** (0.0052)
FEA _{Count q-1}	-0.0840 (0.0582)	0.1329** (0.0609)	-0.2511*** (0.0550)	-0.2986*** (0.0583)
FEA_{Count q-1} * Opacity_{q-1}	-0.0077 (0.0086)	0.0185** (0.0091)	-0.0320*** (0.0081)	-0.0294*** (0.0086)
R ²	0.3256	0.1414	0.4973	0.1334
Panel C: Penalty Measure				
Opacity _{q-1}	-0.0259*** (0.0048)	-0.0217*** (0.0051)	-0.0077* (0.0046)	-0.0289*** (0.0052)
FEA _{Penalty q}	-0.0225*** (0.0061)	-0.0106 (0.0070)	-0.0252*** (0.0054)	-0.0069 (0.0047)
FEA_{Penalty q} * Opacity_{q-1}	-0.0171** (0.0071)	-0.0052 (0.0080)	-0.0237*** (0.0057)	-0.0041 (0.0057)
R ²	0.3257	0.1414	0.4971	0.1325
Observations	57,432	57,432	57,432	57,432
Number of banks	944	944	944	944
Controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from Eqs. 10-12 for analysing the moderating effect of opacity on total bank liquidity creation and its components. The three measures of misconduct are: FEA_{Dummy} (Panel A), FEA_{Count} (Panel B), and FEA_{Penalty} (Panel C). All variables are defined in Table 1. All controls are lagged by one quarter. The dependent variables are the dollar amounts of the total bank liquidity creation and its components divided by gross total assets. The sample period ranges from 2001:Q1 to 2024:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.6.2. Role of social capital

Table 21 presents the results from the panel data regressions of total BLC (column 1), asset side BLC (column 2), liability side BLC (column 3) and off-balance sheet side BLC (column 4) on the three misconduct provisions: Dummy (Panel A), Count (Panel B) and Monetary penalty (Panel C), an interaction term $FEA * Social\ Capital$, and controls from 2001:Q1 to 2014:Q4. We find that social capital is negatively associated with liability creation on the liability and off-balance sheet sides. This is because banks in high social capital areas reduce opportunistic behaviour (Hasan et al., 2017; Jha and Chen, 2015) and take on lower abnormal risk (Jin et al., 2017), thereby reducing non-lending activities (Tracey et al., 2025). Moreover, Cornett et al. (2021) find that banks in high social capital areas prioritize the interests of customers and other stakeholders over purely focusing on profit maximization. Such banks are found to pay higher interest and charge lower fees on deposits, which enables deposits to remain sticky. Thus, banks in high social capital counties need not issue large volumes of liquid liabilities, as these banks have access to stable deposits.

Additionally, the coefficients on the dummy and count measures of misconduct continue to display a negative and significant relationship with BLC. Turning to the interaction term, we find that social capital mitigates the negative effect of misconduct on the liquidity created from the liability and off-balance sheet sides of the balance sheet (Panels A and B). This suggests that counties with higher social capital have increased trust in their banking institutions or the people who work there, and funds are not withdrawn when these banks face an FEA. Moreover, the interaction terms in Panels B and C demonstrate that higher social capital has a more pronounced negative impact on the liquidity created on the asset side of the balance sheet, indicating that the bank management cares about the externalities imposed on others due to their misconduct actions and hence reduces the bank's investments in risky assets. These results support our third (H3) hypothesis and suggest that bank insiders and outsiders in counties with denser social networks and shared civic norms cooperate highly to ensure the smooth functioning of banks operating within those counties.

