

Economic Consequences of Mandatory Auditor Reporting to Bank Supervisors*

Karthik Balakrishnan
Emmanuel T. De George
Aytekin Ertan
Hannah Scobie

October 2020

Abstract

We study the economic consequences of mandates that require bank auditors to report to bank supervisors. Based on survey responses from the European Central Bank and all 28 national bank regulators within the European Union and a review of national banking regulations, we create a novel dataset of the extent of these mandates. Exploiting the cross-sectional and time-series variation in these mandates, we investigate the effects of mandated auditor reporting on bank risk. We find evidence that auditor reporting reduces bank riskiness, as measured by counterparty risk, nonperforming loans, and credit spreads. We also observe a decline in risk-weighted assets, which suggests that mandated auditor reporting enhances the effectiveness of regulatory supervision. In addition, we find that improvements to the supervisory review process and to banks' information environment support enhanced market discipline. Finally, mandated auditor reporting comes with costs: it reduces future lending growth and profitability, as well as increases audit fees paid by shareholders.

JEL classification: *G28, G34, G38*

Keywords: *banking; auditing; bank risk; regulation; bank supervision; information sharing*

* We thank numerous bank regulators for their survey responses and several follow-up discussions. We are grateful to John Hitchins, Andrew Meek, and especially Charles Randell—Chair of the Financial Conduct Authority—for their insightful discussions and feedback. We appreciate the helpful comments and suggestions from Ron Anderson, John Barrios, Matthias Breuer, John Core (editor), Anna Costello, Fabrizio Ferri, Jim Gibson, Brandon Gipper, Yadav Gopalan, Leslie Hodder, Urooj Khan, Anya Kleymenova, Mike Milchanowski, Miguel Minutti-Meza, Greg Miller, Venky Nagar, Allen North, Mani Sethuraman, Andrew Sutherland, Dushyant Vyas, Chris Williams, and Gwen Yu, as well as participants at the Columbia Junior Faculty Conference, Columbia University, LSE seminar series on Regulations in Financial Markets, University of Michigan, St. Louis Fed Financial Institutions Research Conference, and the University of Warwick for helpful comments and suggestions. The RAMD Funding from the London Business School is gratefully acknowledged. Balakrishnan is at Rice University, 6100 Main Street, Houston, TX 77005, De George (corresponding author) is at Miami Business School, University of Miami, 5250 University Drive, Coral Gables, FL 33146, USA, Ertan is at the London Business School, Regent's Park, London NW1 4SA, UK, and Scobie is at the European Economics and Financial Centre, Senate House, Malet Street, London WC1E 7HU, UK. This paper was previously titled “The Economic Consequences of Interactions between Auditors and Bank Supervisors”

1. Introduction

The global financial crisis of 2007-2009 raised concerns about risk management processes and governance at banks (BIS, 2014; Härle et al., 2016). This has resulted in a trend toward increased regulation (e.g., Basel III). A specific development and the focus of this study is the Basel Committee's recommendation that external auditors share information about bank risk and health with bank supervisors.¹ This is intended to expand the scope and formalize the need for stronger relationships and information exchange between external auditors and bank supervisors (BIS, 2014).

In accordance with the Basel Committee's recommendation, several EU countries developed mandates increasing the role auditors play in bank oversight. Many regulators—e.g., ECB, IAASB, the Federal Reserve, and the FDIC—argue that requirements for auditors to report information to supervisors reduces risk and enhances the effectiveness of prudential supervision.² Yet the efficacy of these mandates is unclear, and they may result in significant costs and unintended consequences for banks and the economy. Critics of Basel regulations view them as regulatory overreach, which may hamper risk-taking (and by extension, lending, investment, and future economic growth); decrease shareholder value; and reduce system stability vis-à-vis shadow banking (Maxwell, 2016). Additional concerns include implementation and adjustment costs as well as privacy issues (Chalmers, 2017; JWG, 2016).

In this study, we investigate the potential benefits and costs for a sample of EU countries that have mandated, through national law, auditor reporting bank supervisors. We attempt to

¹ Basel Core Principle 27 refers to prudential regulations and requirements for banks in relation to financial reporting and external audits.

² For example, the Basel Committee sent a letter to the International Auditing and Assurance Standards Board (IAASB) in March 2013 recommending enhancements to the auditing standards and the international standard on quality control. Consequently, the IAASB proposed strategy for 2015–2019 includes some of these recommendations. In addition, the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency indicated their support for the principles and expectations set forth in the Basel Committee's guidance. See OCC Bulletin: <https://www.occ.gov/news-issuances/bulletins/2016/bulletin-2016-2.html> (accessed on 23-Dec-2019).

provide insights into the potential consequences of these mandates for bank risk and bank health, in addition to providing evidence of the costs these mandates can impose.

Ex ante, the effects of mandatory auditor reporting to bank supervisors on bank risk and health is unclear. On the one hand, it may generate benefits. In particular, mandatory auditor reporting to bank supervisors can reduce bank risk via three channels: (i) regulation-based supervision, (ii) supervisory review efforts, and (iii) market discipline. First, auditors can observe more closely and frequently many of the financial measures supervisors use, and can provide assurance on such numbers. For example, when assessing loan loss provisions for statutory audit purposes, auditors examine the risk of default within the loan portfolios, which may enhance evaluation of the risk weights used in regulatory reporting. Second, information from auditors can make the supervisory review process—i.e., on-site inspections and the analysis of reported information—more effective. For example, to the extent that auditors help identify high-risk areas, supervisors can better design their on-site examinations for more effective assessments. Also, supervisors can benefit from the assistance of the auditor in verifying the information used for their analysis (BIS, 2002). Third, auditors can work with supervisors to induce banks to improve the information available to stakeholders, allowing for better market discipline. In addition to these three channels, there is also a significant indirect effect. Aside from directly influencing the supervisory process, mandatory auditor reporting to supervisors may also serve as an ex-ante disciplinary tool. The perceived enhanced scrutiny from auditor reporting may deter managers from risk-taking, thereby resulting in lower bank risk.

On the other hand, auditors' inputs to banking supervision may have little or no effect in terms of the benefits intended by the regulatory mandates. Auditors' objectives are different from those of regulators. While the focus of the auditors' job is on the financial health and performance of the singular banks they are auditing, regulators are primarily concerned about the health of the banking system. For these reasons, information generated by the auditing process may not translate

to the supervision context in ways that are immediately relevant and useful. Moreover, an audit firm is a commercial enterprise that is paid by the companies it audits; hence, there is a potential for conflict of interest.³ Relatedly, much of the information received by auditors in conducting their audit procedures is sensitive; thus, confidentiality obligations may prohibit or reduce the openness of reporting and dialogue between auditors and supervisors. Likewise, any compromise to confidentiality (actual and perceived) may negatively impact communication and information exchange between auditors and banks and by extension, the integrity and effectiveness of the auditing process. In addition, increased auditor involvement may deteriorate supervision if the supervisors overly rely on the inputs from auditors instead of their own on-site examinations. Overall, the effects of mandated auditor reporting to bank supervisors with respect to reducing bank risk is an open empirical question.

The economic consequences of these mandates likely extend beyond bank risk and to a broad set of stakeholders; the overall impact of the regulation on bank health and the economy is complex. An excessive regulatory drive to reduce bank risk can negatively affect banks' lending activity and banks' profitability (e.g., Granja and Leuz, 2019). These effects are detrimental to shareholder value and potentially to the real economy (e.g., Granieri and Renda, 2012). Shareholders may also have to bear the cost of efforts expended by auditors.

To study these issues, we perform a difference-in-differences analysis that exploits the staggered adoption of laws mandating auditor reporting to bank supervisors across all 28 EU countries during the period of 2009 to 2018. To identify adopting countries and the nature of the adoption regime, we survey the national bank supervisors of all EU member states and the European Central Bank (ECB). In particular, we ask whether auditors provide the regulator with

³ Of the potential for conflict of interest, the Basel Committee argues that “the experience in countries with long-standing ties between auditors and supervisors indicates that the conflicts of interest that auditors may in principle perceive as preventing close collaboration with supervisors assume less importance in practice and do not present an obstacle to a fruitful dialogue” (see BIS, 2014, available online: <http://www.bis.org/publ/bcbs244.htm>).

(i) specific *private* information; and (ii) explicit assurance on capital ratios, solvency ratios, or any other item. Our treatment sample includes bank-year observations where countries mandate external auditors to do either (i) or (ii).⁴

Banks are subject to a variety of risks that supervisors monitor and to which they may limit exposure, including credit risk, market risk (e.g., interest and foreign exchange risk), liquidity and funding risk, operational risk, legal risk, and reputational risk (BIS, 2014). Arguably, “the most significant ... is the risk that a customer or counterparty will not settle an obligation for full value” (BIS, 2014). Accordingly, to capture bank risk (our outcome of interest), we use two reported measures closely monitored by supervisors: counterparty risk and nonperforming loans. Counterparty risk is the economic loss from a counterparty to a contract defaulting before the settlement of the cash flows; it occurs in settings where there is a bilateral risk of loss.⁵ Thus, it captures a wide range of bank transactions outside the traditional notion of credit risk (e.g., transactions that involve collateral, including over-the-counter derivatives and repo). Counterparty risk also serves as an essential input to capital ratio requirement calculations and is closely monitored by regulators and investors, especially after the financial crisis. The calculation of counterparty risk is complex, requiring the bank to accurately estimate four critical parameters: the probability of default, exposure at default, loss given default, and maturity.

Our second measure is nonperforming loans (NPLs), which captures the level of credit risk for a given bank (e.g., Houston et al., 2010; Beck et al., 2013). NPLs are loans that are in default or close to being in default, usually 90 days in arrears (Bholat et al., 2016). Banks classify these loans as substandard, doubtful, or loss-making. Taken together, counterparty risk and NPLs comprehensively capture the risks banks take in their activities. As a third complementary

⁴ To verify adoption and identify its timing and nature, we examine a variety of legislation and central bank annual reports.

⁵ In a conventional unsecured loan, a bank’s exposure to credit risk is unilateral, i.e., the risk is only for the lending bank. Counterparty risk captures the *bilateral* risk of loss in bank transactions, such as a loan whose collateral may not cover the losses, or in settings in which the bank is the borrower and its posted collateral may not be returned.

measure, for the subset of banks with credit default swaps (CDS), we also examine CDS spreads—a market-based assessment of the bank’s overall riskiness.

Using a comprehensive sample of 16,931 bank-years (3,161 banks) from across the EU between 2009 and 2018, we find a significant decline in all three of our bank risk measures, after controlling for a variety of bank-level and country-level factors, as well as bank and time fixed effects. The effects are economically significant. For example, banks’ counterparty risk declines by about 6.6%, while NPLs are reduced by over 2%. The results hold when using a propensity-score matched control sample of 2,411 bank-years (385 banks). Also, pre-regulation trends in our risk measures are statistically similar for treatment and control banks, supporting the parallel-trends assumption and mitigating selection concerns. Overall, this evidence suggests that mandatory auditor reporting to bank supervisors reduces bank risk.

Similar to other cross-country, regulation-based studies, one concern is that other concurrent regulations may drive the variation in the dependent variable. In particular, mandating auditor reporting to bank supervisors could be just one part of broader regulatory initiatives that reduced bank risk. We attempt to address this concern in three ways. First, we review the regulations in our treatment countries. Though this does not mean concurrent reforms do not exist, we find no evidence of a concurrent reform accompanying the mandated auditor reporting across all treatment countries. Second, in addition to various country-level variables (capturing concurrent changes in regulatory stringency, credit reforms, and country-specific economic trends), we control for the Basel reporting regime for each bank-year; this accounts for the staggered adoption of Basel reforms in different countries, as well as individual banks’ voluntary adoptions of these rules. Third, we provide a within-country analysis. Specifically, we focus on the UK, the one country where the auditor mandate only applies to a subset of banks, namely those with assets greater than £50 billion. Using this size-based cutoff, we show that the effect exists only for UK banks that were required to comply with the regulations. Unless other concurrent

regulations only applied to large banks as well, this test should reduce concerns with the effect of concurrent reforms.

Having documented a reduction in bank risk, we then provide evidence on *how* the mandates may have contributed to this trend through the three channels discussed earlier. To capture the efficacy of the mandates vis-a-vis our first channel, regulation-based supervision, we examine the risk-weights used by banks for their assets. Increased auditor effort in assessing the risk-weights and more effective enforcement of these buffers should make the measurement of risk-weighted assets (RWAs) more accurate. Ex ante, the direction of the effect on RWAs is unclear. It may be positive if the mandate curtails prior underreporting of risk weights; or negative if the mandate rectifies prior overreporting errors or if banks' asset quality improves. We find that affected banks exhibit a 1.9 percentage point decline in RWAs (after controlling for NPL changes).

The second channel we examine is the supervisory review process. While detailed data on supervisory efforts is not publicly available, we provide three pieces of evidence that support the efficacy of this channel in contributing to a reduction in bank risk. First, we document a decrease in the number of on-site examinations performed by national supervisors in treated countries, which is consistent with the information provided by auditors reducing the extent of on-site examinations (a point further supported by survey responses we received from national supervisors). Second, we observe that bank risk declines relatively more in countries with mandatory auditor-supervisor meetings, in keeping with the notion that these meetings facilitate the transfer of information useful for supervisors in their examinations.⁶ Third, we find a larger reduction in bank risk when regulators are more resource-constrained, proxied by the number of full-time staff at the supervisory body.

⁶ We collect this information via our survey. We discuss our survey of EU supervisors in detail in the Online Appendix.

The third channel we examine is market discipline. To the extent that these mandates improve the information environment, this should increase the effectiveness of monitoring by stakeholders and thus, discipline management. We assess the quality of the information environment using the ratio of short-term CDS spreads to long-term CDS spreads. Motivated by Duffie and Lando (2001), this parsimonious metric isolates the magnitude of information imprecision for a given level of credit risk. We find a significant decline in information imprecision for treatment banks, which is consistent with the mandates improving (CDS) investors' evaluation of banks' risk profile. We also find treatment banks' loan-loss provisioning becomes timelier, which is consistent with improved audit outputs (audited financial reports) enabling better monitoring of bank risk.

