

Mandatory Auditor Involvement in Bank Supervision*

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Abstract

We examine the mandatory involvement of auditors in bank supervision. We create a novel dataset on auditor-regulator interaction by directly liaising with national bank regulators in the European Union and reviewing the related laws. We document considerable heterogeneity in whether regulators require auditors to provide long-form audit reports, give assurance on ratios, and hold regular meetings. We then investigate the effects of the reforms that enhance auditor-regulator interaction. We find a significant reduction in counterparty credit risk of treatment banks. These findings are more pronounced for countries with powerful supervisors and for middle-sized banks. Further, we find stronger results for private banks, which suggests that enhanced auditor-regulator interaction acts as a substitute for market discipline. Our inferences hold for alternative measures of risk, such as CDS spreads, nonperforming loans and risk-weighted assets. Finally, consistent with banks bearing the costs of the additional audit work, we observe an increase in audit fees paid by banks whose auditors become a part of bank regulation.

JEL classification: G28, G34, G38

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1. Introduction

Information flow between insiders and outside stakeholders is essential for efficient governance for all institutions (Armstrong, Guay, Mehran, and Weber [2016]). Financial institutions are unique in that they are supervised by regulators who need timely and detailed information about banks. In fact, anecdotal evidence indicates that regulators ascribe the severity of the recent financial crisis to the lack of timely information and believe that if banks had revealed information sooner, regulatory intervention would have been more effective (see Harris and Raviv [2014]).^{1,2} Observers have suggested that auditors play an important role in improving information flows between banks and regulators (Armstrong et al. [2016]), and the role that bank auditors should play in bank supervision is now taking center stage in policy discussions. For example, Basel III recommends that external auditors of banks and bank supervisors engage in formal dialogues to facilitate timely information sharing about banks' health.³ While the notion that bank regulators can reach out to auditors on an as-needed basis is commonplace, the Basel III recommendation formalizes the need for enhanced auditor-regulator interaction. These calls could lead regulators to impose mandatory requirements on bank auditors, substantially enhancing the role auditors play in bank supervision.

¹ The recent case of Metro Bank, a UK financial institution, highlights the limitations of the current scope of bank audits and the lack of timely flow of information to supervisors. In early 2019, the bank 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%, when they should have received weightings of 100%. The auditors did not identify this issue because assurance on risk-weighted assets and capital ratios is outside the audit scope. Although it was the regulator who 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 minimise the scope for errors or cheating.

² In addition, Ryan et al. [2013] find an unusually high volume of bank-insider sales in late 2006 and provide evidence that this activity was associated with the extent to which banks wrote down their securitization-related assets after the onset of the crisis. Agarwal et al. [2012] find that corrective regulatory action is more effective when it is timely.

³ Moreover, IAASB's proposed strategy for 2015–2019 includes some of the Basel committee's recommendations.

However, when auditors provide direct support to regulators, it raises important questions about the nature of their interaction and redraws the boundaries of the audit function. It also leads banks and their capital providers into uncharted territory. Our study aims to fill this gap and provide initial evidence on the landscape of mandatory auditor involvement with bank regulators and the economic consequences of such interactions.

Whether auditors' involvement in bank supervision improves the monitoring of the financial system is not obvious. On the one hand, there are several reasons why auditors may complement regulatory supervision. First, auditors share a public interest role with regulators, with duties that go beyond those owed to their client banks. Second, they are able to observe closely, and more frequently, many of the financial measures regulators use, and they can provide assurance on such numbers. Third, in many cases, auditors are better-resourced than regulators, with expert knowledge that may be too costly for banking supervisors to acquire.

On the other hand, there are several reasons why auditors should have little or no role in banking supervision. First, auditors' objectives are different from those of regulators. While the focus of the auditors' job is to judge the health of the bank they are auditing, regulators are concerned about the health of the banking system as a whole. Second, the effectiveness of auditors in a regulatory context is questionable, given that they are not banking supervisors, a role requiring a very different skillset and form of assurance. Third, an audit firm is a commercial enterprise that receives commission fees from the very banks it audits; hence, there is a relatively high potential for conflict of interest. In addition, increased auditor involvement may also lead to regulatory capture if supervisors simply rely on the numbers provided by auditors. For instance, on-site

supervisory examinations could decline, especially for mid-sized banks.⁴ Powerful banks may try to maximize their own private welfare, which could be at odds with social welfare (Barth et al. [2008]).