Table 21: The moderating effect of social capital on bank liquidity creation

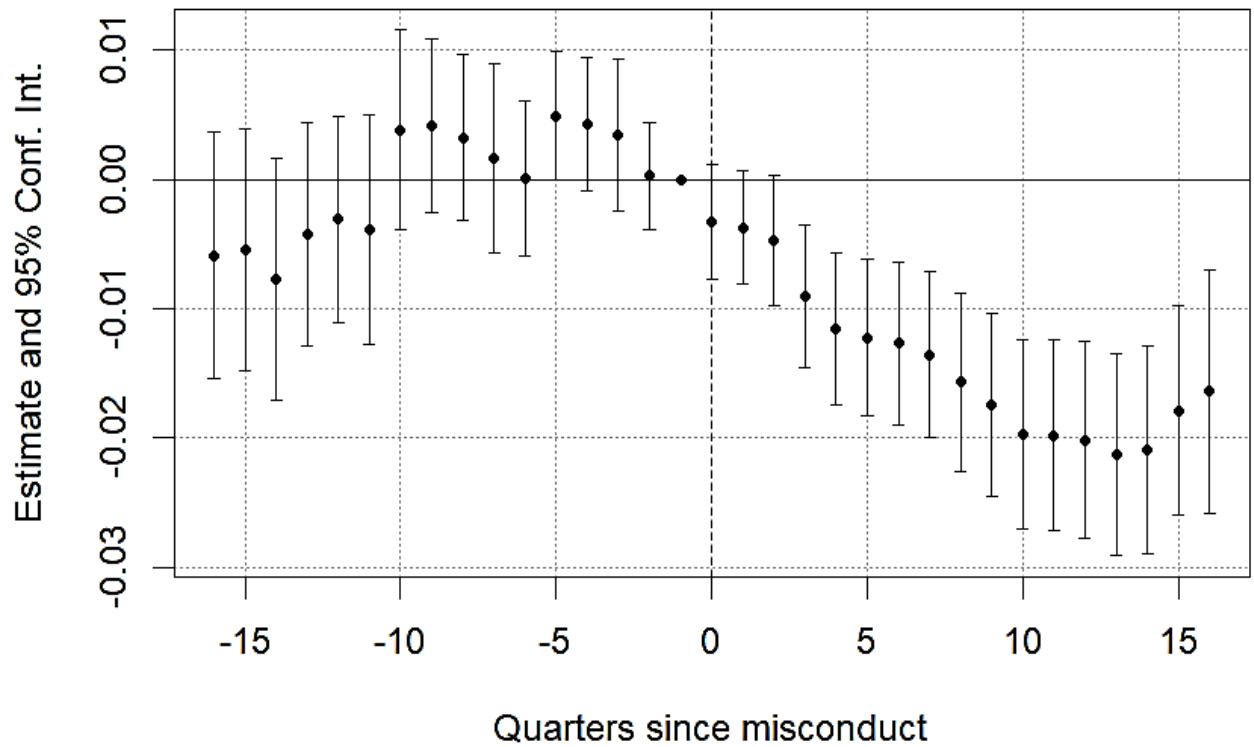
	(1)	(2)	(3)	(4)
VARIABLES	BLC _q	BLC _{Asset q}	BLC _{Liability q}	BLC _{OBS q}
Social Capital _{q-1}	-0.0460 (0.0366)	0.0616 (0.0468)	-0.1174*** (0.0395)	-0.1434*** (0.0503)
R ²	0.1441	0.1296	0.3458	0.1331
Panel A: Dummy Measure				
Social Capital _{q-1}	-0.0461 (0.0366)	0.0619 (0.0468)	-0.1179*** (0.0394)	-0.1439*** (0.0502)
FEA _{Dummy q-1}	-0.0374*** (0.0133)	-0.0103 (0.0154)	-0.0257** (0.0123)	-0.0812*** (0.0144)
FEA _{Dummy q-1} * Social Capital _{q-1}	0.0007 (0.0026)	-0.0052* (0.0031)	0.0068*** (0.0022)	0.0054** (0.0026)
R ²	0.1442	0.1297	0.3462	0.1339
Panel B: Count Measure				
Social Capital _{q-1}	-0.0461 (0.0366)	0.0620 (0.0468)	-0.1180*** (0.0394)	-0.1441*** (0.0502)
FEA _{Count q-1}	-0.0344*** (0.0133)	-0.0046 (0.0149)	-0.0279** (0.0124)	-0.0851*** (0.0145)
FEA _{Count q-1} * Social Capital _{q-1}	0.0005 (0.0030)	-0.0074** (0.0035)	0.0089*** (0.0025)	0.0072** (0.0029)
R ²	0.1442	0.1298	0.3463	0.1342
Panel C: Penalty Measure				
Social Capital _{q-1}	-0.0462 (0.0366)	0.0615 (0.0468)	-0.1176*** (0.0395)	-0.1435*** (0.0504)
FEA _{Penalty q}	-0.0030 (0.0036)	-0.0005 (0.0016)	-0.0054 (0.0051)	0.0004 (0.0017)
FEA _{Penalty q} * Social Capital _{q-1}	-0.0421 (0.0314)	-0.0440*** (0.0149)	-0.0030 (0.0439)	-0.0302* (0.0162)
R ²	0.1443	0.1297	0.3460	0.1331
Observations	36,238	36,238	36,238	36,238
Number of banks	898	898	898	898
Controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES

Note: This table reports regression coefficient estimates from Eqs. 10-12 for analysing the moderating effect of social capital on total bank liquidity creation and its components. The three measures of misconduct are: FEA_{Dummy} (Panel A), FEA_{Count} (Panel B), and FEA_{Penalty} (Panel C). All variables are defined in Table 1. All controls are lagged by one quarter. The dependent variables are the dollar amounts of the total bank liquidity creation and its components divided by gross total assets. The sample period ranges from 2001:Q1 to 2014:Q4. All continuous variables are winsorized at the 1st and 99th percentiles and standardized to have a mean of zero and a standard deviation of one. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

8.7. Robustness: staggered quasi-natural experiment

The regressions in the baseline specification (Eqs. 2-4) are attempts to estimate all FEAs without a difference-in-differences (DiD) specification. A prerequisite for the DiD analysis is that the response variable of the treatment and control groups in the pre-treatment period must meet the parallel trend hypothesis (Sun et al., 2023). Fig. 5 shows the relative difference in total bank liquidity creation (BLC) in the treatment and control groups before and after the enactment of an FEA. We see a significant difference in the trend after FEAs are sanctioned on banks in the treatment group. Specifically, banks in the treatment group see a decline in their total bank liquidity creation. This figure suggests that treatment and control banks have parallel trends prior to the enactment of FEAs.

Fig. 5: Establishing parallel trends in the pre-treatment period



Note: The figure shows the estimated difference in total liquidity creation between treated and control banks. The horizontal axis represents the number of quarters that have elapsed since a formal enforcement action (FEA Dummy) was taken against a bank. The vertical axis shows the difference in the total bank liquidity creation (BLC).

Further, we use DiD to evaluate the causal effects of FEAs on BLC. Since the FEAs are sanctioned on banks at different time periods and with varied intensities based on the misconduct, the treatment effect will be heterogeneous. The two-way fixed effects model is not appropriate in this case, as it would lead to a forbidden comparison by taking banks treated earlier as a control group for banks treated later. Therefore, we follow the robust estimators of heterogeneous treatment effects proposed by [Callaway and Sant'Anna \(2021\)](#) to estimate the "average treatment effect on the treated" (ATT) with a 95% confidence interval. Here, the staggered treatment adoption assumption ensures that once a bank participates in the treatment, it remains treated, as the bank won't forget its treatment experience. We utilise our entire sample of banks, which yields a 0.9 correlation with the [Berger and Bouwman \(2009\)](#) data. As bank supervisors initially enforce informal actions against misconduct banks, which are confidential and thus unknown to the market, bank activities can change to address these actions ([Deli et al., 2019](#); [Delis et al., 2019](#); [Papadimitri et al., 2019](#)). Hence, banks can anticipate the enactment of an FEA before it is actually imposed. Thus, we assume a quarter-long anticipation period in our study. We run the DiD analysis using the "doubly robust" approach, as it provides additional robustness against model misspecifications compared to the outcome regression and inverse probability weighting approaches.