While a decrease in bank risk may be a positive development from regulators' perspective, such reductions could result economic costs. We next explore this critical issue and find that treatment banks' loan growth and profitability decline in the three years following the mandates. We also find that mandatory auditor reporting to supervisors triggers an increase in the fees paid to auditors, which suggests that banks bear at least some part of the additional cost of auditor reporting. Both findings indicate that the reduction in bank risk comes at a cost to bank shareholders. Therefore, although we find a decrease in individual bank risk, it remains unclear whether this decline is desirable for banks' stakeholders or the overall stability of banking system.⁷

Our study contributes to the accounting and banking literature in several areas. One strand of literature studies the impact of accounting (mainly, loan loss provisions) on bank supervision through its impact on capital ratios (e.g., Beatty et al., 1995; Collins et al., 1995; Beatty and Liao, 2014; Acharya and Ryan, 2016). In contrast, we focus on the impacts of auditors' involvement in

⁷ For example, our findings of a contraction in lending activity suggest banks reduce lending to risky borrowers, but the demand for this risky credit does not cease. In fact, non-bank institutions may step in, which is likely at higher costs and greater risk. Relatedly, our findings may also act as evidence of regulatory overreach. For example, Granieri and Renda (2012) argue that over-regulation in the EU is resulting in little innovation and risk-taking.

the supervisory function. In this domain, a few recent studies investigate the interplay between auditors and regulators. Nicoletti (2018) examines whether external auditors and bank regulators have conflicting effects on loan loss recognition timeliness. Ghosh et al. (2019) posit that bank regulation can be a substitute for auditing. They find that bank supervision in the US reduces the risk associated with bank audits, and therefore auditors can expend less effort. However, this substitution also works to reduce market discipline over banks. While Ghosh et al. (2019) study how auditors' behavior changes in the presence or absence of supervisors, we focus on auditors' role *within* bank supervision and the associated economic consequences. Accordingly, auditor involvement in bank supervision may have either a complementary or substitutive effect depending on the nature of the interaction. Gopalan et al. (2019) find that third-party verifications, in the form of FDICIA-related internal control audits, are only imperfect substitutes for bank supervision. Unlike these studies, we focus on the mandatory information flow from auditors to regulators and exploit a setting in which auditors have a mandated role in supervision. Our study also adds to the broader auditing literature (e.g., Tepelagul and Lin, 2015; Kausar et al., 2015; Lisowsky et al., 2017) by investigating the relatively unexplored demand for audit services from an external stakeholder, namely, bank regulators.

2. Background and Theoretical Underpinnings: Auditors' Role in Bank Supervision

The overarching objective of supervision is to identify and remediate conditions that could threaten banks' immediate health or long-term viability. Therefore, supervision encompasses a wide range of activities that support both traditional efforts to ensure compliance with law and regulation as well as more modern, "prudential" work to monitor for unsafe or unsound business practices in banks.⁸

⁸ As observed in recent work, supervision is distinct from regulation (Hirtle et al., 2019; Eisenbach et al., 2016). Regulation entails the development, promulgation, and enforcement of rules that dictate how banks operate. Although

Due to potential externalities of bank failures, supervisors seek to reduce bank risk. The distinguishing features of bank supervision are (i) the assessment of the safety and soundness of banks through monitoring and exams; and (ii) the use of this information to request corrective actions. Over the years, supervision has transitioned from point-in-time annual examinations toward a more holistic, forward-looking approach, as supervisors have sought to make institutions more robust in the face of rapid financial innovation (Mishkin, 2001). Such forward-looking assessments of risk management and internal controls require quantitative analysis and qualitative evaluations, necessitating significant judgment. Thus, recent supervisory activities rely on both hard information (i.e. reported quantitative data) and soft information (i.e. qualitative or subjective interpretations); and therefore the work that supervisors execute and the outcomes of internal processes, including risk management, controls, and governance, are difficult to quantify.

Supervisors obtain verifiable data on bank risk and collect information about a bank's actions through costly monitoring. The results of this monitoring generate an (informative) interim signal on which the supervisor takes action. For example, supervisors may meet with bank management to discuss, both specific issues regarding firm activities as well as general perspectives on the industry environment and economic outlook. Since such signals are noisy and supervisory monitoring and intervention are costly, supervisors typically prioritize their efforts and allocate their limited resources on banks that have a higher likelihood of failing or those that threaten financial stability.

External auditors, like supervisors, assess the bank performance and can aid in supervisory efforts. Regulators and supervisors often rely on auditors for inputs to their efforts, but it is unclear how a mandatory requirement for auditors to report to bank supervisors affects supervisory strategy and thereby, banks' risk. Given the paucity of theory addressing this issue, we seek to

financial regulation and supervision (or regulators and supervisors) are terms that are often used interchangeably, they reflect separate and complementary activities and roles within a financial system.

understand how an increase of such reporting may affect supervisory strategy and banks' riskiness, based on the views of national supervisors. To do so, we have conducted surveys and in-person discussions with regulators from all EU countries (including the UK) and the ECB to understand the nature of auditor-supervisor relationships, any requirements for auditor reporting, the information obtained, and its usefulness.

Drawing from the responses to our surveys, we consider the following ways in which mandatory auditor-supervisor reporting can affect banks' riskiness.

i) *Regulation-based supervision:* Supervisory activities encompass compliance with regulations. Regulations, such as the capital adequacy rules, are designed to ensure banks' health. As supervisors rely on such regulations to monitor banks, the efficacy of regulations depends on the verifiability of pertinent information. However, verification is costly. In their communications with auditors, supervisors can request further information and verification of important regulatory inputs. With verified information, supervisors can take more decisive regulation-driven actions. For example, the Basel Committee on Banking Supervision expects the auditor to attend to (and potentially report on) key areas such loan loss provisioning, financial instruments measured at fair value, liabilities. disclosures, and the assessment of going concern (BIS, 2014). Supporting this notion, Doogar et al. (2015) find that as the recent financial crises unfolded, auditors shifted their attention to the adequacy of loan charge-offs and risks associated with loan distribution activities, which is consistent with auditors responding to shifts in banks' risk.

ii) *Supervisory Review Process:* Beyond regulatory compliance, supervisors use a range of hard and soft information to identify shortcomings in banks' governance and risk management. If a supervisory assessment identifies shortcomings, supervisors pursue a range of responses to require the firm to rectify the problems, from formal enforcement actions and rating downgrades, which constrain bank activities, to more subtle warnings that work via moral persuasion. Such

supervisory activities critically hinge on interim signals and soft information. Since auditors work closely with client banks and are in continuous contact with bank operations, they are positioned to possess valuable soft information on the soundness of a bank. Auditors can provide supervisors with timely and relevant information signals that facilitate effective intervention, such as when to intervene and how to best focus their supervisory efforts. For example, on-site examinations are an assessment based on looking at areas of highest risk. To the extent that auditors help identify high-risk areas, they make such examinations more effective. Multiple national regulators in our survey (e.g., Estonia, Germany, and Slovenia) indicated that they use auditor inputs to better design and plan their off-site as well as on-site examinations and to understand what areas to focus on in their examinations.

iii) *Improved market discipline:* Since mandatory auditor reporting can improve the quality of the information environment, it can also enhance market discipline. Prior work finds that regulations that empower private monitoring has a particularly beneficial effect on the integrity of bank lending in countries with sound legal institutions (Beck et al., 2006). In addition, mandatory auditor reporting to bank supervisors can improve audit function and overall audit outputs. For example, a supervisor may provide an assessment in areas that are relevant to the audit from which the auditor may obtain helpful information and insights; and may then focus attention on areas of supervisor concerns (BIS, 2014). Thus, the improved information environment of banks—facilitated by auditor-supervisor relationships and communications—may enhance private monitoring and thus mitigate bank risk.

While the above arguments indicate that an increase in auditor reporting should reduce bank risk, there are also reasons to believe increased auditor involvement may have no effect or could increase bank risk. First, agency problems among supervisors, banks, and auditors could mitigate the effectiveness of any mandatory auditor reporting. For instance, supervisors may act

in a self-serving manner. When faced with a problem bank, reputational concerns may drive supervisors to hide the problems as long as possible. Whatever their cause, problem bank situations often lead to forbearance, under which mandated auditor reporting to supervisors could merely reflect a form of window-dressing with no measurable impact on banks' riskiness. Worse, powerful supervisors may use their powers to benefit favored constituent banks instead of improving social welfare (Barth et al., 2004; Djankov et al., 2002). And given that banks pay auditors and therefore auditors may prioritize bank client interests over supervisor interests, relying on auditors' information may hurt the efficiency of supervision.

Second, the increased information gap between banks and supervisors may limit the usefulness of auditor reporting. Setting aside any agency issues, auditors and supervisors focus on different concerns when examining a bank. While the supervisor assesses long-term viability of a given bank and the banking system overall, the auditor is mainly concerned with the quality and accuracy of a bank's financial statements (i.e. banks' reported financial position and performance). The auditor also evaluates the bank's continuing viability (often for about one year from the date of the balance sheet) to support the going-concern basis on which the financial statements are prepared. A supervisor cannot assume that the auditor's evaluation for the purposes of audit would necessarily be relevant or adequate for supervisory purposes. This disparity may lead the supervisor to place weight on extraneous information in supervisory decisions.

Third, and related to the above, the auditor may not have sufficient knowledge of the intricacies of the banking industry, and competence to respond to additional regulatory requirements important to bank supervisors. For example, whether credit risk is adequately diversified with respect to policies and procedures that limit exposures to certain risky individual borrowers, industrial or commercial sectors, or certain countries or economic regions (BIS, 2014). Such an exercise requires extensive knowledge of the bank's activities, complexities, and exposures and correlations within and across the banking and private sector.

Based on the above arguments, the effect of auditor reporting to bank supervisors with respect to reducing bank risk is an open empirical question.

3. Empirical Design and Measures

3.1 Measuring Mandatory Auditor Reporting

There is little structured information on how auditors engage with bank regulators and what requirements exist across the world. To understand the extent of the mandatory auditor reporting to bank supervisors, we surveyed bank regulators within each 28 EU member states and the ECB's regulatory authority, i.e., the Single Supervisory Mechanism (SSM). In particular, we ask: *(i)* whether auditors provide specific detailed private information (e.g., a long-form audit report) to the regulator; *(ii)* whether auditors provide the regulator with explicit assurance on capital ratios, solvency ratios, or any other specific item; and *(iii)* the extent to which auditors and regulators meet regularly to discuss the bank's performance. Following their responses, we held follow-up discussions in person and over email to obtain a context and allow respondents to elaborate on their answers. We asked open-ended questions about regulators' views on these issues to better understand the nature of the interactions, the specific regulation that mandated these requirements, and why the regulator did, or did not, adopt certain requirements. In conjunction with the survey responses, we conducted a review of banking regulations in each of our sample countries to determine and verify the dates of the relevant mandates. This effort allows us to construct a database that includes official information about the legal requirements regulators impose on bank auditors.⁹ The Online Appendix details the survey and regulator responses.

Table 1 summarizes the years in which each country enacted the regulations. We observe that of the 13 countries that mandate auditor reporting to bank supervisors, nine countries passed

⁹ In several cases, the regulators themselves provided a reference to the law, act, or decree. In those cases, we confirmed the year that the current regulation was enacted and ensured that no previous regulations existed that might already have required auditor involvement.

these reforms during our sample period. These include Belgium, Croatia, Estonia, Hungary, Luxembourg, the Netherlands, Slovenia, Spain, and the UK. For example, Luxembourg enacted additional reporting requirements for auditors in 2013, while the UK required auditors to furnish additional long-form audit reports privately to the bank supervisor starting in 2016. Four countries already adopted similar reforms before our sample period: Austria (1994), Germany (1998), Portugal (2008), and Slovakia (2001).

Turning to additional requirements for auditors to provide assurance over capital ratios, we find significant overlap in the countries—and in the timing of these regulations—with those who enact additional reporting requirements. Nine of the 28 EU member states require additional assurance over capital ratios, with seven of these overlapping with additional reporting requirements (i.e., Austria, Belgium, Croatia, Estonia, Germany, Hungary, and Spain). Only the Netherlands and Lithuania reported that auditors are required to give assurance over capital ratios, but they do not require auditors to share any additional reporting (such as a long-form audit report) with the bank supervisor. Due to the significant overlap between countries that require additional reporting and those that require assurance regulations, we focus on both additional reporting requirements and ratio assurance in our empirical analysis.

3.2 Research Design

To test for the effects of mandatory auditor reporting in the banking sector, we adopt a difference-in-differences estimation framework:

$$Risk_{i,t} = \beta_1 Post_{c,t} \times Treatment_c + \beta_2 Post_{c,t} + \beta_3 Treatment_c + \Theta \mathbf{Controls} + \nu_i + \mu_t + \varepsilon_{i,t}. \quad (1a)$$

In the above model, the subscript c denotes countries, i stands for individual banks, and t signifies years. Each observation is a bank-year. First, we employ the full sample of European banks (16,931 bank-years) during our sample period of 2009–2018 to estimate this model. Model

(1a) follows the traditional difference-in-differences terminology.¹⁰ Given the nature of the regulations we study, we define *Treatment* at the country level. *Post* equals zero throughout the sample period for control countries. Since *Post* switches on for treatment countries only, it is identical to $Post \times Treatment$ in this specification.¹¹ Since *Post* and $Post \times Treatment$ capture the same observations, only one of them will be identified in the estimation of (1a). We label this term as *Mandatory Auditor Reporting* for ease of interpretation. Effectively, we provide the estimates for Equation (1b). This is consistent with the approach in Bertrand and Mullainathan (2003).

$$Risk_{i,t} = \beta_1 \text{Mandatory Auditor Reporting}_{c,t} + \Theta \text{Controls} + v_i + \mu_t + \varepsilon_{i,t}. \quad (1b)$$

The independent variable of interest, *Mandatory Auditor Reporting*, is an indicator variable that switches on for banks in treatment countries, following the year of the reform (13 countries: Austria 1994, Belgium 2012, Croatia 2014, Estonia 2014, Germany 1998, Hungary 2014, Luxembourg 2013, Netherlands 2014, Portugal 2008, Slovakia 2001, Slovenia 2015, Spain 2011, and the UK 2016). This variable equals to zero otherwise.

We account for bank risk (*Risk*) using two reported measures: *Counterparty risk*, *Nonperforming loans*. These metrics are used by prior work to capture different aspects of the underlying bank risk (e.g., Arora et al., 2012; Jimenez et al., 2013; Maddaloni and Peydro, 2011). *Counterparty risk* is calculated by banks as the economic loss in the event that a counterparty to a contract defaults before the final settlement of the cash flows in settings where there is a bilateral risk of loss. Counterparty risk encompasses transactions on derivative instruments, transactions with repurchase commitment, stock and commodities lending, long-settlement transactions, and financing of guarantees that can constitute a substantial fraction of the bank's assets. We examine riskiness in lending assets as the ratio of NPLs to total loans (*Nonperforming loans*). An increase

¹⁰ We begin our sample period in 2009 due to data availability in the SNL database (see section 4).

¹¹ Note that in alternative models that rely on matching, *Post* will be non-degenerate for controls observations, and thus, *Post* and $Post \times Treatment$ will be different. We discuss one such model in Section 5 in our PSM tests.

in information for regulators can enhance supervision. Even the possibility of an increase in oversight may alter banks' incentives to hold higher-quality assets (Houston et al., 2010). As a third and complementary measure, we employ the year-end percentage spread of the five-year CDS contract of a bank (*CDS Spread*). The size of the CDS spread provides a timely and liquid measure of the market view of the risk for banks. However, a drawback of this straightforward market-based metric is the small sample size.

Our vector of controls includes several bank-level and country-level variables that account for factors that are potentially associated with bank risk. Each of these variables is lagged by one year. The bank-level vector includes logged total assets (*Size*), equity-to-assets ratio (*Capital*), return-on-equity ratio (*Profitability*), loan-to-assets ratio (*Loan intensity*), year-over-year growth in lending (*Loan growth*), provisions-to-loans ratio (*Loan loss provisions*), the natural logarithm of the number of employees (*Employees*), the ratio of operating expenses to operating income (*Cost-to-income ratio*), and regulatory reporting (*Basel*). At the macroeconomic level, we account for the country's economic growth (*GDP growth*), the concentration of the banking sector (*Bank concentration*), and the volatility of the financial markets (*Market volatility*). We also directly control for legal and institutional developments in a country to better identify our main effect: *Legal rights*, *Credit information*, *Insolvency resolution*, and *Significant reform dummy*. Finally, we include bank fixed effects to absorb any bank-level heterogeneity (e.g., Laux and Rauter, 2017; Balakrishnan and Ertan, 2019), and year fixed effects to control for any macroeconomics trends. Detailed variable definitions appear in the Appendix.