Another important dimension to consider is how the information flow between auditors and regulators would alter the monitoring of banks by markets. Market discipline and bank supervision are intertwined governance structures for financial institutions. For instance, greater information flow to the supervisor shifts monitoring capabilities and incentives towards the supervisor and reduces the relative intensity of market discipline. Whether this shift is positive or negative depends on the strength of these forces. If the bank regulator has adequate supervisory power, the increased information flow will lead to better monitoring of banks. However, if the supervisor is weak—or worse, open to capture—the information flow could harm the functioning of the banking system. Further, the presence of more information from banks may cause regulators to place lower weight on market signals.

Although the issue of auditor involvement in bank supervision is critical, the auditor-regulator relation is an under-researched area. There is little structured information on how bank regulators engage with auditors and what mandatory requirements exist across the world. We seek to fill this void by creating a dataset of current practices. We liaised with national banking regulators and obtained direct input on the auditor requirements within the 28 European Union countries. This effort allows us to construct a database that includes official information about the legal requirements regulators impose on bank auditors. We identify three types of interactions between auditors and supervisors: (1) whether auditors provide specific detailed private

⁴ Large and systemically important banks tend to have more stringent supervisory reviews. Some banks have regulators on-site on a continuous basis. We expect that auditor information sharing in such settings is less critical.

information (e.g., a long-form audit report) to the regulator; (2) whether auditors provide the regulator with assurances on capital ratios, solvency ratios, or any other specific item; and (3) the extent to which auditors and regulators meet regularly to discuss the bank's performance. We liaised with banking supervisors in all 28 EU member states, all of whom supplied answers to our key questions. As a second step, we examined a variety of legislation and central bank annual reports to ascertain the specific regulations enacted during our sample period of 2009 through 2018. We find substantial variation in the requirements on reports and assurance on capital ratios across national supervisors. While 13 of the 28 countries in our sample require additional reporting (e.g., an extended audit report), nine countries require additional assurance on ratios. Moreover, we observe that regulators from all 28 EU countries except for Italy and Slovakia require some fixed frequency of meetings between regulators and bank auditors. However, we note significant variation in the form and frequency of the required meetings. Overall, it is interesting to note that countries have chosen to focus on different attributes. We also notice considerable variation in when these requirements were adopted.

We next provide evidence on the economic consequences of these enhanced auditor requirements. In our analysis, we focus on whether mandated involvement of bank auditors in supervision mitigates banks' riskiness. Our primary measure of risk is the counterparty credit risk. This is the risk that the counterparty to a transaction could default before the final settlement of the transaction's cash flows, i.e., the risk that the default of a bank's counterparty might affect the bank's own default probability. This measure captures the financial loss due to portfolio concentration as well as the correlation in the defaults of counterparties.⁵ To this end, counterparty

⁵ Thus, counterparty risk creates a bilateral risk of loss: The market value of the transaction is uncertain and can vary over time with the movement of underlying market factors.

risk captures a broad and timely notion of risk. In addition to counterparty risk, we also consider other notions of risk in our analyses including funding costs and CDS spreads, as fundamentals-based and market-based metrics of a bank's credit risk.

Using a propensity-score-matched (PSM) sample of 3,139 bank-years from 610 EU banks between 2009 and 2018, we perform a difference-in-differences analysis that exploits the staggered adoption of laws requiring auditor involvement in bank supervision. We observe a significant decline in banks' counterparty credit risk by over 8%. Likewise, we find significant in treatment banks' CDS spread and funding costs. We note that these findings hold when we control for a variety of bank-level and country-level factors, as well as bank and time fixed effects. Nevertheless, we re-estimate our tests using specifications that do not rely on matching on observables. We find similar results on the full population of EU banks.