[Table 22](#) presents the results excluding controls (column 1) and including controls (column 2). We report the single parameter of the aggregated group-time average treatment effect as per simple aggregation, dynamic effects (event studies), group-specific effects, and calendar time effects. All four 'average treatment effect on the treated' (ATT) estimates are negative and highly significant. [Fig. 6](#) plots the aggregate group-time effects as an event study with a 95% confidence

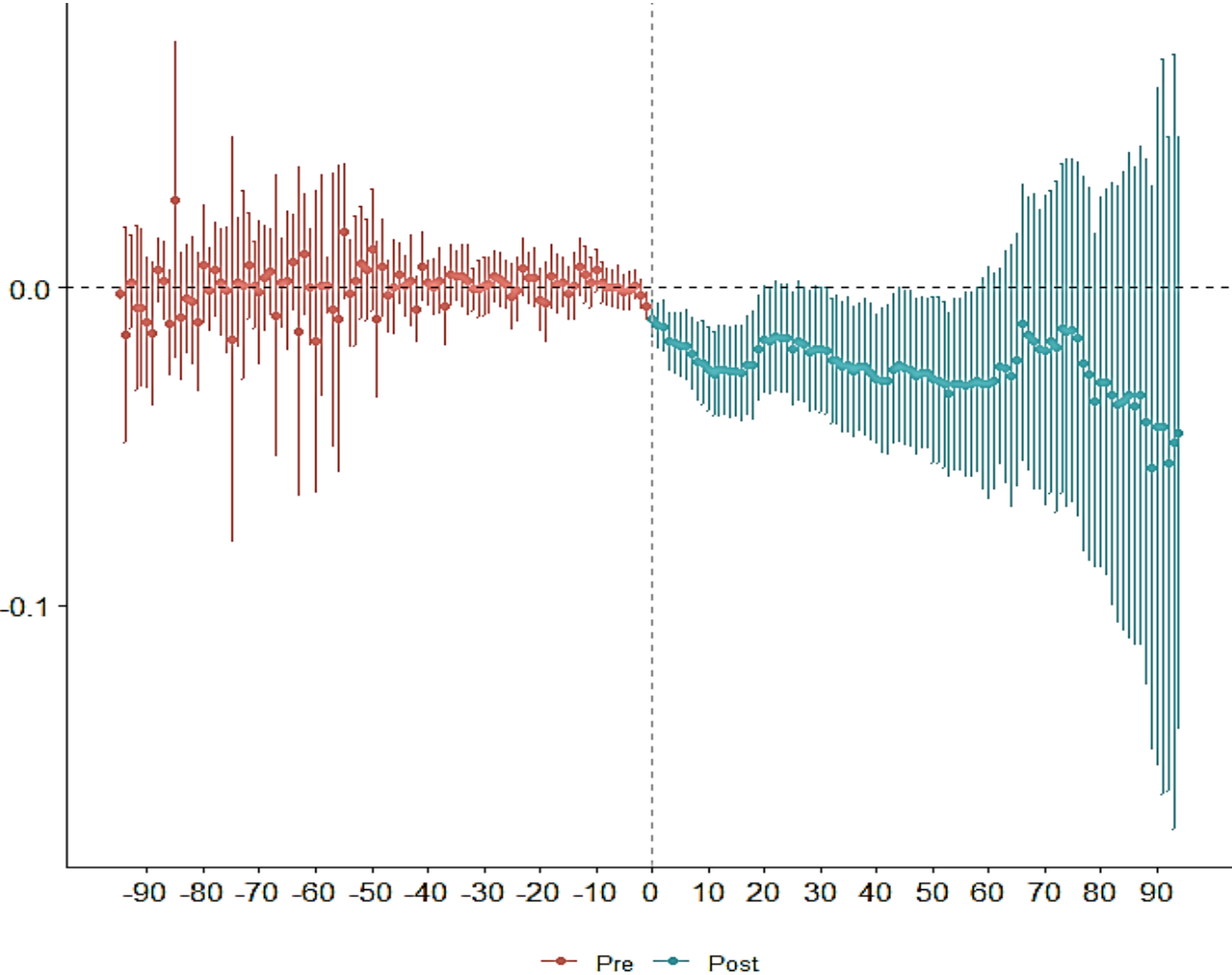
interval. We find that the enactment of an FEA on a bank reduces the liquidity created by banks. Thus, these findings reaffirm the validity of our baseline results.