4. Data and Sample

We conduct our tests on a dataset of bank financial characteristics merged with the country-specific details of banks' audit regulation. Bank-specific controls and measures of risk come from SNL Financial, except for *CDS Spread*, which we obtained from Markit. Our country-level

macroeconomic variables are from the World Bank’s Global Financial Development Database and Doing Business Surveys (Djankov, 2016). Due to SNL’s limited time-series coverage of European data, the sample period begins in 2009 and ends in 2018.

Turning to our bank-level variables, we use *Basel* to account for banks’ time-varying regulatory reporting framework. It takes one of the following values: zero (no Basel reporting identified by SNL), 1 (Basel I), 2 (Basel II), 2.5 (Basel II, Pillar 3), and 3 (Basel III). This variable also accounts for concurrent changes in other regulations related to bank supervision.

Table 2 presents descriptive statistics for our full sample. In Panel A, we observe that *Mandatory Auditor Reporting* is switched on for 61% of bank-year observations. The average bank has *Counterparty risk* of \$742 million ($= \exp(13.516) \times 1,000$), with *NPLs* of 6.75% and *CDS spread* of 163 bps. While the average (median) bank has total assets of \$1.62 billion (\$1.19 billion), the mean *Capital* and *Profitability* ratios are 9.73% and 3.35%, respectively. Loans constitute more than half of total assets for the average bank (*Loan intensity*), while the annual growth rate (*Loan growth*) is almost 5.4%. During the sample period, the average GDP growth is only 0.26% consistent with sluggish growth among EU member states, but with a wide spread (8.4% standard deviation). The mean (median) value for *Bank concentration* is 80% (71%); the top five banks in the respective countries constitute around three-quarters of the total banking system.

Panel B presents a sample breakdown by country and year. Consistent with SNL’s coverage of European banks, there is more data after 2012. Perhaps more important, the breakdown indicates that Germany constitutes a large proportion of our sample. This imbalance, however, is not a significant cause for concern because (i) our findings remain similar if we remove Germany from our analysis (untabulated); and (ii) we reach similar conclusions on a more balanced sample in our PSM analysis (Section 5.2.1).

5. Empirical Results

5.1 Main Results: Analysis of Bank Risk

Panel A of Table 3 presents the results from the estimation of Equation (1b). We find a significant reduction across all three bank risk proxies for our treatment banks after mandated auditor reporting to bank supervisors. Beginning with column (1), the relative decline in *Counterparty risk* of treatment banks is -0.069 and statistically significant. This suggests a 6.6% decline ($= \exp(-0.069) - 1$) in the counterparty risk of banks following the mandated involvement of auditors in bank supervision. Our control for time trends (year fixed effects) and time-invariant bank-specific features (bank fixed effects) mitigate the concern that macroeconomic trends or time-invariant national or corporate factors drive our results (Christensen et al., 2016). We note that *Size*, *Capital*, and *Loan intensity* are significantly associated with *Counterparty risk*, in keeping with the idea that large and well-capitalized banks, as well as entities with greater relative lending, can engage in more risky arrangements.

In column (2) of Table 3, Panel A, we observe a reduction in *Nonperforming loans* after the adoption of reforms, with the coefficient estimate suggesting a significant decline of 2.3 percentage points. This finding may indicate better ex-post lending decisions due to improved screening or monitoring. Regardless, this analysis shows the considerable influence of mandatory auditor reporting to bank supervisors on banks' real decisions.

The estimates in column (3) shed light on how outside stakeholders (CDS market participants) view the enhanced reporting and communication between bank auditors and regulators, and more specifically, the market's perception of mandatory auditor involvement in the supervisory process. We find that *CDS spreads* for treatment banks fall by about 41 basis points following the passage of reforms. This finding is economically meaningful, given the sample standard deviation of *CDS spreads* of 155 basis points. Overall, these inferences suggest that banks

reduce risk following the passage of regulations that require auditor reporting to bank supervisors.¹²

5.2 Analyses to Mitigate Identification Concerns

As with all regulation-based empirical research, our study faces identification challenges. In this subsection, we discuss the identification challenges that may cast doubt on our inferences, and perform several tests to try and mitigate these concerns.

5.2.1 Selection

The decision to introduce a regulation is susceptible to selection at the country level and may lead to significant differences between our treatment and control groups. In Panel B of Table 3, we add controls to account for pre-regulation trends, *Pre-mandate*. This indicator variable switches on the year before the mandated auditor-regulation starts. For all bank risk proxies, we verify that the parallel trends assumption holds, i.e., the coefficient on *Pre-mandate* is indistinguishable from zero. We also note that our main results (reported in Panel A) are similar in this specification. For example, the coefficient on *Mandatory Auditor Reporting* is negative and significant for *Counterparty risk* and *NPL*. The results for *CDS spread* also remain economically meaningful though marginally significant statistically.

To further mitigate this concern, we examine a PSM sample of 2,411 bank-years (385 banks). For each regulation, we conduct a propensity score matching in the year before the treatment (only once per regulation). This allows us to find a matched control bank for each treatment bank. After determining these treatment-control pairs, we keep the sample stable over time. We consider banks in countries that enacted legislation before the sample period as part of our control sample. Table 4 reports the results for our PSM analysis. *Treatment* is an indicator

¹² Our results are robust (and inference unchanged) when we perform one-way clustering by country only (i.e. removal of two-way country-year clustering), and clustering at the bank level.

variable that switches on only if the bank is from a country that mandates auditor reporting to bank supervisors during our sample period 2009–2018, i.e., a subset of the treatment countries from our main empirical regression (Belgium, Croatia, Estonia, Hungary, Luxembourg, Netherlands, Slovenia, Spain, and the UK only, due to their mandates occurring during our sample period). *Post* switches on for years after the treatment, and for control observations, this is the year of their respective matched bank. That is, we define a ‘synthetic’ *Post* variable for control observations.

We report descriptive statistics in Panels A and B. The properties of our PSM sample vary slightly compared to our full sample, with the PSM sample of banks being slightly larger, better capitalized, and more profitable. Also, Panel B suggests that this sample seems to be distributed across countries more evenly than the main sample. Panel C reports results from the first-stage estimation, while Panel D reports the differences in variable means between our treatment and matched sample at the year of estimation. That we find no significant differences between our treatment and control banks confirms the validity of our matching procedure.

Panel E presents the main estimation results using the PSM sample, including bank and year fixed effects. In column (1), we estimate results for *Counterparty risk* and find statistically similar results to those reported in Panel A for the full sample. The coefficient of interest, $Treatment \times Post$, is -0.103 and significant at the 1% level. Economically, this coefficient suggests a 9.8% decline in the counterparty risk of treatment banks.¹³ We also observe a reduction in *Nonperforming loans* and *CDS Spread* after the adoption of reforms, with the coefficient estimates suggesting significant declines of 2.48 percentage points and 46 basis points, respectively. Overall, these results are qualitatively similar to our main findings reported using the full sample.¹⁴

5.2.2 Other concurrent regulations

¹³ In untabulated results, we re-estimate our tests by limiting our control sample to banks in countries that are never treated. Our inference remain unchanged in that we continue to find a statistically significant decline in bank risk.

¹⁴ We also ensure that the parallel trends assumption holds for this test (untabulated).

Another identification concern common in regulation-based empirical research is that the regulation of interest may be part of a larger package of concurrent regulations. To understand the extent of this concern, we adopt a systematic approach to review specific regulations for our treatment countries, and search for other circulars, directives, or regulations both nationally and from the ECB. First, we reviewed the specific regulations cited by regulators and performed a keyword search for all mentions of “Auditor,” “Supervisor,” “Regulator,” “Assurance,” and “Bank” to ensure we reviewed all requirements relating to the auditor. We found no systematic trends of any similar auditor-related bank reforms enacted around the same time as our treatment.¹⁵ Second, we searched the websites of the national regulators for our treatment countries to find information (e.g., Annual Reviews/Reports) on any concurrent banking reforms enacted in or around our treatment years. We focused our review on regulations pertaining to bank auditors, and liquidity and capital requirements, and found no instances of other auditor-related reforms during our treatment years. Third, we reviewed the Basel Committee on Banking Supervision (BCBS) periodic global progress reports on the adoption of the Basel regulatory framework. These reports provide detailed updates on the adoption status of Basel III standards for each BCBS member jurisdiction.¹⁶ Focusing on changes in the adoption status of relevant regulations (e.g., regulatory capital, liquidity, and disclosures on RWA and capital composition), we noted no significant changes/implementation (i.e., change to status code 4) within treatment countries around the time of our auditor reforms.¹⁷ (See the Online Appendix for further details.)

¹⁵ This is not to say that several EU countries were not enacting banking specific regulations around this time. For example, in Belgium, the Banking Act on the status and supervision of credit institutions (25 April 2014) transposed several EU directives into national law. However, the requirements for enhanced auditor reporting were adopted two years prior, in 2012.

¹⁶ For example, see the “Sixteenth progress report on adoption of the Basel regulatory framework” at: <https://www.bis.org/bcbs/publ/d464.pdf>.

¹⁷ The color coded status used in the reports are as follows: 1 = draft regulation not published; 2 = draft regulation published; 3 = final rule published (not yet implemented by banks); 4 = final rule in force (published and implemented by banks). Standards for which the agreed implementation deadline has passed receive a color code to reflect the status of implementation: green = adoption completed; yellow = adoption in process (draft regulation published); red = adoption not started (draft regulation not published); and “na” = not applicable.

Furthermore, we address this concern empirically in several ways. First, all specifications include a control variable (*Basel*) that captures a given bank's Basel reporting regime (i.e., Basel I, Basel II, Basel II Pillar 3, Basel III) over time. This term accounts for the staggered implementation of Basel reforms across different countries and individual banks' voluntary adoption of these rules.¹⁸ Second, we control for country-level indices that track concurrent changes in regulatory stringency, credit reforms, and country-specific economic trends. As can be seen in our main specifications presented in Tables 3 and 4, we include these four additional country-year variables: *Legal rights*, which is an index made up of 10 aspects related to the legal rights in collateral law and two aspects related to bankruptcy law; *Credit information*, which is an index that measures rules and practices affecting the coverage, scope, and accessibility of credit information available in a given country; *Insolvency resolution*, which is an index based on the commencement of proceedings, management of debtor's assets, reorganization proceedings, and creditor participation; and *Significant reform dummy*, which is an indicator variable that equals 1 for country-years with an increase in *Credit information*, *Insolvency resolution*, or *Legal rights*. We find that our estimates remain significant after the inclusion of these variables.

Finally, we exploit the UK setting, which allows us to mitigate country-level time-varying confounds, where rules regarding the extent of auditor reporting to bank supervisors are based on bank-size thresholds. Auditors of UK banks are required to provide additional reports to the regulator (the Prudential Reporting Authority of the Bank of England) if their client banks have at least £50 billion in assets. This feature yields a natural treatment group (banks with assets greater

¹⁸ In (untabulated) sensitivity tests we replace our continuous variable *Basel* with a set of indicator variables representing each of the Basel reporting regimes (i.e. we do not impose any functional form among Basel regimes). Our results remain qualitatively similar.

than £50 billion) and a control group (banks with assets less than £50 billion).¹⁹ Thus, we can use the UK setting to provide within-country evidence.²⁰

Our variable of interest is $Post_t \times UK\ Treatment_t$. In this model, $Post$ switches on after 2016, which is the year of adoption within the UK. $UK\ Treatment$ is defined at the bank level, rather than the country level, switched on for banks above the size-threshold for the requirements (i.e., assets greater than £50 billion). The control variables and fixed-effect structure mirror those in our main analysis. Due to the inclusion of bank and year fixed effects, both $Treatment$ and $Post$ main effects are omitted from the final estimation. Since we rely on a single-country setting, we cluster standard errors by bank.

Panel A of Table 5 presents the descriptive statistics for the UK sample, which suggests that the UK banks are fairly similar to the PSM sample in terms of several key variables like *Counterparty risk*, *Size*, *Capital*, and *Basel*. Panel B of Table 5 presents the estimation results. We find an economically and statistically significant reduction in risk for two of our three dependent variables: *Counterparty risk* (column 1), *CDS spread* (column 3). Overall, these findings corroborate our main results in a within-country setting.

5.3 Robustness

We carry out two sets of robustness tests. First, we partition our sample based on bank size. We expect our results to be more pronounced among banks for which supervisors are at a plausible information disadvantage and among those with significant negative externalities. Although large banks inflict significant negative externalities in the event of a failure, these entities also receive more scrutiny (e.g., in some cases, regulators are physically located in the largest banks to obtain

¹⁹ The control sample includes banks with total assets of £20–£50 billion. This mitigates the concern that we may simply be capturing a “size effect” and also ensures a more balanced sample of treatment and control.

²⁰ As an additional within country test, in an untabulated analysis, we find that the main effect holds for private banks. This rules out the possibility that some concurrent changes to securities regulation is driving the finding.

information directly). Thus, we expect our results to be weaker for this group. Similarly, while supervisors are at an information disadvantage concerning small banks, their externality effect is much smaller, and they are less complex. Typically, small bank failures are swiftly handled. Overall, we expect to find our results to be strong in the medium-sized banks. In keeping with this idea, the results in Panel A of Table 6 suggest that both counterparty risk and NPLs decline more for medium-sized banks. Thus, auditors play a more significant role when the information asymmetry between supervisors and banks is high.²¹

Second, to assess whether particular countries drive our main results, we re-estimate equation (1) for *Counterparty risk* and *Nonperforming loans* on subsamples that omit each of our nine treatment countries individually. We limit our sensitivity analysis to our bank-reported risk metrics, given the limited sample size available for *CDS Spread*. Panel B of Table 6 reports results for *Counterpart risk*. Across each specification, the coefficient on our variable of interest (*Mandatory Auditor Reporting*) is negative and significant, ranging from -0.055 to -0.088, consistent with our main results reported in Table 3. Panel C of Table 6 reports results for *NPL*. We find that the coefficient on *Mandatory Auditor Reporting* remains negative and significant in seven of nine specifications, with coefficient magnitudes ranging from -2.441 to -3.003. While still negative, we lose statistical significance when we omit Hungary or Slovenia. Overall, these findings support our main conclusions, which are not isolated to any particular country.

5.4 Mandatory Auditor Reporting and Reductions in Bank Risk: Channels

²¹ We also note that these results mitigate concerns that our findings may be due to the on-going SSM requirements in several treatment countries. These efforts were isolated to the largest banks within each country, i.e., those deemed “significant” in terms of size or cross-border activities. That we find our results to be strongest among medium-sized banks (as opposed to the largest banks) casts doubt on the SSM as an alternative explanation.

This section provides evidence on the channels through which mandatory auditor reporting reduces bank risk. We provide empirical tests of our three main channels: (i) regulation-based supervision, (ii) supervisory review efforts, and (iii) market discipline.