As with all regulation-based empirical research, our study faces identification challenges. Although the mandatory nature of regulation is not confounded by bank-level factors, the decision to introduce a regulation is susceptible to selection at the country level. This selection issue can affect our findings if the countries in the control group are very different from that of the treatment group. To allay this concern, we perform our matching at the bank level as against the country level. Further, we establish that the pre-regulation trends in bank risk are statistically identical for the treatment and control groups (i.e., verification of the parallel trends assumption).

A second identification concern is that concurrent regulations may be responsible for our findings. In particular, mandatory auditor involvement could be just one part of broader regulatory initiatives, and this composite package of reforms might be the correct treatment effect. As we focus on adoptions that are staggered over time and across multiple countries, this concern is a serious threat to our findings only if all (or sufficiently many) countries in our treatment group

implement a broadly similar set of regulations precisely at the time the auditor-related regulations are implemented. From our read of regulations in our treatment countries, we find this tends not to be the case. Empirically, we address this issue by controlling for country-level indices that track concurrent changes in regulatory stringency, credit reforms, and country-specific economic trends. We also exploit the cross-sectional variation in the extent of information sharing in the spirit of a treatment intensity analysis. We document that the decrease in counterparty risk is stronger among countries that also require assurance on capital ratios. As a more stringent identification test to rule out country level time-varying confounds, we exploit the UK setting, where rules regarding auditor-supervisor interactions are based on bank-size thresholds. This provides strong within-country identification and allows use a quasi-regression-discontinuity approach to show that the effect exists only for UK banks that were required to comply with the regulations.

Having established our main findings, we examine the cross-section to better understand how and for what kind of banks/regimes enhanced auditor-regulator interaction reduces bank risk. We find that our results are driven primarily by medium-sized banks. This finding is consistent with the idea that the largest banks in a country were already under the spotlight (e.g., in some cases regulators are physically located in the largest banks in order to obtain information directly), while regulators may not prioritize the smallest banks.⁶ In addition, we observe stronger results for banks in jurisdictions with more powerful supervisors (Barth et al. [2013]). This inference suggests that enhanced inputs from auditors to regulators are effective especially when the regulators have legal and institutional tools and authority. Finally, we analyze how market discipline mediates the

⁶ Further, the major banks have built their own business models using the internal rating based (IRB) approach, under the watchful eye of the regulator while mid-size and smaller banks may not have the resources or the expertise to do so and instead follow a standardized approach, established by the Basel Committee on Banking Supervision, into which they fit their assets.

main effect. Our findings suggest that privately held banks benefit more from enhanced auditor-regulator interaction than publicly traded banks, which lends support to the idea that such collaborations help more when the market discipline is weak.

To further understand the channel through which the observed effects work, we examine additional outcome variables. First, we consider the level of risk-weighted assets (RWAs) held by the bank. Given that managers have incentives to understate the riskiness of their assets to ensure appropriate buffers, more information to supervisors and effective enforcement of the level of buffers could lead to more accurate assessments of risk-weighted assets. In turn, this may incentivize managers to reduce credit risk, as greater monitoring will reduce their ability to opportunistically classify risk weights. We find a 4.37% decline in RWAs of banks that experience increased auditor involvement in banking supervision. We attribute declining RWAs to a reduction in banks' asset risk as a whole. In addition, we examine the level of non-performing loans (NPLs), as greater information and oversight may also lead to lower levels of NPLs. In line with improved ex-post lending decisions following increased auditor involvement, we find a 1.70% reduction in NPLs.⁷

More closely related to information flows is the market's ability to assess a bank's risk (a notion of information risk). Increasing information to supervisors can reduce information risk in two ways. First, auditor assurance on additional ratios increases the information available to the market. Second, for the same level of information to markets, greater information flow to supervisors can reduce information risk if the monitoring is transferred to the supervisor. In contrast, such mandatory requirements can also increase information risk: The market does not

⁷ Our inference that the reduction in NPLs reflects improvements in banks' screening and monitoring provides further comfort that the reduction in RWAs is due to real activities aimed at reducing riskiness and improving capital adequacy.

have the information that the supervisor has, and, more importantly, the market is not sure how and when the supervisor will act on this information. Thus, there is a potential for heightened information risk. We measure information risk as the ratio of short-term CDS spreads to long-term CDS spreads (Duffie and Lando [2001]; Arora, Richardson, and Tuna [2014]). This computation helps us isolate the magnitude of information risk (short-term spreads) for a given level of credit risk (long-term spreads). We find that information risk goes down following the regulations that require that bank auditors provide additional reports and assessments to bank supervisors. Overall, these inferences help us conclude that enhanced auditor-supervisor collaboration disciplines banks' risk, and, conditional on a given level of risk, enables debt-market investors to better assess the banks' risk profile.