Table 22: Staggered DiD estimates with a confidence interval of 95%

	(1)	(2)
ATT	BLC	BLC
Simple aggregation	-0.0238 (0.0049)	-0.0259 (0.0057)
Dynamic effects	-0.0257 (0.0068)	-0.0263 (0.0080)
Group-specific effects	-0.0238 (0.0049)	-0.0258 (0.0048)
Calendar time effects	-0.0189 (0.0040)	-0.0224 (0.0047)
Controls	No	Yes
Quarter FE	Yes	Yes
Bank FE	Yes	Yes
Anticipation period	1 quarter	1 quarter
Observations	346,505	299,558
Control group	Never treated	Never treated
Estimation method	Doubly robust	Doubly robust

Note: This table presents the DiD results excluding controls (column 1) and including controls (column 2) following [Callaway and Sant’Anna \(2021\)](#). We report the single parameter of the group-time average treatment effect, aggregated as per simple effect, dynamic effects (event studies), group-specific effects, and calendar time effects, which are significant at the 5% level.

Fig. 6: Dynamic group-time average treatment effects with an anticipation period of one quarter



Note: This figure aggregates group-time effects into an event study plot with a 95% confidence interval. We assume an anticipation period of one quarter due to informal actions and estimate the average treatment effect on the treated (ATT) using the doubly robust estimation method. The x-axis is the length of exposure to the enactment of an FEA.

8.8. Path Analysis

Our previous analyses provide a strong, robust negative relationship between bank misconduct provisions and liquidity creation. In this subsection, we examine if there are any paths through which this relationship is mediated. Following [Bauer et al. \(2021\)](#) and [Colak et al. \(2025\)](#), we use unidirectional (recursive) path analysis and structural equation modelling to investigate the mediation effect of FEA (the source variable) on liquidity creation and its components (outcome variables). We identify funding liquidity creation (FLC) and return on assets (ROA) as the two mediators through which the effects of FEA are transmitted to curtail liquidity creation. FLC is the amount of bank lending that exceeds the bank's stock of cash deposits. Since a bank's capital ratio determines how much funding liquidity it can create ([Delis et al., 2017](#)), and FEAs reduce banks' risk-based capital ratios ([Thakor and Yu, 2024](#)) by imposing restrictions on their risky activities, we expect FEAs to have a negative effect on FLC and ROA. Moreover, as banks expand the total volume of financing available beyond what savers had deposited, through lending, we expect FLC to have a positive effect on BLC and ROA.

To examine the mediating effect of FLC and bank profitability on the association between supervisory enforcement actions and liquidity creation, we estimate the following system of equations:

$$FLC_{i,q-1} = a_0 + a_1 FEA_{i,q-1} + \beta_1 X_{i,q-1} + \varepsilon_{i,q} \quad (13)$$

$$ROA_{i,q-1} = a_0 + a_2 FEA_{i,q-1} + \beta_1 X_{i,q-1} + \varepsilon_{i,q} \quad (14)$$

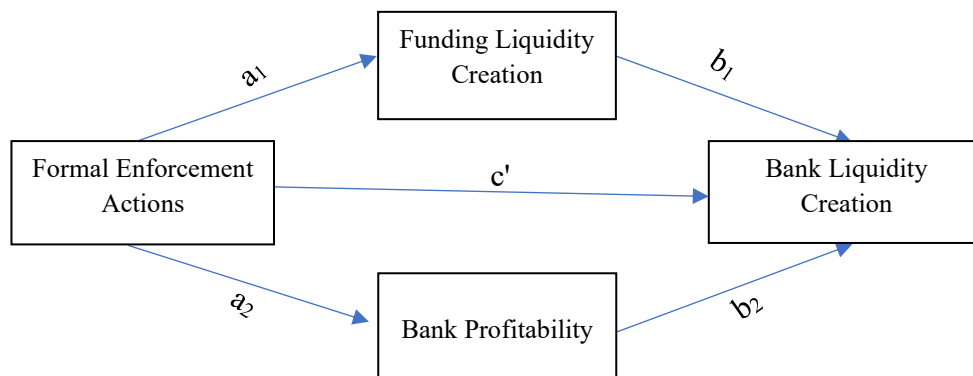
$$BLC_{i,q} = a_0 + c FEA_{i,q-1} + \beta_1 X_{i,q-1} + \varepsilon_{i,q} \quad (15)$$