5.4.1 Regulation-based supervision

To shed light on whether mandatory auditor reporting influences banks' risk through better regulatory enforcement, we focus on RWAs, which are critical inputs for assessing capital adequacy, a key regulatory requirement. Capital regulations are a primary pillar of prudential supervision, as put forth in the Basel Accord. Most countries have minimum capital requirements for the establishment of new banks, and capital adequacy tests are typically a core component of supervision. Capital adequacy, assessed by comparing a bank's assets with its capital resources, is designed to reflect the relative riskiness of the various categories of assets or off-balance-sheet items, such as RWAs. Currently, RWAs are beyond the scope of financial audits. However, supervisors in some countries mandate assurance on this measure as a part of the information they receive from auditors.

Ex ante, the effect of mandated auditor reporting to bank supervisors on RWAs is unclear. On the one hand, this mandate may curtail the underreporting of RWAs by banks, which would increase RWAs. In contrast, we may observe a reduction in RWAs if they fix overestimation errors or if they trigger improvements in lending quality.

We re-estimate equation (1) with *Risk-weighted assets* as the dependent variable. We define *Risk-weighted assets* as the percentage ratio of total RWAs to total assets and present our empirical results in Table 7 Panel A. Column (1) details our main specification, while column (2) also includes a term to account for pre-regulation trends. In columns (3) and (4), we further incorporate the change in NPLs to control for the quality of the loan portfolio. Thus, in columns (3) and (4), we interpret the coefficient on *Mandatory Auditor Reporting* as the accuracy in the

estimation of risk-weights. In particular, *Risk-weighted assets* decline by about 0.019 following the adoption of reforms increasing auditor involvement in bank supervision. These figures are meaningful, given the sample standard deviation of *Risk-weighted assets* of 0.183.

In Panel B, we re-estimate our main results in Table 3 on a sample that consists only of treatment countries. The variable of interest, *Ratio Assurance AND Mandatory Auditor Reporting*, equals one for banks whose auditors are required to give ratio assurance. We continue to find a significant decline in *Counterparty risk*, which we view as evidence that ratio assurance requirements play some role in reducing bank risk. We acknowledge, however, that we cannot fully tease out the effect of ratio assurance, as almost all of these treatment countries also have an accompanying additional reporting requirement.

5.4.2 Market discipline

Next, we examine the market discipline channel. Supervisors' closer relationship with auditors and mandated reporting channels may also increase the quality of audit output and result in a better information environment, improving market discipline. We provide two empirical tests to shed light on this channel. First, we examine *Information imprecision*, which we measure as the ratio of short-term CDS spreads to long-term CDS spreads (Duffie and Lando, 2001; Arora et al. 2014). This computation helps us isolate the magnitude of information imprecision for a given level of credit risk because both the short-term and long-term spreads have the same level of credit risk. Table 8, Panel A reports the regression results. We estimate equation (1) with *Information imprecision* as our dependent variable, and find a significant reduction, even when controlling for pre-regulation trends—in column (2), the coefficient on *Treatment* \times *Post* is -0.075 and significant. These findings suggest that auditor reporting to supervisors appears to discipline bank risk, and conditional on the level of risk-taking, enables debt-market investors to better assess banks' risk profiles.

Second, we examine whether mandatory auditor reporting to bank supervisors improve the timeliness of loan-loss provisions, which would be consistent with improvements in audit outputs (audited financial reports) enhancing private monitoring and reducing bank risk. We measure *Loan loss provisions* as the current year's loan loss provisions, scaled by total loans and presented in percentage points. In the spirit of Bushman and Williams (2012), we estimate a variant of equation (1) with *Loan loss provisions* as the dependent variable and with the change in current NPLs (ΔNPL_t), future NPLs (ΔNPL_{t+1}), and interaction terms with our *Mandatory Auditor Reporting* as the variable of interest. We report the regression results in Table 8, Panel B. Specifically, we find the interaction term *Mandatory Auditor Reporting* \times ΔNPL_{t+1} is negative and significant, before and after controlling for lagged *Loan loss provisions* (columns 1 and 2).

5.4.3 Supervisory Review Process

Our third channel relates to the supervisory review process, wherein supervisors can benefit from discussions with auditors in planning and executing the bank reviews. It is a challenge to ascertain the effect of these mandates on supervisory effort because the transfer of soft information in communications between auditors and supervisors is unobservable and because an all-encompassing measure of supervisory effort is hard to obtain. We aim to provide suggestive evidence on this channel by performing three tests. First, we collect information on the annual number of on-site examinations supervisors conduct—for all sample countries except for Cyprus, Greece, Ireland, Netherlands, and Sweden, which did not share the pertinent data. Table 9, Panel A reports the results from our country-level regressions of on-site examinations. We find that mandated auditor reporting to bank supervisors reduce the number of visits for on-site inspections. This finding is consistent with our survey responses, where some national supervisors stated that increased auditor reporting allowed them to perform more off-site supervision and to design their on-site examinations more efficiently. Overall, the evidence suggests that greater auditor

involvement may enable resource-constrained supervisors to better tailor their bank assessments for more efficient on-site examinations.

Second, we examine whether the risk reductions we observe are more pronounced in jurisdictions that also require mandatory meetings between auditors and bank supervisors. We measure the extent of mandated auditor meetings with supervisors via our survey responses (see Table 1) and re-estimate our main specification within a sample of treatment countries only. We redefine our variable of interest as *Meetings AND Mandatory Auditor Reporting*, which captures treatment banks whose auditors are also required to meet with bank supervisors at least once annually. As shown in Table 9, Panel B, we find evidence consistent with an incremental decline in bank risk when there is also a requirement for meetings. The reduction is statistically significant for *Counterparty risk* but not for *Nonperforming loans*.

Third, we investigate whether auditor reporting to supervisors reduces bank risk more when regulators are resource-constrained. This test is predicated on the notion that resource-constrained supervisors are likely to rely more heavily on auditors for soft information and cues on when to intervene. We follow the empirical design that we adopt for meetings above and estimate our model on a sample of treatment countries only. The variable of interest, *Resource Constrained AND Mandatory Auditor Reporting*, switches on only for bank-year observations that operate in countries whose regulators are resource-constrained (i.e., for countries whose bank regulators' employee per regulate bank is below-median). We find evidence of a reduction in bank risk, although the estimates are statistically significant for *Counterparty risk* but not for *Nonperforming loans*. This observation is broadly in line with mandatory auditor reporting benefiting resource-constrained supervisors more, which can be interpreted as auditors playing a role in the broader supervisory review process.

5.5 Analysis of Potential Costs

Supervision relies on judgment, and supervisors could be excessively conservative in their assessments of bank risks. There is an inherent tradeoff between achieving stability and growth. Excessive supervisory actions and scrutiny based on increased information from auditors could slow down bank operations—in terms of both profitability and lending (i.e., risk-taking). Although still inconclusive, prior work provides some evidence that supervision can reduce bank efficiency (e.g., Barth et al., 2013). Supervisory concerns about risk management could force banks to make investments in technology and data infrastructure with significant upfront costs, depressing near-term profits. The empirical literature also suggests that stricter supervisory standards are associated with slower loan growth (e.g., Peek and Rosengren, 1995).

Accordingly, we assess the impact of mandated auditor regulations on profitability and lending by re-estimating equation (1) for *Loan growth* (the annual percentage change in loans) and for *Profitability* (the percentage return on equity). We examine these metrics over three windows from $t+1$ through $t+3$, i.e., up to three years following the mandate. Table 10 reports the regression results for *Loan growth* and *Profitability*, respectively. We find a significant reduction in lending about 1.3–2.2 percentage points (Panel A) and a decline in profitability of about one percentage point (Panel B), indicating that the reduction in bank risk comes at a cost to shareholder value.

Finally, we examine a direct cost. Given the mandatory requirements to report to bank supervisors, audit firms will likely have to expend additional resources and effort. This raises a question of who bears the additional cost burden. To shed light on this issue, we examine the audit fees for banks after the commencement of regulator-auditor collaboration. Specifically, we re-estimate a modification of Equation (1) with total fees paid to auditors for all audit related services as the dependent variable. We use the natural log of total audit fees to proxy for the audit effort given that prior studies have found fees and audit hours are highly correlated (e.g., Aobdia 2019). In addition, we include several bank-level controls, consistent with prior studies examining audit

pricing for financial institutions (e.g., Ettredge et al., 2014). We obtain audit fee data bank-level control variables from Factset, for our sample of banks during 2009 – 2018.²²

Table 11 presents the results of this analysis. In Panel A we report descriptive statistics for the new variables used in these analyses. In Panel B we present the results of our regression analysis. The coefficient on *Mandatory Auditor Reporting* suggests a significant rise in total fees paid to auditors following these mandates—the estimate of 0.266 (column 2) corresponds to an increase in audit fees of approximately 30%, which is statistically and economically meaningful. Our findings suggest that banks bear (at least some of) the cost of mandated auditor reporting. We note also that this finding provides some validation for our main inferences, in that it is consistent with auditors expending additional effort in light of these mandates.

6. Conclusion

Supervisors are resource-constrained and use imperfect information to monitor banks and proactively intervene to prevent bank failures. This study focuses on the role of bank auditors in micro-prudential supervision. In particular, we examine the economic consequences of mandatory reporting of auditors to bank supervisors for bank risk and bank health. By using survey inputs from national regulators and legislative documents, we construct a novel dataset of the adoption of laws mandating auditor reporting to bank supervisors across all 28 EU countries during the 2009–2018 period. We find evidence that bank risk—as measured by counterparty risk, NPLs, and CDS Spreads—declines after this mandate.

We provide evidence on three channels through which auditor reporting to supervisors reduces bank risk. First, we find a decline in risk-weighted assets (RWAs), which we interpret as evidence for improved regulation-based supervision. Second, in keeping with enhanced market discipline, we observe an improvement in the information environment—measured by the term

²² We acknowledge that our sample for the audit fee analysis is considerably reduced due to data limitations.

structure of credit spreads and loan loss recognition timeliness. Third, we also find evidence consistent with improvements to the supervisory review process. In addition to our investigation of the underlying mechanisms, we also study the costs these risk reductions could entail. We find that following mandated auditor reporting to bank supervisors, banks' loan growth and profitability decrease.

We leave several questions for future research. Our risk measures come mainly from regulatory and financial disclosures. Since many of these mandates were adopted recently, a full examination of their long-term impact on banks' performance volatility (e.g., Hodder et al., 2006), on bank failures, and on systemic risk appears to be a logical next step (Leuz and Wysocki, 2016). Moreover, researchers could examine institutional features that mediate the choice and extent of auditor involvement in supervision as well as the consequences of that involvement.

Appendix. Variable Definitions

Variable Name	Definition	Source and field code
<i>Mandatory Auditor Reporting</i>	Indicator that switches on for banks in countries that have implemented audit-supervision reforms.	Survey (Table 1)
<i>Total Audit fees</i>	Total annual fees to paid to auditors for all statutory audit and audit related services (transformed to natural logarithm form in the regression tests).	Factset: FF_AUD_FEES
<i>Bank concentration</i>	Assets of five largest banks as a share of total commercial banking assets (%).	World Bank: GFDD.OI.06
<i>Basel</i>	Equals 1, 2, 2.5, or 3 depending on the bank's Basel reporting regime. Non-Basel reporters take zero.	SNL: #225203
<i>Capital</i>	The ratio of equity to assets (%).	SNL: #131939 and #132264
<i>Capital Adequacy</i>	Capital adequacy ratio (%)	Factset: FF_CAP_RATIO_TOT
<i>Cost-to-income ratio</i>	Operating expenses divided by operating income (%).	SNL: #226949
<i>Counterparty risk</i> †	Natural logarithm of the risk of financial loss if a customer or counterparty fails to meet an obligation.	SNL: #225242
<i>Credit information</i>	Index that measures rules and practices affecting the coverage, scope and accessibility of credit information available in the country.	Doing Business: Depthofcreditinformation
<i>CDS Spread</i>	Five-year average annual CDS spread (%).	Markit: spread5y
<i>Employees</i>	The number of full-time-equivalent employees working for the company and its subsidiaries.	SNL: #134875
<i>GDP growth</i>	Year-over-year growth in gross domestic product (%).	World Bank: NY.GDP.MKTP.CD
<i>Information imprecision</i>	The ratio of the one-year CDS spread to the five-year CDS spread.	Markit: spread1y and spread5y
<i>Insolvency resolution</i>	Index based on commencement of proceedings, management of debtor's assets, reorganization proceedings, and creditor participation.	Doing Business: ResolvingInsolvencyDTF
<i>Legal rights</i>	Index that includes 10 aspects related to legal rights in collateral law and 2 aspects in bankruptcy law.	Doing Business: Strengthoflegalrightsindex
<i>Loan growth</i>	Year-over-year growth in loans (%).	SNL: #131923
<i>Loan intensity</i>	The ratio of loans to assets (%).	Factset: FF_LOAN_GR SNL: #132264 and #131923 Factset: FF_LOAN_ASSETS

<i>Loan loss provisions</i>	Loan loss provisions divided by total loans (%).	SNL: #131958 and #132264 Factset: FF_LOAN_LOSS_PROV_PCT
<i>Local GAAP</i>	Indicator that switches on for banks that report under local GAAP, as opposed to IFRS. Set to 0 otherwise.	Factset: FF_ACTG_STANDARD
<i>Loss</i>	Indicator variable that switches on if net income is negative for the current year.	Factset: FF_NET_INCOME
<i>Market volatility</i>	Stock price volatility is the average of the 360-day volatility of the national stock market index.	World Bank: GFDD.SM.01
<i>Nonperforming loans</i>	The ratio of nonperforming loans to total loans (%). Where “Nonperforming loans as reported by the company or, where not available, calculated as the sum of loans classified as substandard, doubtful and loss.”	SNL: #243681 and #131923
<i>Post</i>	Indicator that switches on only if the observation is after the implementation of the audit-supervision reform.	Survey (Table 1)
<i>Profitability</i>	Return on equity (%).	SNL: #132006
<i>Public</i>	Indicator variable that switches on for publicly traded banks, i.e. those with market valuation and ISIN.	Factset: FF_MKT_VAL & FF_ISIN
<i>ROE</i>	Return on Equity, in percentage points. Measured as Net Income divided by total shareholders’ equity from Factset.	Factset: FF_NET_INCOME & FF_SHLDRS_EQ
<i>Risk-weighted assets</i>	The ratio of total risk-weighted assets to total assets (%).	SNL: #248884 and #132264
<i>Significant reform dummy</i>	Equals one for country-years with an increase in <i>Credit information</i> , <i>Insolvency resolution</i> , or <i>Legal rights</i> .	Doing Business
<i>Size</i>	USDmm total assets, in natural logarithm.	SNL: #132264
<i>Treatment</i>	Indicator that switches on only for countries that implement audit-supervision reforms in the sample period.	Survey (Table 1)

† SNL collects this information from Pillar III disclosures. This amount is the charge that banks calculate for all exposures that give rise to counterparty risk, including over-the-counter derivatives, exchange-traded derivatives, long settlement transactions, and securities financing transactions.