As a final step, we examine who bears the cost of the increased auditor-regulator engagement. A higher degree of collaboration between auditors and supervisors implies that the auditors expend more effort and resources (Hogan and Wilkins [2008]). This cost should be borne by the system. We find that banks in jurisdictions with enhanced auditor-supervisor engagement exhibit higher audit fees than other banks. This finding suggests that banks themselves bear the additional cost of increased auditor involvement in banking supervision. We note that this test also adds credibility to our main inferences—if our findings were an artifact of concurrent economic trends and unrelated regulations, we would not observe an increase in the audit fees incurred by treatment banks.

CONTRIBUTION AND RELATED LITERATURE

Our study contributes to the accounting and finance literature on banking. One stream of work studies the impact of accounting on bank supervision through its impact on capital ratios

(Beatty, Chamberlain, and Magliolo [1995]; Collins, Shackelford, and Wahlen [1995]; Beatty and Liao [2014]; Acharya and Ryan [2016]).⁸ Papers in this domain mainly focus on loan loss provisions, the predominant bank accrual for regulatory capital ratio calculations. In contrast to this line of work, we focus on auditors' involvement in the supervisory function. We note that a few recent studies investigate the interplay between auditors and regulators. Nicoletti [2018] examines whether bank regulators and external auditors have conflicting effects on loan loss provisioning timeliness. Similarly, Ghosh, Jarva, and Ryan [2018] argue that bank regulation can be a substitute for auditing. Finally, Gopalan, Imdieke, Schroeder, and Stuber [2019] find that third-party verifications, in the form of FDICIA-related internal control audits, are only imperfect substitutes for bank supervision. The authors exploit a change in the size thresholds for required FDICIA-related internal control audits and find that banks that are no longer subject to these audits increase their NPLs, relative to unaffected banks. Unlike these studies, we focus on the mandatory information flow from auditors to regulators. Further, in our setting, auditors have a role in prudential supervision.

Our study also adds to the broader auditing literature. First, our paper identifies demand for audit services from an external stakeholder: bank regulators. To our knowledge, this demand is unexplored. More importantly, this study captures an increase in demand for audit services that is plausibly exogenous to an individual bank's fundamentals. The audit literature has faced empirical challenges in cleanly identifying demand for audit services and relating this demand to audit fees (see DeFond and Zhang 2014). Our setting and research design enable us to cleanly

⁸ Prior work has examined the impact of regulation on accounting practices as well. For example, Altamuro and Beatty [2010] find that mandated internal control requirements enhance the validity of loan loss provisioning. Bischof, Daske, Elfers, and Hail [2019] examine the bank disclosure practices mandated by financial reporting standards (IFRS 7) and banking regulation (Pillar 3 of Basel II). Collins, Dewing, and Russell [2012] identify the new roles of auditors and accountants after the UK Banking Act 1987.

identify an increase in demand for audit services and isolate the impact of this demand on audit fees. Further, in the context of the banking industry, prior studies examine the pricing of audit services we contribute to this literature by examining the role of auditors in bank supervision.⁹ While studies find it difficult to distinguish whether higher fees are due to more audit effort, or simply a risk premium, we are able to attribute our findings to a net increase in auditor effort, given enhanced auditor-regulator interaction likely reduces litigation risk from an audit perspective.