$$BLC_{i,q} = a_0 + c' FEA_{i,q-1} + b_1 FLC_{i,q-1} + b_2 ROA_{i,q-1} + \beta_1 X_{i,q-1} + \varepsilon_{i,q} \quad (16)$$

where, FLC is the log of funding liquidity creation multiplier, measured as the log of total deposits divided by cash deposits, and ROA is measured as the ratio of net income to total assets. The significance of the indirect effects is assessed using bootstrapping, as our source variable (FEA) is a dummy variable ([Preacher and Hayes, 2008](#)).

The structural equation model (Eqs. 13-16) decomposes the total path (c) into a direct path (c') and an indirect path ($a_1 b_1 + a_2 b_2$)¹¹. Fig. 7 describes the path between FEA and liquidity creation.

Fig. 7: Path between FEA and liquidity creation



¹¹ Number of observations should be the same across Eqs. 13-16 to ensure that the total effect is the sum of direct and indirect effects.

Table 21 reports the results for the mediated path from FEA to BLC (Panel A), BLC_{Asset} (Panel B), $BLC_{Liability}$ (Panel C) and BLC_{Asset} (Panel D). The direct path from FEAs to BLC is negative and statistically significant. For instance, approximately 64.44%¹² of the total effect of FEA on BLC is attributed to the direct path. The indirect path shows that FEA decreases both FLC and ROA, and in turn, these mediators have a positive influence on BLC. Results for the mediated path show that only 7.78%¹³ of the total effect of FEA on BLC can be attributed to FLC, and the remaining 27.78%¹⁴ is attributed to ROA. Interestingly, in Panel C, we see that the funding multiplier has a negative effect on the liability-side liquidity creation. This can be because of the excess dependence on bank capital rather than deposits for lending. In all, our results show that funding multiplier and bank profitability serve as significant mediators for the negative relationship between misconduct sanctions and liquidity creation. Thus, our path analysis suggests that enforcement actions constrain funding liquidity and bank profitability, which subsequently constrains total bank liquidity creation.

Table 21: Path Analysis

	(1)	(2)	(3)
Panel A: BLC is the outcome variable			
	LogFLCM (Funding Liquidity Creation)	ROA (Bank Profitability)	Outcome Variable
Total Effect (c) $c(BLC, FEA_{Dummy})$			-0.0450*** (0.0136)
Direct Effect (c') $c'(BLC, FEA_{Dummy})$			-0.0290** (0.0132)
$a(Mediator, FEA_{Dummy})$	-0.0539** (0.0235)	-0.2308*** (0.0365)	
$b(BLC, Mediator)$	0.0646*** (0.0104)	0.0541*** (0.0083)	
Total Mediated Path (a * b)	-0.0035**	-0.0125***	-0.0160***
Direct Effect			64.44%
Indirect Effect	7.78%	27.78%	35.56%
Panel B: BLC_{Asset} is the outcome variable			
Total Effect (c) $c(BLC_{Asset}, FEA_{Dummy})$			-0.0017 (0.0146)
Direct Effect (c') $c'(BLC_{Asset}, FEA_{Dummy})$			0.0091 (0.0141)
$a(Mediator, FEA_{Dummy})$	-0.0539** (0.0235)	-0.2308*** (0.0365)	
$b(BLC_{Asset}, Mediator)$	0.1204*** (0.0114)	0.0186** (0.0083)	
Total Mediated Path (a * b)	-0.0065**	-0.0043***	-0.0108***
Direct Effect			
Indirect Effect			
Panel C: $BLC_{Liability}$ is the outcome variable			
Total Effect (c) $c(BLC_{Liability}, FEA_{Dummy})$			-0.0469*** (0.0128)
Direct Effect (c') $c'(BLC_{Liability}, FEA_{Dummy})$			-0.0389*** (0.0125)
$a(Mediator, FEA_{Dummy})$	-0.0539** (0.0235)	-0.2308*** (0.0365)	
$b(BLC_{Liability}, Mediator)$	-0.0784*** (0.0093)	0.0529*** (0.0076)	
Total Mediated Path (a * b)	0.0042**	-0.0122***	-0.0080***
Direct Effect			82.94%
Indirect Effect	-8.96%	26.01%	17.06%