The Basel Committee’s official definition is as follows: “*Counterparty risk is the risk that the counterparty to a transaction could default before the final settlement of the transaction's cash flows. An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default. Unlike a firm's exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending bank faces the risk of loss, Counterparty risk creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction. The market value is uncertain and can vary over time with the movement of underlying market factors.*”

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Table 1. Results from the Survey on Mandatory Auditor Reporting to Bank Supervisors

Country	Additional reporting	Ratio assurance	Meetings	Verified regulatory source (re. additional reporting mandate)
Austria	1994	1994	Annual ¹	Federal Banking Act (Bankwesengesetz - BWG)
Belgium	2012	2014	Annual ²	Circular 9th June 2017 / Annual Report 2014
Bulgaria	No	No	Ad-hoc	
Croatia	2014	2014	Annual ¹	Credit Institutions Act - Article 172 and 174
Cyprus	No	No	Annual ¹	
Czech Rep.	No	No	Annual ¹	
Denmark	No	No	Annual ³	
Estonia	2014	2014	Annual ¹	Credit Institutions Act (1999) - Article 93
Finland	No	No	Annual ³	
France	No	No	Site Exams ⁴	
Germany	1998	1998	Annual ¹	Banking Act (Kreditwesengesetz, KWG) of 1998 - Section 29
Greece	No	No	Annual ¹	
Hungary	2014	2014	Site Exams ⁵	Act CCXXXVII of 2013 on Credit Institutions and Financial Enterprises – S.263
Ireland	No	No	Annual ¹	
Italy	No	No	No ⁶	
Latvia	No	No	Annual ¹	
Lithuania	No	2004	Semi-annual	
Luxembourg	2013	No	Annual ³	CSSF Circular 01/27
Malta	No	No	Ad-hoc	
Netherlands	No	2014	Varying ⁷	
Poland	No	No	Site Exams ⁸	
Portugal	2008	No	Annual ¹	"Banking Law (1992)" - amendments to Article 120 and 121
Romania	No	No	Annual/Quarterly	
Slovakia	2001	No	No ⁶	Act No. 483/2001 ("Act on Banks") - Article 40
Slovenia	2015	No	Annual ¹	Banking Act (Zban-2 amendment)
Spain	2011	2011	Annual ¹	Eighth Additional Provision of the Royal Decree 1517/2011 of 31 October 2011
Sweden	No	No	Annual ¹	
UK	2016	No	Annual/Semi-annual	Supervisory Statement SS1/16 (Jan 2016)

Notes:

¹ Annual meeting held (at the minimum), with ad-hoc meetings on a case by case basis, i.e., for special issues that arise

² At least twice a year for systemically important institutions, at least once a year for all other banks.

³ For large/systemically important/enhanced supervision banks meeting with auditors are required at least annually. Ad-hoc meetings for other banks

⁴ As part of site examinations, there is contact with the auditors. In addition, as part of alert mechanisms, auditors can ask for meetings.

⁵ In the case of Hungary, the meetings occur as part of comprehensive onsite examinations held every 3 years.

⁶ No formal rule specifying the frequency of meetings. In the case of Italy, the Bank of Italy organizes (twice a year) meetings with the association of audit firms to discuss general issues related to the banking industry. In Slovakia, it is on an ad-hoc basis when issues arise.

⁷ In the case of the Netherlands, regulators meet with bank auditors several times a year for large banks, and once every two/three years for small banks. Meetings with industry groups are scheduled 3 times a year. Audit firms are once a year.

⁸ In the case of Poland, the PFSA will meet with the bank's board and auditor. Bilateral meetings between PFSA and auditor are held when necessary.

Table 2. Descriptive Statistics

This table presents the sample statistics for the main estimation samples. Each observation is a bank-year, except for *Number of on-site examinations*, which we observe at the country-year level. Panel A presents the sample statistics, Panel B presents a breakdown of the sample by country and year. Variable definitions appear in the Appendix. All bank-level control variables are winsorized at the 1% and 99%.

Panel A. Summary statistics

	Mean	stdev	p10	p50	p90	N
<i>Mandatory Auditor Reporting</i>	0.610	0.488	0.000	1.000	1.000	16,931
<i>Counterparty risk</i>	13.516	2.134	11.051	13.221	16.529	16,931
<i>Nonperforming loans</i>	6.752	8.236	0.673	3.480	18.519	12,841
<i>CDS Spread</i>	1.628	1.550	0.514	1.176	3.278	600
<i>Size</i>	21.187	2.211	18.672	20.818	24.331	16,931
<i>Capital</i>	9.731	5.767	5.142	8.684	14.449	16,931
<i>Profitability</i>	3.352	8.330	0.157	3.165	10.033	16,931
<i>Loan intensity</i>	58.056	18.589	33.762	60.552	78.957	16,931
<i>Loan growth</i>	5.371	18.372	-5.599	3.307	14.592	16,931
<i>Loan loss provisions</i>	0.586	1.610	-0.390	0.270	1.946	16,931
<i>Employees</i>	5.290	1.878	3.135	5.063	7.857	16,931
<i>Cost-to-income ratio</i>	67.049	17.633	47.933	67.277	83.180	16,931
<i>Basel</i>	2.664	0.486	2.000	3.000	3.000	16,931
<i>GDP growth</i>	0.258	8.424	-12.821	2.632	9.524	16,931
<i>Bank concentration</i>	80.205	8.846	71.025	80.860	91.823	16,931
<i>Market volatility</i>	21.538	5.748	14.440	20.493	27.659	16,931
<i>Legal rights</i>	5.729	1.926	2.500	6.000	7.500	16,931
<i>Credit information</i>	6.091	1.438	4.500	6.000	8.000	16,931
<i>Insolvency resolution</i>	80.562	14.038	62.440	84.780	91.930	16,931
<i>Significant reform dummy</i>	0.799	0.401	0.000	1.000	1.000	16,931
<i>Risk-weighted assets</i>	53.916	16.720	31.245	55.201	73.946	19,048
<i>Information imprecision</i>	0.545	0.307	0.208	0.491	0.929	542
<i>Loan growth t+1</i>	4.504	12.719	-5.604	3.376	14.174	14,578
<i>Profitability t+1</i>	3.885	6.482	0.245	3.186	10.458	14,578
<i>Loan growth t+2</i>	4.547	12.105	-5.282	3.531	14.114	11,280
<i>Profitability t+2</i>	3.941	6.326	0.335	3.153	10.443	11,280
<i>Loan growth t+3</i>	4.665	12.183	-5.258	3.729	14.124	8,171
<i>Profitability t+3</i>	4.028	6.215	0.349	3.156	10.552	8,171
<i>Number of on-site examinations</i>	3.388	1.321	1.609	3.434	5.255	171

Panel B. Sample distribution by country and year

By country				By year	
Austria	612	Ireland	109	2009	312
Belgium	112	Italy	2,998	2010	335
Bulgaria	129	Latvia	73	2011	339
Croatia	190	Lithuania	37	2012	2,099
Cyprus	50	Luxembourg	194	2013	2,485
Czech Republic	153	Malta	60	2014	2,621
Denmark	539	Netherlands	188	2015	2,650
Estonia	62	Poland	207	2016	2,527
Finland	505	Portugal	404	2017	2,447
France	540	Slovakia	60	2018	1,116
Germany	8,404	Slovenia	117	Total	16,931
Greece	110	Spain	343		
Hungary	102	Sweden	518		
Ireland	109	United Kingdom	115		

Table 3. Mandatory Auditor Reporting and Bank Risk: Main Results

This table presents the results from bank-year-level regressions for our main dependent variables: *Counterparty risk*, *Nonperforming Loans*, and *CDS Spread*. We measure *Counterparty risk* as the natural logarithm of the counterparty risk disclosures obtained by SNL from regulatory disclosures. This metric is the charge that banks calculate for all exposures that give rise to counterparty risk, including over-the-counter derivatives, exchange-traded derivatives, long settlement transactions, and securities financing transactions. *Nonperforming loans* is the ratio of nonperforming loans (SNL #243681) to total loans (SNL #131923). *CDS Spread* is the five-year annual CDS spread (%) taken at year-end. *Mandatory Auditor Reporting* takes the value of 1 for bank-years that are in countries that passed additional reporting requirements (e.g., LFAR) or Ratio Assurance requirement (see Table 1), following the year of the reform (Austria 1994, Belgium 2012, Croatia 2014, Estonia 2014, Germany 1998, Hungary 2014, Luxembourg 2013, Netherlands 2014, Portugal 2008, Slovakia 2001, Slovenia 2015, Spain 2011, and the UK 2016). This variable is set to zero for banks from these countries prior to the reform as well as for banks in non-reform countries throughout the sample period. Variables definitions are in the Appendix. *T*-statistics presented in parentheses are computed using standard errors clustered within country-year and robust to heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Main results

	(1)	(2)	(3)
	<i>Counterparty risk</i>	<i>Nonperforming loans</i>	<i>CDS Spread</i>
<i>Mandatory Auditor Reporting</i>	-0.069*** (-3.01)	-2.313** (-2.42)	-0.406* (-1.67)
<i>Size</i>	0.639*** (10.23)	0.723 (0.66)	-0.201 (-0.44)
<i>Capital</i>	0.010*** (3.93)	-0.010 (-0.24)	-0.097*** (-2.85)
<i>Profitability</i>	0.000 (0.87)	-0.073*** (-2.94)	-0.031*** (-3.37)
<i>Loan intensity</i>	0.010*** (9.06)	-0.058 (-1.58)	0.017 (1.41)
<i>Loan growth</i>	0.000 (0.86)	-0.020*** (-3.64)	-0.000 (-0.07)
<i>Loan loss provisions</i>	-0.001 (-0.47)	0.360*** (3.76)	0.021 (0.24)
<i>Employees</i>	0.075** (2.58)	0.503 (0.75)	-0.509* (-1.77)
<i>Cost-to-income ratio</i>	-0.000 (-1.16)	-0.045*** (-3.36)	-0.007** (-1.98)
<i>Basel</i>	0.004 (0.22)	-0.110 (-0.35)	-0.087 (-0.35)
<i>GDP growth</i>	-0.002* (-1.78)	0.076 (0.91)	-0.026 (-1.62)

<i>Bank concentration</i>	-0.002 (-1.26)	0.064 (1.12)	-0.043** (-2.08)
<i>Market volatility</i>	-0.000 (-0.02)	0.089 (1.09)	0.076** (2.03)
<i>Legal rights</i>	0.039*** (3.89)	-1.617*** (-4.72)	-0.155 (-0.92)
<i>Credit information</i>	-0.015 (-1.08)	-0.482 (-1.23)	0.041 (0.16)
<i>Insolvency resolution</i>	0.000 (0.23)	0.078** (2.07)	-0.006 (-0.62)
<i>Significant reform dummy</i>	0.011 (1.31)	-0.097 (-0.18)	-0.022 (-0.13)
Observations	16,931	12,841	600
Within R-squared	35.9%	11.9%	21.7%
Bank and Year FE	Yes	Yes	Yes

Panel B. Pre-treatment parallel trends

	(1) <i>Counterparty risk</i>	(2) <i>Nonperforming loans</i>	(3) <i>CDS Spread</i>
<i>Mandatory Auditor Reporting</i>	-0.072*** (-3.11)	-2.557** (-2.56)	-0.363 (-1.63)
<i>Pre-Mandate</i>	-0.013 (-0.44)	-0.840 (-0.78)	0.173 (0.80)
Observations	16,931	12,841	600
Within R-squared	35.9%	11.9%	21.8%
Bank and Year FE	Yes	Yes	Yes

Table 4. Mandatory Auditor Reporting and Bank Risk: PSM Sample

This table presents the results from bank-year-level regressions for the propensity-score-matched (PSM) sample, where *Treatment* is an indicator variable that switches on only if the bank is from a country that mandates auditor reporting to bank supervisors during the sample period (see Table 1). *Post* switches on for years after the treatment; for control observations, this is the year of their respective matched bank. Panels A and B present the descriptive statistics for this sample. Panels C and D show evidence on the validity of the matching procedure; the former panel includes the results from the first-stage estimation (which is performed year by year), while the latter contains the differences in the variable means between treatment and matched firms as at the year of estimation. Panel E presents the main estimation results using the PSM sample. *T*-statistics presented in parentheses are computed using standard errors clustered within country-year and robust to heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Descriptive statistics (PSM sample)

	Mean	stdev	p10	p50	p90	N
<i>Treatment</i> × <i>Post</i>	0.219	0.414	0.000	0.000	1.000	2,411
<i>Counterparty risk</i>	14.899	2.527	11.530	14.707	18.289	2,411
<i>Nonperforming loans</i>	7.642	9.396	0.545	4.062	19.846	1,247
<i>CDS Spread</i>	1.373	1.170	0.474	1.049	2.818	260
<i>Size</i>	22.850	2.658	19.333	22.697	26.802	2,411
<i>Capital</i>	9.212	7.049	3.537	7.813	14.908	2,411
<i>Profitability</i>	3.707	14.077	-5.668	4.993	14.614	2,411
<i>Loan intensity</i>	50.210	23.660	12.333	54.497	77.235	2,411
<i>Loan growth</i>	6.287	33.411	-12.584	2.791	22.292	2,411
<i>Loan loss provisions</i>	1.053	4.240	-0.112	0.303	2.294	2,411
<i>Employees</i>	6.397	2.296	3.584	6.144	9.857	2,411
<i>Cost-to-income ratio</i>	64.599	27.311	35.800	63.217	88.417	2,411
<i>Basel</i>	2.611	0.530	2.000	3.000	3.000	2,411
<i>GDP growth</i>	0.411	8.255	-12.821	2.632	9.524	2,411
<i>Bank concentration</i>	79.020	13.136	65.826	78.494	94.117	2,411
<i>Market volatility</i>	20.641	7.337	13.186	19.633	28.921	2,411
<i>Legal rights</i>	5.751	1.957	3.000	6.000	8.000	2,411
<i>Credit information</i>	5.113	2.039	2.000	5.000	7.000	2,411
<i>Insolvency resolution</i>	72.120	20.302	42.140	78.750	93.810	2,411
<i>Significant reform dummy</i>	0.695	0.461	0.000	1.000	1.000	2,411

Panel B. By country breakdown of the PSM sample

PSM treatment countries	Belg.	Croatia	Estonia	Hungary	Luxemb.	Nether.	Spain	UK
Number of obs.	98	174	54	98	185	159	71	63
PSM other countries	Austria	Denmark	Finland	France	Germany	Italy	Sweden	Other
Number of obs.	65	105	70	120	516	185	68	380

Panel C. First-stage results of PSM

	(1)	(2)	(3)	(4)	(5)	(6)
	Adoption year 2011	Adoption year 2012	Adoption year 2013	Adoption year 2014	Adoption year 2015	Adoption year 2016
	<i>Mandatory Auditor Reporting</i>	<i>Mandatory Auditor Reporting</i>	<i>Mandatory Auditor Reporting</i>	<i>Mandatory Auditor Reporting</i>	<i>Mandatory Auditor Reporting</i>	<i>Mandatory Auditor Reporting</i>
<i>Size</i>	-0.345 (-1.41)	0.324*** (2.70)	0.348*** (4.20)	0.327*** (4.30)	-3.286*** (-6.14)	1.368*** (3.51)
<i>Capital</i>	-0.100 (-1.28)	0.016 (0.95)	0.022* (1.79)	0.037*** (3.17)	-0.317*** (-3.24)	-0.226 (-1.33)
<i>Profitability</i>	-0.008 (-0.31)	0.046** (2.14)	0.045*** (3.18)	-0.022** (-2.50)	-0.122*** (-3.35)	-0.091 (-1.27)
<i>Loan intensity</i>	0.017 (1.16)	-0.029*** (-4.09)	-0.048*** (-9.39)	-0.004 (-0.87)	0.005 (0.31)	0.006 (0.37)
<i>Loan growth</i>	-0.004 (-0.18)	0.010* (1.84)	0.006* (1.72)	0.009** (2.04)	0.007 (0.49)	-0.017 (-0.41)
<i>Loan loss provisions</i>	-0.299 (-0.96)	-0.017 (-0.23)	-0.092 (-1.53)	0.125*** (2.63)	-0.367* (-1.86)	-0.827 (-1.14)
<i>Employees</i>	0.648*** (2.62)	-0.151 (-1.03)	-0.393*** (-3.79)	-0.037 (-0.41)	3.278*** (6.29)	0.322 (1.25)
<i>Cost-to-income ratio</i>	-0.068*** (-3.23)	0.009 (0.92)	-0.001 (-0.14)	0.007 (1.49)	-0.127*** (-4.32)	0.019 (0.91)
Observations	402	2,986	3,093	3,136	2,998	2,866