Finally, we also extend the findings of Barth et al. [2013], who develop a comprehensive database of bank regulatory and supervisory policies. In constructing an index of official supervisory power to measure the degree to which the country's bank supervisor has the authority to take specific actions, Barth et al. [2013] provide insights into the relationship between supervisory agents and external auditors. They document (1) whether the supervisory agency has the right to meet with external auditors about banks, (2) whether the auditors are required to communicate directly to the supervisory agency about illicit activities such as fraud or insider abuse, and (3) whether supervisors can take legal action against external auditors for negligence. However, we differ from Barth et al. [2013] in that we aim to provide insights on the auditors' role in *supervision*. Thus, we obtain information on whether supervisors require auditors to submit a long-form audit report, provide assurance on ratios, and attend meetings. Moreover, while the Barth et al. survey ends in 2011, we focus on more recent developments post Basel III. As noted above, we observe that several countries have implemented regulations that increase auditor duties towards supervisors during this recent period.

⁹ See, for example, Fields, Fraser, and Wilkins [2004], Kanagaretnam, Krishnan, and Lobo [2010], Kanagaretnam, Lim, and Lobo [2010]. Other studies examine audit opinions on publicly traded financial institutions that subsequently failed (Blacconiere and DeFond [1997]), banks' accounting restatements (Gunther and Moore [2003]), and the effectiveness of bank audits (Siddiqui and Podder [2002]; DeBoskey and Jian [2012]).

2. Current Landscape: Mandatory Auditor Involvement with Bank Supervisors

In this section, we provide a detailed description of the current landscape of mandatory auditor duties towards bank regulators. In order to understand the extent of the auditor-regulator relationship, we focus on three dimensions of auditor responsibilities: assurance, reporting, and dialogue. We liaised with bank regulators within each of the 28 EU member states and the European Central Bank's regulatory authority, i.e., the Single Supervisory Mechanism (SSM), to obtain this information. First, we administered a survey with three questions intended to capture auditor responsibilities to bank supervisors. Following their responses, we held follow-up discussions in person or 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 why the regulator did or did not adopt certain requirements. Using these survey responses as a starting point, we conducted a review of banking regulations in each of our sample countries to determine when relevant mandates were enacted. We then used this dataset for our empirical analysis to study the impact of auditor involvement in banking supervision on economic outcomes (see Section 3 onwards).

In Section 2.1, we describe our survey questions and the rationale behind them, the process we used to contact respondents and solicit written responses, and our follow-up discussions with regulators. In 2.2, we describe the results of our survey and discussions with regulators and notable observations from their responses. In 2.3, 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.

2.1. SURVEY OF BANK REGULATORS: QUESTIONS AND PROCEDURES

To gauge the extent of mandatory auditor involvement in banking supervision, we asked three questions of the bank regulators within each of the 28 EU member states and the European Central Bank's regulatory authority, i.e., the SSM (Single Supervisory Mechanism). Below, we provide the questions and explain what they are intended to capture.

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 risk-weighted assets, which are not recognized in the audited financial

statements. The Metro Bank incident discussed in footnote 1 highlights the lack of assurance on such numbers—even for a fairly large and visible public bank in a well-developed country like the UK. Specific assurances provided on these capital ratios, or any other ratios used by regulators—e.g., solvency 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 lie. 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. One way this additional assurance might be useful is if the auditors provide assurance on risk-weighted assets. In order to gain further insight, we asked the regulators, who answered that they do require assurance on ratios, whether they require specific assurance on risk-weighted assets and 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. 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. We liaised with bank regulators from October to December 2017, with follow-up meetings beginning 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.

2.2 DISCUSSION OF RESPONSES FROM SURVEY OF BANK REGULATORS

We tabulate a summary of responses in Appendix A. 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.¹⁰

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 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, with the exceptions of 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 Appendix A. 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:

¹⁰ 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.

... 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 assurances 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 response 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 a given country. The ECB itself is responsible for the supervision of the larger banks, those with assets totaling more than €30 billion.¹¹ 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.

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 a follow-up to the survey, we asked regulators from the nine countries that require assurance on ratios whether they require assurance on risk-weighted assets and to what extent they rely on this information. Germany, Austria, and Estonia require assurance on risk-weighted assets

¹¹ 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).

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 the bank's situation, is an important resource for individual supervision of the bank, and reduces the time involved in off-site inspections.

2.3 REGULATIONS MANDATING AUDITOR-REGULATOR INTERACTIONS

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. Our sample period for the empirical analysis is 2009–2018, due to data availability in the SNL database (see Section 3 for a detailed discussion). 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 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. Appendix A 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 additional reporting requirements in our empirical analysis. Moreover, a greater number of reforms occur during our sample period, which also helps with our identification. We discuss the specifics of our research design in the next section.