¹² -0.0290/-0.0450 or -0.0290/(-0.0290+-0.0160) = 0.6444

¹³ -0.0035/-0.0450 or -0.0035/(-0.0290+-0.0160) = 0.0778

¹⁴ -0.0125/-0.0450 or -0.0125/(-0.0290+-0.0160) = 0.2778

Panel D: BLC_{OBS} is the outcome variable			
Total Effect (c)			-0.1072***
$c(BLC_{OBS}, FEA_{Dummy})$			(0.0150)
Direct Effect (c')			-0.0897***
$c'(BLC_{OBS}, FEA_{Dummy})$			(0.0146)
$a(Mediator, FEA_{Dummy})$	-0.0539**	-0.2308***	
	(0.0235)	(0.0365)	
$b(BLC_{OBS}, Mediator)$	0.0422***	0.0657***	
	(0.0117)	(0.0088)	
Total Mediated Path (a * b)	-0.0023***	-0.0152***	-0.0175***
Direct Effect			83.68%
Indirect Effect	2.15%	14.18%	16.32%
Controls	Y	Y	Y
Bank and Year FE	Y	Y	Y
Observations	50,915	50,915	50,915

Note: This table presents the results for Eqs. 13-16, which examines the effect of formal enforcement actions on bank liquidity creation (Panel A) and its components (Panels B-D) through a direct path and an indirect path mediated by funding liquidity creation (FLC) and bank profitability (ROA). We report standardized coefficients to permit comparison of magnitudes across channels. Control variables are the same as in the baseline regression. All continuous variables are winsorized at the 1st and 99th percentiles. The significance of the indirect effect is estimated using bootstrapping. Values in parentheses are standard errors clustered at the bank level. *, ** and *** indicate statistical significance at 10%, 5% and 1% confidence level respectively.

9. Conclusion

To identify the 'cost effect' and the 'reputational effect' of misconduct on bank liquidity creation, we examine the role of formal enforcement actions and their components in influencing bank liquidity creation. The theoretical frameworks we develop, based on existing literature, suggest that formal enforcement actions will either curtail liquidity creation due to restrictions on activities or the diversion of resources, or else they will enhance liquidity creation, as banks will put in extra effort to avoid losing business because of the reputational stigma attached to misconduct provisions.

To empirically test which effect dominates, we match hand-collected data on formal enforcement actions with data on bank liquidity creation for the period ranging from 2001:Q1 to 2024:Q4. We create three measures to identify bank misconduct: dummy, count, and monetary penalty measures. Our results show that FEAs significantly reduce total BLC, with this negative impact primarily driven by Class 1 actions, cease-and-desist orders, and sanctions by the FDIC on the liability and off-balance sheet aspects of liquidity creation. According to our baseline specification, an FEA curtails BLC in the following quarter by 0.66 percentage points of a bank's GTA, and in the case of monetary penalties, total liquidity created declines by 0.28% as a proportion of the bank's GTA in the concurrent quarter. The empirical results are consistent when considering liquidity hoarding (alternative specification), treatment effects model, PSM, EB, and DiD approaches. We also find that Class 1 and Class 3 actions imposed by the FR, and civil money penalties for inadequate internal controls, are major drivers of reduced total bank liquidity creation. Whereas the least severe action (Class 1*WA) still allows banks to increase the total BLC. Moreover, FEAs reduce banks' liquidity creation, with the effect varying by bank size, capital, funding structure, and the number of misconduct provisions faced. Civil money penalties significantly constrain liquidity creation by large banks.