Panel D. Differences in means

	Differences in mean	t-stat
<i>Size</i>	0.126	(0.61)
<i>Capital</i>	0.355	(0.46)
<i>Profitability</i>	-0.265	(-0.22)
<i>Loan intensity</i>	0.300	(0.13)
<i>Loan growth</i>	-2.930	(-1.11)
<i>Loan loss provision</i>	0.136	(0.76)
<i>Employees</i>	-0.036	(-0.20)
<i>Cost-to-income ratio</i>	-0.888	(-0.39)

Panel E. Main results (PSM sample)

	(1)	(2)	(3)
	<i>Counterparty risk</i>	<i>Nonperforming loans</i>	<i>CDS Spread</i>
<i>Treatment × Post</i>	-0.103*** (-4.56)	-2.484*** (-3.19)	-0.463* (-1.76)
<i>Post</i>	0.051*** (2.74)	-0.198 (-0.53)	0.244** (2.09)
<i>Size</i>	0.699*** (11.03)	2.222* (1.69)	0.249 (0.49)
<i>Capital</i>	0.013*** (2.84)	0.099 (0.74)	-0.032 (-0.79)
<i>Profitability</i>	0.000 (0.09)	-0.038 (-0.98)	-0.032** (-2.41)
<i>Loan intensity</i>	0.010*** (7.98)	0.012 (0.30)	0.031* (1.84)
<i>Loan growth</i>	-0.000 (-0.06)	-0.015** (-2.18)	-0.000 (-0.07)
<i>Loan loss provisions</i>	-0.004** (-2.08)	0.224 (0.87)	-0.072 (-0.49)
<i>Employees</i>	0.056 (0.90)	-1.275 (-1.23)	-0.499 (-1.32)
<i>Cost-to-income ratio</i>	-0.001 (-0.90)	-0.017 (-0.99)	-0.004 (-0.92)
<i>Basel</i>	0.001 (0.02)	1.000 (1.06)	0.013 (0.04)
<i>GDP growth</i>	-0.003** (-2.16)	0.004 (0.07)	-0.008 (-0.78)
<i>Bank concentration</i>	0.000 (0.15)	-0.027 (-0.41)	-0.108*** (-4.00)
<i>Market volatility</i>	-0.000 (-0.05)	0.205* (1.70)	0.125*** (2.78)
<i>Legal rights</i>	0.009 (0.99)	-1.553*** (-4.34)	-0.185 (-1.51)
<i>Credit information</i>	-0.024** (-1.99)	-0.716 (-1.38)	0.022 (0.08)
<i>Insolvency resolution</i>	0.001 (1.62)	0.063 (1.57)	0.001 (0.13)
<i>Significant reform dummy</i>	0.006 (0.55)	-0.404 (-0.90)	-0.291** (-2.49)
Observations	2,411	1,247	260
Within R-squared	43.78%	22.15%	61.15%
Bank and Year FE	Yes	Yes	Yes

Table 5: Within-Country Analysis: Evidence from the UK

This table repeats the main analysis in a within-country specification. Panel A includes the sample statistics, and Panel B presents the regression results. *UK Treatment* equals one for banks with total assets above £50 billion, and zero for banks with assets from £20 billion to £50 billion. *Post* switches on from 2016 onward. *Post*, *Treatment*, and macroeconomic controls (*GDP growth*, *Bank concentration*, and *Market volatility*) do not appear in the table since these terms are dropped from the model in a single-country sample estimation that includes bank and year fixed effects. All other variables are as defined in the Appendix. *T*-statistics presented in parentheses are computed using standard errors that are robust to within-bank correlation and heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Descriptive statistics

	Mean	stdev	p10	p50	p90	N
<i>UK_Treatment</i> × <i>Post</i>	0.145	0.353	0.000	0.000	1.000	193
<i>Counterparty risk</i>	17.498	1.646	15.329	17.704	19.466	193
<i>Nonperforming loans</i>	3.081	2.620	1.191	2.171	5.581	66
<i>CDS Spread</i>	1.231	0.871	0.429	0.957	2.592	86
<i>Size</i>	25.835	1.561	24.025	26.243	27.744	193
<i>Capital</i>	5.463	1.629	3.536	5.142	7.688	193
<i>Profitability</i>	3.471	9.277	-7.243	5.504	12.077	193
<i>Loan intensity</i>	54.472	25.891	10.027	59.726	84.527	193
<i>Loan growth</i>	7.651	33.728	-10.016	2.465	21.782	193
<i>Loan loss provisions</i>	0.426	0.738	0.000	0.217	1.257	193
<i>Employees</i>	9.208	2.155	6.558	9.575	11.720	193
<i>Cost-to-income ratio</i>	75.723	34.299	50.772	68.536	105.626	193
<i>Basel</i>	2.767	0.392	2.000	3.000	3.000	193

Panel B. Replication of main results

	(1)	(2)	(3)
	<i>Counterparty risk</i>	<i>Nonperforming loans</i>	<i>CDS Spread</i>
<i>UK_Treatment</i> × <i>Post</i>	-0.138** (-2.18)	-0.754 (-0.69)	-0.306** (-2.95)
<i>Size</i>	0.726*** (7.49)	-0.109 (-0.02)	0.494 (1.42)
<i>Capital</i>	0.000 (0.01)	-0.119 (-0.36)	-0.015 (-0.18)
<i>Profitability</i>	-0.004 (-1.48)	-0.023 (-0.78)	-0.008 (-0.64)
<i>Loan intensity</i>	0.002 (0.61)	-0.150 (-1.00)	-0.041*** (-3.34)
<i>Loan growth</i>	0.000 (1.08)	0.018 (0.42)	0.006*** (3.43)
<i>Loan loss provisions</i>	0.037 (1.39)	1.188** (2.49)	0.164 (1.45)
<i>Employees</i>	0.086 (1.01)	-0.041 (-0.02)	0.629 (1.52)
<i>Cost-to-income ratio</i>	-0.004*** (-4.81)	-0.035** (-2.83)	-0.010 (-1.36)
<i>Basel</i>	-0.054 (-0.33)	-1.777 (-0.42)	-0.428 (-0.56)
Observations	193	66	84
Within R-squared	0.612	0.713	0.574
Bank and Year FE	Yes	Yes	Yes

Table 6. Mandatory Auditor Reporting and Bank Risk: Robustness

This table presents the results of robustness tests. In Panel A, the specifications include explicit controls for pre-regulation trends: In Panel A, we report an analysis of subsamples based on bank size (small, medium and large). In Panels B and C, we replicate the main results (i.e., Table 4) by removing treatment countries one by one. *T*-statistics presented in parentheses are computed using standard errors clustered by country-year and robust to heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Partitions by bank size

	(1)	(2)	(3)	(4)	(5)	(6)
	Conditioning variable: Bank size			Conditioning variable: Bank size		
	Small	Medium	Large	Small	Medium	Large
	<i>Counterparty Risk</i>			<i>Nonperforming Loans</i>		
<i>Mandatory Auditor Reporting</i>	-0.096 (-1.62)	-0.104*** (-3.28)	-0.031 (-1.09)	-3.624 (-1.50)	-4.428*** (-3.07)	-1.242 (-1.19)
Observations	4,237	8,365	4,081	3,462	6,887	1,684
Within R-squared	25.7%	47.0%	36.8%	9.9%	22.3%	4.5%
All lower order terms	Y	Y	Y	Y	Y	Y
All previous controls	Y	Y	Y	Y	Y	Y
Bank and Year FE	Y	Y	Y	Y	Y	Y

Panel B. Counterparty risk, removing each treatment country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Excluding Belgium	Excluding Croatia	Excluding Estonia	Excluding Hungary	Excluding Luxembourg	Excluding Netherlands	Excluding Slovenia	Excluding Spain	Excluding UK
<i>Auditor-Supervisor Interaction</i>	-0.078*** (-3.31)	-0.063** (-2.45)	-0.068*** (-2.89)	-0.055** (-2.31)	-0.066*** (-2.79)	-0.088*** (-3.76)	-0.068*** (-2.80)	-0.072*** (-2.92)	-0.055** (-2.42)
Observations	16,845	16,842	16,892	16,879	16,810	16,839	16,888	16,636	16,903
All previous terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C. Nonperforming loans, removing each treatment country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Excluding Belgium	Excluding Croatia	Excluding Estonia	Excluding Hungary	Excluding Luxembourg	Excluding Netherlands	Excluding Slovenia	Excluding Spain	Excluding UK
<i>Auditor-Supervisor Interaction</i>	-2.441** (-2.50)	-2.704*** (-2.69)	-2.443** (-2.43)	-1.093 (-1.50)	-2.577** (-2.49)	-2.477** (-2.20)	-1.225 (-1.39)	-2.635** (-2.42)	-3.003*** (-3.32)
Observations	12,805	12,809	12,822	12,794	12,798	12,783	12,817	12,492	12,820
All previous terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7. Regulatory Supervision Channel

This table presents regression results relating to the role of supervision in mediating our findings. Panel A includes the results from bank-year-level regressions for *Risk-weighted assets*, the ratio of total risk-weighted assets (SNL #248884) to total assets (SNL #132264) in percentage points. In Panel B, we examine the effect of Mandatory Auditor Reporting that specifically require ratio assurance among treatment countries only. *Ratio Assurance AND Mandatory Auditor Reporting* switches on for observations where the auditors of treatment banks were also required to provide assurance over ratio. Lower order terms include the individual components of the interaction variable. Previous controls, whose coefficient estimates are suppressed for brevity, include *Size*, *Capital*, *Profitability*, *Loan intensity*, *Loan growth*, *Loan loss provisions*, *Employees*, *Cost-to-income ratio*, *Basel*, *GDP growth*, *Bank concentration*, *Market volatility*, *Legal Rights*, *Credit Information*, *Insolvency Resolution*, and *Significant Reform Dummy*. All variables, including these controls, are defined in the Appendix. T-statistics presented in parentheses are computed using standard errors that are robust to within country and year correlation and heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Risk-weighted assets

	(1)	(2)	(3)	(4)
	<i>Risk-weighted assets</i>	<i>Risk-weighted assets</i>	<i>Risk-weighted assets</i>	<i>Risk-weighted assets</i>
<i>Mandatory Auditor Reporting</i>	-1.848*** (-2.78)	-1.914*** (-2.62)	-1.933*** (-2.92)	-1.982*** (-2.73)
<i>Pre-interaction</i>		-0.264 (-0.32)		-0.198 (-0.24)
<i>Size</i>	-3.855*** (-5.02)	-3.855*** (-5.03)	-3.742*** (-5.08)	-3.742*** (-5.08)
<i>Capital</i>	0.409*** (5.47)	0.409*** (5.47)	0.410*** (5.52)	0.410*** (5.52)
<i>Profitability</i>	-0.000 (-0.01)	-0.000 (-0.02)	0.001 (0.09)	0.001 (0.08)
<i>Loan intensity</i>	0.291*** (10.51)	0.291*** (10.50)	0.292*** (10.59)	0.292*** (10.59)
<i>Loan growth</i>	-0.004 (-0.87)	-0.004 (-0.87)	-0.004 (-0.88)	-0.004 (-0.88)
<i>Loan loss provisions</i>	0.167** (2.44)	0.167** (2.44)	0.153** (2.30)	0.153** (2.30)
<i>Employees</i>	2.982*** (3.98)	2.984*** (3.98)	2.910*** (3.89)	2.912*** (3.89)
<i>Cost-to-income ratio</i>	-0.005 (-0.51)	-0.005 (-0.51)	-0.003 (-0.29)	-0.003 (-0.29)
<i>Basel</i>	-0.558 (-1.14)	-0.561 (-1.15)	-0.591 (-1.20)	-0.593 (-1.21)
<i>GDP growth</i>	0.014 (0.37)	0.015 (0.39)	0.008 (0.21)	0.008 (0.23)

<i>Bank concentration</i>	-0.162*** (-2.75)	-0.162*** (-2.76)	-0.156*** (-2.65)	-0.157*** (-2.66)
<i>Market volatility</i>	0.099 (1.63)	0.098 (1.62)	0.093 (1.55)	0.092 (1.54)
<i>Legal rights</i>	0.384 (1.16)	0.383 (1.16)	0.428 (1.30)	0.428 (1.30)
<i>Credit information</i>	-1.017** (-2.09)	-1.009** (-2.10)	-0.989** (-2.04)	-0.983** (-2.05)
<i>Insolvency resolution</i>	-0.026 (-1.29)	-0.026 (-1.30)	-0.025 (-1.26)	-0.025 (-1.27)
<i>Significant reform dummy</i>	-0.081 (-0.21)	-0.070 (-0.18)	-0.141 (-0.37)	-0.133 (-0.35)
<i>Change in nonperforming loans</i>			0.051** (2.54)	0.051** (2.54)
Observations	19,048	19,048	18,950	18,950
Within R-squared	14.0%	14.0%	14.1%	14.1%
Bank and Year FE	Yes	Yes	Yes	Yes

Panel B. Treatment countries only: Ratio Assurance

	(1) <i>Counterparty risk</i>	(2) <i>Nonperforming loans</i>
<i>Ratio Assurance AND Mandatory Auditor Reporting</i>	-0.104*** (-3.41)	-0.740** (-0.51)
Observations	10,903	8,905
Within R-squared	32.8%	12.2%
All lower order terms	Yes	Yes
All previous controls	Yes	Yes
Bank and Year FE	Yes	Yes

Table 8. Market Discipline Channel

This table includes additional results. The unit of observation is a bank-year. Panel A includes the regression results in which the dependent variable is *Information imprecision*, the ratio of the one-year CDS spread to five-year CDS spread. In Panel B, the dependent variable is current loan loss provisions. All variables are defined in the Appendix. *T*-statistics presented in parentheses are computed using standard errors clustered by country-year and robust to heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Information imprecision

	(1)	(2)
	<i>Information imprecision</i>	<i>Information imprecision</i>
<i>Mandatory Auditor Reporting</i>	-0.090** (-2.13)	-0.075* (-1.95)
<i>Pre-Mandate</i>		0.059 (1.50)
<i>Size</i>	0.081 (0.56)	0.083 (0.58)
<i>Capital</i>	0.007 (0.73)	0.006 (0.72)
<i>Profitability</i>	-0.003** (-2.06)	-0.003** (-2.06)
<i>Loan intensity</i>	0.004 (1.51)	0.004 (1.51)
<i>Loan growth</i>	-0.001 (-1.11)	-0.001 (-1.07)
<i>Loan loss provisions</i>	0.016 (1.00)	0.017 (1.10)
<i>Employees</i>	-0.006 (-0.08)	-0.011 (-0.16)
<i>Cost-to-income ratio</i>	-0.001 (-1.01)	-0.001 (-1.03)
<i>Basel</i>	-0.059 (-0.97)	-0.059 (-0.96)
Observations	542	542
Within R-squared	19.5%	19.8%
Macro controls and Year FE	Yes	Yes