3. Empirical Design

Our predictions pertain to the real effects of enhanced auditor-regulator interaction in the banking sector. We perform the bulk of our empirical tests using a difference-in-differences estimation framework. In our main analysis, we rely on the following model:

$$Risk_{i,t} = \beta_1 Post_{c,t} \times Treatment_c + \beta_2 Post_{c,t} + \beta_3 Treatment_c + \Theta \text{ CONTROLS} + v_i + \mu_t + \varepsilon_{i,t}. \quad (1)$$

In this model, the subscript c denotes countries, i stands for individual banks, and t signifies years. Each observation is a bank-year. We capture bank risk (*Risk*) as counterparty credit risk assessed from regulatory reports (*Counterparty risk*).

In additional tests, we use on the left-hand side audit fees and alternative metrics of bank risk, including CDS spreads, risk-weighted assets, nonperforming loans, information risk.¹² Variable definitions appear in Appendix B. We provide more information on the data sources in Section 4. The controls vector includes bank-level and country-level variables that account for factors that are potentially associated with bank risk and the likelihood of a reform that enhances auditor-regulator interaction. 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*), logged total 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*), level of development (*GDP per capita*), 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: *Legal rights*, *Credit information*, *Insolvency resolution*, and *Significant reform dummy*.

The two components of the difference-in-differences estimator are *Post* and *Treatment*, both indicator variables. In equation 1, *Treatment* varies at the country level; it switches on for countries that pass a reform that enhances auditor-regulator interaction throughout our sample

¹² CDSs are an insurance-type contract in which the buyer pays a periodic fixed premium to insure against the credit risk of the bank in question. The size of the premium provides a timely and liquid measure of the market view of the risk for banks.

period, post-2009. In our study, we focus on two major sets of reforms that exhibit meaningful cross-country variation. The first type is *additional reporting*, namely new rules that require auditors to submit additional information to the national banking supervisor. The second type is *ratio assurance*, under which the auditor is mandated to provide assurance on prudential capital ratios. Our investigation suggests a significant overlap in these two types of audit/banking regulations, with additional reporting being the dominant one (Appendix A). For this reason, in our empirical analyses, we focus on the reforms that introduce additional audit reporting to bank supervisors (Table 1). Hence, *Treatment* switches on for Belgium (2012), Croatia (2014), Estonia (2014), Hungary (2014), Luxembourg (2013), Slovenia (2015), Spain (2011), and the UK (2016). Due to heterogeneity in the timing of these reforms, *Post* varies at the country-year level and takes the value of one following the aforementioned years. In the presence of bank fixed effects, *Treatment* is not estimated in the model. However, *Post* remains identified even when we include year fixed effects because of the staggered adoption of the audit rules.

Our traditional difference-in-differences model uses a control group and estimates the effect of audit/banking reforms relative to this set of observations over the same period. We construct the set of control observations by identifying a group of banks that are identical, in terms of observables, to the banks in our treatment group. We provide a detailed description of this procedure in the next section. Overall, our bank-level matching and use of bank fixed effects in the main estimation models seem to be the most restrictive specification that also gives a reasonably balanced sample.

Despite our attempts to put together a reasonable control group, our empirical approach is not flawless. By definition, PSM relies on matching on observables, and selection on unobservables could be an important threat to the validity of our inferences. To be sure, we ensure

that bank risk pre-treatment behaves similarly across the treatment and control groups, but we note that this check does not mitigate confounding effects occurring *concurrently* to the treatment. To alleviate these issues, we perform two additional tests that do not rely on matching. First, we analyze the entire sample throughout the sample period and adopt an approach consistent with Bertrand and Mullainathan (2003). The model is as follows.

$$Risk_{i,t} = \beta_1 Post_Treatment_{c,t} + \Theta \text{ CONTROLS} + \nu_i + \mu_t + \varepsilon_{i,t}. \quad (2)$$

The difference between this model and equation 1 is that equation 2 does not rely on any matching between treatment and control observations, the traditional *Post* variable will never switch on for control countries. Therefore, *Post_Treatment*, as a composite variable, takes the value of zero for treatment countries up to their respective regulation years and one after this point.