We further empirically demonstrate that the negative impact of misconduct on liquidity created on both the liability and off-balance-sheet sides is stronger for more opaque banks and can be mitigated when banks operate in high social capital counties. In contrast, the negative effect of misconduct on the asset-side liquidity creation is mitigated by more opaque banks and pronounced by high social capital. These reactions are attributed to public trust, bank reputation, and the opportunistic behaviour of bank management. In addition, we find that funding liquidity creation and bank profitability significantly mediate the path between formal enforcement actions and bank liquidity creation, with the direct path accounting for around 64% of the total path.

These results have policy implications. Bank management can assess the cost that each type of enforcement action imposes on the liquidity creation capacity of banks and, accordingly, limit the risk they take to ensure that the benefits of taking on risky activities do not exceed the costs. Bank misconduct has become a critical challenge for regulators due to the costs it imposes on the stakeholders, financial stability, and society ([Zingales, 2015](#)). Our findings suggest that while formal enforcement actions may enable banks to operate more safely by restricting risky activities, they may also hinder the liquidity provided to the economy. Hence, bank management and policymakers must analyse the cost that each type of misconduct imposes on the economy through various components of bank liquidity creation.

APPENDIX A: Constructing our dependent variables

A.1.: Construction of Berger and Bouwman’s (2009) bank liquidity creation (catfat) measure

Assets		
Illiquid Assets (weightage = 1/2)	Semiliquid Assets (weightage = 0)	Liquid Assets (weightage = -1/2)
Commercial real estate loans	Residential real estate loans	Cash and due from other institutions
Loans to finance agricultural production	Consumer loans	All securities
Commercial and industrial loans	Loans to depository institutions	Trading assets
Other loans and lease financing receivables	Loans to state and local governments	Fed funds sold
Other real estate owned	Loans to foreign governments	
Customers’ liability on bankers’ acceptances		
Investment in unconsolidated subsidiaries		
Intangible assets		
Premises		
Other assets		
Liabilities and Equity		
Liquid Liabilities (weightage = 1/2)	Semiliquid Liabilities (weightage = 0)	Illiquid Liabilities and Equity (weightage = -1/2)
Transactions deposits	Time deposits	Bank's liability on bankers' acceptances
Savings deposits	Other borrowed money	Subordinated debt
Overnight federal funds purchased		Other liabilities
Trading liabilities		Equity
Off-Balance Sheet Guarantees (Notional Value)		
Illiquid Guarantees (weightage = 1/2)	Semiliquid Guarantees (weightage = 0)	Liquid Guarantees (weightage = -1/2)
Unused commitments	Net credit derivatives	Net participations acquired
Net standby letters of credit	Net securities lent	
Commercial and similar letters of credit		
All other off-balance sheet liabilities		
Off-Balance Sheet Derivatives (Gross Fair Values)		
		Liquid Derivatives (weightage = -1/2)
		Interest rate derivatives
		Foreign exchange derivatives
		Equity and commodity derivatives

A.2.: Construction of Berger et al.’s (2022) bank liquidity hoarding measure

Assets	
Liquid Assets (weightage = 1/2)	Illiquid Assets (weightage = -1/2)
Cash and due from other institutions	Commercial real estate loans
All securities	Loans to finance agricultural production
Trading assets	Commercial and industrial loans
Fed funds sold	Other loans and lease financing receivables
	Other real estate owned
	Customers’ liability on bankers' acceptances
	Investment in unconsolidated subsidiaries
	Intangible assets
	Premises
	Other assets
Liabilities and Equity	
Liquid Liabilities (weightage = 1/2)	
Transactions deposits	
Savings deposits	
Overnight federal funds purchased	
Trading liabilities	
Off-Balance Sheet Guarantees (Notional Values) and Derivatives (Gross Fair Values)	
Liquid Derivatives (weightage = 1/2)	Illiquid Guarantees (weightage = -1/2)
Interest rate derivatives	Unused commitments
Foreign exchange derivatives	Net standby letters of credit
Equity and commodity derivatives	Commercial and similar letters of credit
	Net participations sold
	All other off-balance sheet liabilities

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