Panel B. Timeliness of loan loss provisions

	(1)	(2)
	<i>Loan loss provisions</i>	<i>Loan loss provisions</i>
<i>Mandatory Auditor Reporting</i> × ΔNPL_{t+1}	0.191** (2.05)	0.170* (1.89)
<i>Mandatory Auditor Reporting</i> × ΔNPL_t	-0.038 (-1.08)	-0.041 (-1.19)
<i>Mandatory Auditor Reporting</i>	-0.744** (-2.11)	-0.310 (-0.99)
ΔNPL_{t+1}	-0.005 (-0.38)	0.006 (0.47)
ΔNPL_t	0.060*** (3.16)	0.047** (2.22)
<i>Size</i>	-0.498* (-1.67)	-0.369 (-1.26)
<i>Capital</i>	-0.045 (-0.39)	-0.044 (-0.38)
<i>Profitability</i>	-0.055*** (-4.03)	-0.013 (-0.87)
<i>Loan intensity</i>	-0.001 (-0.14)	0.003 (0.37)
<i>Loan growth</i>	0.021 (1.65)	0.016 (1.23)
<i>Employees</i>	0.515** (2.08)	0.366 (1.52)
<i>Cost-to-income ratio</i>	-0.038* (-1.89)	-0.023 (-1.16)
<i>Basel</i>	-0.009 (-0.06)	-0.010 (-0.08)
<i>Loan loss provisions (t-1)</i>		0.634*** (6.74)
Observations	10,155	10,155
Adj. R-squared	0.046	0.070
Control for lagged LLP	No	Yes
Year FE	Yes	Yes

Table 9. Supervisory Review Process Channel

This table presents the results from regressions pertaining to the effects of broader supervision. In Panel A, the unit of observation is a country-year. The dependent variable, *Number of on-site examinations* is the natural logarithm of the number of on-site bank inspections the regulator conducts during the year. In Panels B and C, the unit of observation is a bank-year. *Meetings AND Mandatory Auditor Reporting* is an indicator variable that switches on only for observations that operate in countries that were also mandated to hold at least one annual meeting with bank supervisors (Panel B). *Resource constraints AND Mandatory Auditor Reporting* is an indicator variable that switches on only for observations that operate in countries whose bank regulators are resource-constrained (i.e., for countries whose bank regulators' employee per regulated bank is below the median) (Panel C). Previous controls, whose coefficient estimates are suppressed for brevity, include *Size, Capital, Profitability, Loan intensity, Loan growth, Loan loss provisions, Employees, Cost-to-income ratio, Basel, GDP growth, Bank concentration, Market volatility, Legal Rights, Credit Information, Insolvency Resolution, and Significant Reform Dummy*. All variables, including these controls, are defined in the Appendix. T-statistics presented in parentheses are computed using standard errors that are robust to within-country and year correlation and heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Country-level on-site bank inspections by supervisors

	<i>Number of on-site examinations</i>
<i>Mandatory Auditor Reporting</i>	-0.257* (-1.79)
<i>GDP growth</i>	0.008 (0.61)
<i>Bank concentration</i>	-0.011 (-1.23)
<i>Market volatility</i>	0.000 (0.03)
<i>Legal rights</i>	0.090 (1.38)
<i>Credit information</i>	-0.127* (-1.85)
<i>Significant reform dummy</i>	0.146 (1.51)
Observations	171
Within R-squared	10.0%
Country FE and Year FE	Yes

Panel B. Treatment countries only: Mandatory meetings

	(1)	(2)
	<i>Counterparty risk</i>	<i>Nonperforming loans</i>
<i>Meetings AND Mandatory Auditor Reporting</i>	-0.077*** (-2.84)	-0.384 (-0.28)
Observations	10,903	8,905
Within R-squared	32.7%	12.1%
All lower order terms	Y	Y
All previous controls	Y	Y
Bank and Year FE	Y	Y

Panel C. Treatment countries only: Regulator resource constraints

	(1)	(2)
	<i>Counterparty risk</i>	<i>Nonperforming loans</i>
<i>Resource constraints AND Mandatory Auditor Reporting</i>	-0.108*** (-3.05)	0.216** (0.22)
Observations	10,903	8,905
Within R-squared	32.8%	12.1%
All lower order terms	Y	Y
All previous controls	Y	Y
Bank and Year FE	Y	Y

Table 10. Banks' Future Performance

This table presents the results from bank-year-level regressions in which the dependent variable is *Loan growth* (Panel A) and *Profitability* (Panel B). As column headings indicate, the dependent variables are measured one year, two years, and three years into the future. *T*-statistics presented in parentheses are computed using standard errors robust to within country and year correlation and heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Future bank lending

	(1)	(2)	(3)
	<i>Loan growth</i> <i>t+1</i>	<i>Loan growth</i> <i>t+2</i>	<i>Loan growth</i> <i>t+3</i>
<i>Mandatory Auditor Reporting</i>	-1.289* (-1.80)	-2.065*** (-2.89)	-2.181** (-2.54)
<i>Size</i>	-0.916*** (-4.44)	-0.913*** (-4.29)	-1.099*** (-4.69)
<i>Capital</i>	0.052 (1.54)	0.020 (0.55)	0.026 (0.62)
<i>Loan intensity</i>	-0.068*** (-5.93)	-0.063*** (-5.80)	-0.049*** (-3.81)
<i>Loan loss provisions</i>	-0.032 (-0.24)	0.091 (0.58)	-0.213* (-1.67)
<i>Employees</i>	0.401* (1.89)	0.382 (1.62)	0.637** (2.46)
<i>Cost-to-income ratio</i>	-0.008 (-0.76)	-0.024** (-2.29)	-0.018 (-1.58)
<i>Basel</i>	-0.624** (-2.37)	-0.575* (-1.75)	-0.261 (-0.59)
Observations	14,617	11,327	8,215
Adj. R-squared	0.038	0.042	0.039
Macro controls and Year FE	Yes	Yes	Yes

Panel B. Future bank profitability

	(1)	(2)	(3)
	<i>Profitability</i> <i>t+1</i>	<i>Profitability</i> <i>t+2</i>	<i>Profitability</i> <i>t+3</i>
<i>Mandatory Auditor Reporting</i>	-0.506 (-1.35)	-0.802* (-1.80)	-1.016* (-1.84)
<i>Size</i>	-0.163 (-1.16)	-0.009 (-0.06)	0.131 (0.85)
<i>Capital</i>	-0.031** (-2.00)	-0.023 (-1.34)	-0.033 (-1.54)
<i>Loan intensity</i>	-0.019** (-2.36)	-0.011 (-1.43)	-0.010 (-1.19)
<i>Loan loss provisions</i>	-0.287* (-1.90)	-0.142 (-1.05)	0.078 (0.78)
<i>Employees</i>	0.323** (2.26)	0.163 (1.04)	0.049 (0.32)
<i>Cost-to-income ratio</i>	-0.094*** (-13.87)	-0.071*** (-10.61)	-0.058*** (-8.98)
<i>Basel</i>	-0.688*** (-4.93)	-0.660*** (-4.60)	-0.674*** (-3.73)
Observations	14,617	11,327	8,215
Adj. R-squared	0.119	0.102	0.108
Macro controls and Year FE	Yes	Yes	Yes

Table 11. Costs of Mandatory Auditor Reporting: Fees paid to Auditors

This table presents the results for our audit fee analysis of sample banks from 2009 – 2018. Panel A includes the sample statistics for the new bank-level variables included in this analysis. We only report the mean for our indicator variables, and standard deviation and median for our all continuous variables. Panel B presents the regression results. The dependent variable is the natural logarithm of total fees paid to auditors for all audit and audit related services. We include several bank-level control variables, in addition to macro-level variables used in our prior analysis and year fixed effects. Column (1) reports results without the inclusion of macro-level variables, while Column (2) includes them. All variable definitions are in the Appendix, and Table 3. *T*-statistics presented in parentheses are computed using standard errors clustered within country-year and robust to heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Descriptive Statistics

	Mean	stdev	Median	N
<i>Total Audit Fees (Millions, EUR)</i>	19.09	13.98	7.00	1,675
<i>Mandatory Auditor Reporting</i>	0.70			1,675
<i>Treatment</i>	0.74			1,675
<i>Size (Log Assets, Millions EUR)</i>	11.65	2.32	12.07	1,675
<i>Loan Loss Provision</i>	0.644	0.88	0.34	1,675
<i>Loan Intensity</i>	58.68	19.31	60.76	1,675
<i>Capital Adequacy</i>	15.82	4.31	15.28	1,675
<i>ROE</i>	5.41	12.16	7.05	1,675
<i>Loan Growth</i>	4.02	15.22	2.23	1,675
<i>Public</i>	0.69			1,675
<i>Loss</i>	0.14			1,675
<i>Local GAAP (Indicator)</i>	0.13			1,675

Panel B. Audit fee regressions

	(1)	(2)
	Ln(<i>Total Audit fees</i>)	Ln(<i>Total Audit fees</i>)
<i>Mandatory Auditor Reporting (Treatment × Post)</i>	0.335** (2.16)	0.266* (1.95)
<i>Treatment</i>	0.148 (0.93)	0.101 (0.69)
<i>Size</i>	0.690*** (67.03)	0.691*** (64.26)
<i>Loan Loss Provision</i>	0.164*** (3.245)	0.151*** (3.25)
<i>Loan Intensity</i>	-0.017*** (-10.22)	-0.017*** (-9.94)
<i>Capital Adequacy</i>	-0.004 (-0.53)	-0.007 (-0.98)
<i>ROE</i>	0.002 (0.89)	0.001 (0.65)
<i>Loan growth</i>	-0.000 (-0.32)	-0.001 (-0.52)
<i>Public</i>	0.101** (2.26)	0.116** (2.67)
<i>Loss</i>	0.007 (0.07)	-0.045 (-0.48)
<i>Local GAAP</i>	-0.613*** (-10.05)	-0.647*** (-10.84)
Macroeconomic controls	No	Yes
Year FE	Yes	Yes
Observations	1,675	1,663
Adj R-squared	0.828	0.830

ONLINE APPENDIX for

“Economic Consequences of Mandatory Auditor Reporting to Bank Supervisors”

A. Survey of Bank Supervisors

The following sub-sections provide a detailed discussion of our survey and discussions with EU, UK, and ECB bank supervisors, which form the basis for information presented in Table 1. Given the objective of the study is to examine the consequences of mandated auditor reporting to bank supervisors for bank risk, we construct a novel dataset on the extent of and the variation in mandatory auditor involvement in bank supervision. To gauge the extent of mandatory auditor involvement in banking supervision, we reached out to all regulators of all 27 EU member states, the UK, and the European Central Bank's regulatory authority, i.e., SSM (Single Supervisory Mechanism). We asked for supervisor input on three dimensions of auditor responsibilities: assurance, reporting, and dialogue. We then used the information gleaned from these surveys as the basis to examine a variety of legislation and central bank annual reports to ascertain the timing and nature of the specific regulations enacted during our sample period of 2009 through 2018.

A.2 Implementation of the Survey

We now describe our survey questions and the rationale for their inclusion, the process we used to contact respondents and solicit written responses, and our follow-up discussions with regulators. To gauge the extent of mandatory auditor involvement in banking supervision, we asked three questions of the bank regulators, as follows:

Q1. Does the banking regulator require a "long-form audit report" to be submitted to the regulator/supervisor?

A long-form audit represents detailed information typically provided by auditors to bank management, e.g., issues that arise during the audit, such as measurement concerns, potential audit adjustments, and internal control issues. Such reports contain audit-related details incremental to the information provided to shareholders through the audit opinion attached to financial statements. The above question allows us to assess whether auditors provide additional private

information to supervisors, above and beyond the information provided as part of public financial statements. When liaising with regulators, we emphasized that this question asked whether they required additional private communications outside of the publicly released information.

Q2. Does the banking regulator require assurance on capital ratios and solvency ratios or any other specific item?

Given that auditors provide assurance on financial statements, regulators are already able to rely on any reported numbers in financial statements. Therefore, to increase the quality of information that the regulators possess, auditors will have to provide assurance on numbers that go above and beyond those recognized in the financial statements. For instance, capital ratios include calculations on RWAs, which are not recognized in the audited financial statements. The recent Metro Bank incident highlights the lack of assurance on such numbers—even for a large, visible public bank in a well-developed country like the UK.¹ Specific assurances on these capital ratios, or any other ratios used by regulators—e.g., liquidity ratios—necessarily improve the quality of their information set. The above question aims to capture the extent to which auditors provide additional assurance specific to the bank regulator’s supervisory role.

Still, it is not clear where the benefits of assurance on capital ratios may manifest. A natural question arises as to whether assurance on capital ratios is beneficial over and above the assurance on the numbers provided via the financial statements. For example, one way this additional assurance might be useful is if the auditors provide assurance on RWAs. To gain further insight, we followed up with regulators who answered that they do require assurance on ratios, and asked

¹ Metro Bank (a large UK financial institution) was forced to admit that hundreds of millions of pounds in commercial loans had been incorrectly classified in risk terms. As much as 10% of the bank’s £14.5bn loan book had been given incorrect risk weightings, with many real estate loans assigned risk weightings of 35-50%, instead of the appropriate weightings of 100%. The auditors did not identify this issue because assurance on risk-weighted assets and capital ratios is outside the audit scope. The regulator (with the aid of a whistleblower) identified this issue, the error had existed for a reasonable period. Subsequent to this issue, Basel Committee on Banking Supervision said auditors should be given responsibility for checking banks’ calculations to minimize the scope for errors or cheating.

whether they require specific assurance on RWAs, (or other ratios) and, more importantly, to what extent they rely on this information.

Q3. Does the auditor meet with the banking regulator about bank performance? If so, at what frequency?

The above question helps us understand whether regulators prefer a face-to-face interview or discussion with the auditors. A face-to-face discussion could provide a platform for the transfer of qualitative, soft information about the bank's performance. In addition, the discussions could help auditors understand the regulators' point of view.

The above questions were included in an email sent to the bank regulators of each of the 28 EU member states, in addition to the European Central Bank's (ECB) regulatory authority from October 2017 to December 2017. The original email was followed up by email, telephone, and face-to-face correspondence to ensure that we received written responses for all 28 country-level regulators and the European Banking Authority. Thereafter, meetings with individual regulators and the European Banking Authority also took place in January 2018. We also held meetings with several regulators in London during their visits to the UK, such as those from the Bank of France, Central Bank of Latvia, and Bank of Italy. In addition, some regulators—e.g., the Central Bank of Greece and the Central Bank of Hungary—were met in Washington at the IMF.

A.3 Discussion of Survey Responses

We now describe the results of our survey and discussions with regulators and notable observations from their responses. We tabulate a summary of supervisor responses in Table 1 of the manuscript. As reported, we find that 12 of the 28 EU countries require auditors to submit additional information, e.g., long-form audit report, to the bank regulator. These countries include Austria, Belgium, Croatia, Estonia, Germany, Hungary, Luxembourg, Portugal, Slovakia, Slovenia, Spain, and the UK. We note that responses varied, with some national regulators

providing clear and concise answers and specifying the law or directive responsible for the mandate. For example, the German regulator responded as follows:

BaFin receives a long-form audit report from the annual auditor. Section 29 Banking Act (KWG, special duties of the auditor) contains provisions on the scope of the audit as well as the auditor's reporting and duties to provide explanations in the course of the audit.

Other regulators did not provide the specific act but broadly described the additional information and assurance that is required. For example, the Estonian regulator stated:

Legislation adds additional reporting requirement for auditors. Legislation says that auditors have to give assurance to the supervisor that nothing has come to the attention of the auditor during the audit which would indicate that there are material breaches of law, that own funds/capital requirements are calculated incorrectly, that relevant IT systems are not safe.

In contrast, Bulgaria, Cyprus, the Czech Republic, Finland, France, Greece, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Poland, Romania, and Sweden do not require auditors to report additional information to the regulator.²

Turning to the question of whether auditors are required to provide assurance on ratios, we observe that nine countries require auditors to give regulators assurances on capital, solvency, or other ratios: Austria, Belgium, Croatia, Estonia, Germany, Hungary, Lithuania, the Netherlands, and Spain. Those that did not were Bulgaria, Cyprus, the Czech Republic, Denmark, Finland, France, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, and the UK. For example, the Croatian regulator stated:

CNB (Croatian National Bank) requires that auditors verify accuracy of the report in which the bank states capital and other prudential ratios. An audit firm verifies the regularity, accuracy and completeness of the reports, by assessing whether they are prepared in accordance with the Credit Institutions Act, regulations adopted thereunder, and the policies and rules laid down by the credit institution, and whether the comparable items of these reports correspond with those of annual financial statements. The assessment

² Note that while the Netherlands responded that the regulator does require the auditor to furnish an extended audit report (i.e., the Long-Form Audit Report, LFAR), the LFAR is publicly disclosed as part of the financial statement, replacing the traditional standard audit opinion. Because this information is not incremental to that received by the public, we do not view it as additional private information/communication between auditor and regulator.

of the reports (is) provided in the form of a statement that the reports have been prepared in accordance with the Credit Institutions Act and subordinate legislation of the Croatian National Bank, and that they reflect the state in a realistic and objective way.

With respect to whether regulators require meetings with the auditors, we find that regulators from all countries, except for Italy and Slovakia, require some fixed frequency of meetings with the external auditors of banks. Interestingly, we note a significant variation in the form and frequency of the required meetings, as reported in Table 1. Specifically, we observe that 19 countries require meetings at least once annually, and four of these do so only for auditors of large and systemically important banks. For example, the Finnish regulator stated:

... there is bilateral communication between the bank auditors and the Fin-FSA based on the EU audit regulation (Article 12) and EBA guidelines (on communication between competent authorities supervising credit institutions/insurance undertakings and the statutory auditors carrying out the statutory audit of credit institutions/insurance undertakings). In respect of the biggest LSI credit institutions, bilateral communication takes place at least once a year. In addition, the Fin-FSA assesses on an ongoing basis whether it is necessary to communicate also with the auditors of other LSI credit institutions either on (a) regular basis (once a year or less frequently) or on an ad hoc basis.

The Austrian regulator not only requires meetings but also holds occasional workshops with all bank regulators:

Meetings with auditors of the biggest banking groups about banks' performance and risk profile are held at least once a year as part of the standard supervisory examination programme. Also, auditors are involved on an ad-hoc basis in case specific, audit-relevant topics arise during the supervisory process. Furthermore, occasional workshops with all bank auditors are organised by FMA/OeNB where current regulatory topics are discussed.

Two countries require meetings only on an ad-hoc basis when issues arise. For instance, Bulgarian regulators do not mandate regular meetings; however, dialogue between the auditor and regulator (BNB) could happen as issues arise, as per their response:

The dialogue between the auditor and the BNB as a competent authority responsible for banking supervision regarding bank performance depends on issues arisen in the supervisory review and evaluation process (SREP). Meetings between auditors and BNB could be held, although not on a regular basis.

Finally, three countries require meetings only as part of supervisory on-site inspections, which may occur every one to three years.

In addition to the 28 EU member states, we sent our survey to the European Central Bank (ECB) supervisory authority. This allows us to cross-check our responses from the national regulators and gain further insight from any auditor requirements pertinent to ECB Banking Supervision, i.e., requirements related to the Single Supervisory Mechanism. Interestingly, in a few cases, the ECB's answer differed to those given by national regulators. For example, national regulators in Luxembourg and Slovakia answered "no" when asked if auditors were required to give regulators assurance on financial ratios, while the ECB listed them as countries that do provide some form of assurance on metrics used to determine capital requirements. Specifically, the ECB stated:

In some countries (AT, BE, DE, ES, IE, LU, NL, SK), statutory auditors of banks have to annually perform additional or specific audits (positive assurance), reviews (negative assurance) or other assurance procedures (positive or negative assurance acc. to ISAE 3000) on the banks' compliance with prudential supervisory requirements.

One reason for the contradiction could be the different sets of banks that the national regulator and ECB are responsible for in each country. The ECB itself is responsible for the supervision of the larger banks, those with assets totaling more than €30 billion.³ Notably, the ECB informed us that it had the right to request long-form audit reports from the institutions that it supervises, but "there are no further specifications for the form of audit reports that need to be submitted (to the ECB)." Regarding assurances on financial ratios, the ECB said that "the practices among the countries regarding the quality assurance differ greatly" and mentioned no additional ECB requirements of the banks that it supervises.

³ The ECB supervises banks per the rules set by the European Banking Authority (EBA), which also conducts stress tests and transparency exercises on over 100 of the largest banks in the EU (including the non-Eurozone).

Regarding regular meetings with bank auditors, the ECB reported that it gave “high importance to the role of the auditors and the added value of external audits for prudential supervision,” adding “ECB senior management meets bi-annually with representatives of the six largest audit firms to exchange views on matters of relevance for the industry as a whole.”

In several follow-up discussions to the survey, we asked regulators about the extent to which they rely on this additional reporting from auditors, whether they feel they have more useful information regarding banks’ performance and risks, and whether the increased auditor reporting has reduced their effort in terms of monitoring and/or bank visits. For example, regulators from Slovenia and Estonia specifically mentioned that the additional reporting and assurance provided by auditors is useful information to better supervise these banks; however, these inputs did not reduce regulators’ effort or time spent at site examinations. BaFin (Germany) stated that:

“the information gives a better overview of the banks’ situation and is also an important source for individual supervision on the bank.”

The German regulators also communicated that increased auditor involvement reduced their time spent during on-site inspections, but they were unable to quantify the amount. In Hungary, regulators stated that they are committed to improving the cooperation between auditors and regulators, and that the additional reporting contributes to banking supervision practice. For example, prior to on-site inspections, the information they glean from the auditor helps the supervisors identify specific topics for a deep dive.

In addition, many regulators who required additional auditor reporting argued that these requirements improved the culture of transparency at banks and prompted favorable changes in internal control systems (and IT systems) in some circumstances. In Lithuania, the regulators informed us that this information is eventually made public and therefore aids in market discipline. They argued that the additional reporting and assurance is “sensitive information to the public when choosing which bank to use for services.”

Finally, we also asked regulators from the nine countries that require assurance on ratios whether they specifically require assurance on RWAs and to what extent they rely on such assurance. Germany, Austria, and Estonia require assurance on RWAs and banks' capital ratios, while Lithuania and Hungary impose no such requirements. Regulators who sought this information also mentioned that it gives a better overview of banks' risk and is a significant resource for supervisors of the individual bank, allowing them to reduce the time involved in off-site inspections.

A.4 Specific regulatory changes

In this sub-section, we provide more detailed information on the timing of the specific regulatory changes that increased auditor involvement in banking supervision, which form the basis for our bank-level empirical analysis. We note that our regulatory search was guided by the regulators' responses.

Using the survey responses from the national regulators as a starting point, we attempt to identify the precise mandatory regulations that enhance auditor-regulator interaction and involvement in banking supervision. This allows us to understand and exploit the variation in the time of adoption of these reforms across countries, which forms the basis for our empirical analysis. For countries where bank regulators confirmed requirements for enhanced auditor-regulator interaction, we searched for legal references dating back to 2008.⁴ Given this data period, we focus on reforms that were introduced between 2011 and 2016 to allow for at least two years of pre- and post-period analyses. In several cases, the regulators themselves had provided a reference to the law, act, or decree. In those cases, we confirmed the year that the current regulation

⁴ Our sample period for the empirical analysis is 2009–2018, due to data availability in the SNL database. We discuss our data sources in section 4 of the manuscript.

was enacted and ensured that no previous regulations existed that might already have required auditor involvement.

Our objective is to capture mandatory changes in auditor involvement in banking supervision during our sample period. Table 1 summarizes the years in which the regulations were enacted in each country. We observe that of the 12 countries that enacted additional reporting, eight countries enacted these reforms during our sample period (Belgium, Croatia, Estonia, Luxembourg, Portugal, Slovenia, Spain, and the UK). For example, Luxembourg enacted additional reporting requirements for auditors in 2013 via CSSF Circular 01/27. In January 2016, the UK adopted Supervisory Statement SS1/16 as released by the PRA, which requires auditors to furnish additional long-form audit reports privately to the bank supervisor. Four countries had already adopted such reforms prior to our sample period. Slovakia's "Act on Banks" (Act No. 483/2001) was adopted in 2001, and Germany's Banking Act (Section 29) was enacted in 1998; both regulations required additional reporting by auditors to bank regulators.

Turning to additional requirements for auditors to provide assurance over capital ratios, we find significant overlap in the countries—and in the timing of these regulations—with those who enact additional reporting requirements. Nine of the 28 EU member states require additional assurance over capital ratios, with seven of these overlapping with additional reporting requirements (i.e., Austria, Belgium, Croatia, Estonia, Germany, Hungary, and Spain). Only the Netherlands and Lithuania reported that auditors are required to give assurance over capital ratios, but they do not require auditors to share any additional reporting (such as an LFAR) with the bank supervisor. Due to the significant overlap between countries that require additional reporting and those that require assurance regulations, we focus on both additional reporting requirements and ratio assurance in our empirical analysis, i.e., this becomes our *Treatment*. Section 3 of the manuscript describes our Treatment variable and research design in detail.

B. Procedures to identify other concurrent regulations

In this section, we provide more detail of our systemic approach to review specific regulations for our treatment countries, as discussed in Section 5.2.2 of the manuscript. A common identification concern in regulation-based empirical research is that the regulation of interest may be bundled with, or part of a larger family of, concurrent regulations. To assess the extent of this issue, we search for other circulars, directives, or regulations both nationally and from the ECB. More specifically, we undertake the following three steps: First, we reviewed the specific regulations cited by regulators, and performed a key-word search for all mentions of “Auditor,” “Supervisor,” “Regulator,” “Assurance,” and “Bank” to ensure we review all requirements relating to the auditor. In addition to helping us validate our discussions with regulators and verify the regulation (and timing) of the auditor-regulator reforms, this also allowed us to ascertain whether similar auditor-related reforms were enacted around the same time. Many of the primary pieces of legislation cited by regulators were large documents and include multiple amendments. These amendments tend to be footnoted with specific enactment dates. We did not find a systematic trend that suggests additional auditor-related bank-specific regulation occurring in the same years as the auditor reporting requirements we study.

This is not to say that several EU countries were not enacting banking specific regulations around this time. For example, in Belgium, the Banking Act on the status and supervision of credit institutions (25 April 2014) transposed several EU directives into national law (e.g., Capital Requirements Directive (2013/36/EU), Bank Recovery and Resolution Directive (2014/59/EU), and Directive on deposit guarantee schemes (2014/49/EU), among others). However, while the assurance on capital ratios coincides with these regulations—which also likely impacted financial institutions—the requirements for enhanced auditor-regulator interaction, which are the focus of our study, were adopted in 2012, two years prior.

Second, we searched the websites of the national regulators for our treatment countries to find information on concurrent bank-related reforms enacted in our treatment years. In most cases, we were able to examine reports (e.g., Annual Reviews/Reports) released by national regulators that detailed newly enacted legislation and significant changes in supervisory mechanisms for a given year. For example, the National Bank of Belgium released the “Prudential regulation and supervision” report for 2014, outlining the process of enacting the first pillar SSM and the various EU directives and provisions they transposed into Belgian law. These reports also laid out the national banks’ progress with the implementation of Basel III and the EU Banking Law. We focus our review on regulations pertaining to bank auditors, and liquidity and capital requirements. We found no instances of other auditor-related reforms during our treatment years. Moreover, the ongoing implementation of SSM requirements in several treatment countries are likely isolated to the largest banks, i.e., those deemed “significant” in terms of size or cross-border activities. To ensure our results are not isolated to large banks only, we partition the sample based on bank size (see Table 6).

Third, we searched for information from the ECB and the Basel Committee on Banking Supervision (BCBS) concerning bank monitoring and the implementation of the Basel regulatory framework. However, we note that such changes are likely to impact both treatment and control countries in the same manner. For instance, during our sample period, the main requirements of Basel II were enacted in 2007 and early 2008, which pre-dates all our additional reporting requirements within our treatment countries. Another major change occurred in January 2014 when the Basel Committee published the final version of the disclosure requirements for the LCR standard. While national authorities were expected to give effect to the liquidity disclosure requirements relating to LCR by no later than 1 January 2015, this only aligns with additional reporting requirements in one (Slovenia) of our treatment countries. Notwithstanding, we recognize that the speed with which EU member states transposed EU directives and the BCBS

framework into national law varies, and therefore may coincide with the staggered adoption of our auditor reforms.

We reviewed the BCBS's periodic (global) progress reports on the adoption of the Basel regulatory framework.⁵ These reports provide detailed updates on the adoption status of Basel III standards for each BCBS member jurisdiction, which provides an insight into the EU (as a whole) and individual member states. Using these reports, where available, we reviewed the changes in the adoption status of relevant regulations (e.g., regulatory capital, liquidity, and disclosures of RWA and capital composition) for our treatment countries around the year of their auditor reporting reforms.⁶ We noted no significant changes/implementation (i.e., change to status code 4) for relevant regulations in our treatment countries around the adoption of our auditor reforms.

For instance, during our sample period, the main requirements of Basel II were enacted in 2007 and early 2008, which pre-dates all our additional reporting requirements within our treatment countries. Another major change occurred in January 2014 when the Basel Committee published the final version of the disclosure requirements for the LCR standard. While national authorities were expected to give effect to the liquidity disclosure requirements relating to LCR by no later than 1 January 2015, this only aligns with additional reporting requirements in one (Slovenia) of our treatment countries. Overall, these procedures provide comfort that our Auditor-Supervisor regulations are not systemically bundled with other concurrent regulations that may threaten the validity of our inferences.

⁵ For example, see the "Sixteenth progress report on adoption of the Basel regulatory framework" at: <https://www.bis.org/bcbs/publ/d464.pdf>

⁶ The color coded status used in the reports are as follows: 1 = draft regulation not published; 2 = draft regulation published; 3 = final rule published (not yet implemented by banks); 4 = final rule in force (published and implemented by banks). Standards for which the agreed implementation deadline has passed receive a color code to reflect the status of implementation: green = adoption completed; yellow = adoption in process (draft regulation published); red = adoption not started (draft regulation not published); and "na" = not applicable.