Our second approach reverts to equation 1 but does so in a within-country framework. This method exploits an institutional detail in the UK, where the rules apply to banks with assets greater than £50 billion. This feature yields a natural treatment group (banks with assets greater than £50 billion) and control group (banks with assets less than £50 billion) under mild assumptions, e.g., banks do not manage their size to avoid the audit regulation. However, this within-country split could merely capture a size effect. To sidestep this problem, in the UK setting, we employ a second specification in which the treatment group includes banks with assets £50 to £500 billion, and the control group contains banks with assets more than £500 billion and those with assets £10 to £50 billion. In other words, we neutralize the potentially confounding size effects by ensuring that the control set includes the largest banks (with assets over £500 billion), as well as medium-sized banks (with assets between £10 and £50 billion), compared to the large banks in that treatment group (with assets between £50 and £500 billion). The estimation model is as follows.

$$Risk_{i,t} = \beta_1 Post_t \times Treatment_i + \beta_2 Post_t + \beta_3 Treatment_i + \Theta \text{ CONTROLS} + \nu_i + \mu_t + \varepsilon_{i,t}. \quad (3)$$

Note that the subscript for *Post* is t , meaning that this indicator switches on in the same period for the whole sample, the year 2016. More important, *Treatment* is defined at the bank level (not the country level), reflecting the within-country considerations we mention in the above paragraph. The rest of the model is the same as equation 1. Note also that both *Treatment* and *Post* are omitted from the final estimation due to bank and year fixed effects, respectively. We also cluster standard errors by bank, while the rest of our analysis relies on clustering by country and year.

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. Most of the bank characteristics, including bank-specific controls and measures of risk, come from SNL Financial.¹³ The exceptions are *Credit risk* and *Information risk*, which are based on CDS spreads obtained from Markit. Our country-level macroeconomic variables are obtained from the World Bank's Global Financial Development Database and Doing Business Surveys. Due to SNL's limited coverage of the time series in Europe, the sample starts in 2009.¹⁴ For each event we study, we create a [-3, 4] window, where 0 is the event year. The post period starts from year +1. Hence, this procedure gives us a balanced and narrow window that stretches four years in each direction.

¹³ We thank SNL for sharing with us a time-varying version of audit fees (item #131212). The field is not historical, otherwise.

¹⁴ We merge SNL with FactSet using ISIN (International Securities Identification Number) and year, with Markit using LEI (Legal Entity Identifier) and year, and with GFD Database using country name and year.

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: 0 (no Basel reporting identified by SNL), 1 (Basel I), 2 (Basel II), 2.5 (Basel II, Pillar 3), and 3 (Basel III).¹⁵ *Counterparty risk* captures banks' risk as a whole and in a timely manner. Unlike nonperforming loans, for example, counterparty risk encompasses the risk in banks' credit, investment, and trading transactions. More formally, the Bank for International Settlements (BIS) includes the following categories of transactions in the calculation of counterparty credit risk: over-the-counter derivatives, exchange-traded derivatives, long-settlement transactions, and securities financing transactions. Another advantage of using *Counterparty risk* is that it is better populated than nonperforming loans and loan loss reserves.¹⁶

Table 2 presents the pertinent summary statistics. The median bank has a *Counterparty risk* of \$1.24 billion ($= \exp(14.03) \times 1,000$). For context, the median observation has total assets (*Size*) of \$2.91 billion ($= \exp(21.79)$). The mean *Capital* and *Profitability* ratios are 10.11% and 4.72%, respectively. Loans constitute more than half of total assets for the average bank (*Loan intensity*), while the annual growth rate (*Loan growth*) is almost 8.5%.

As for our country-level regressors, we note a median per capita income of \$41,642, which is consistent with the developed region we investigate. The average GDP growth is virtually zero (-0.10%) for the average observation, in keeping with the sluggish growth in Europe during our

¹⁵ We considered adding IFRS to account for financial reporting, but we refrained from doing so since this variable is usually degenerate due to the continent-wide switch to IFRS.

¹⁶ The BIS's risk considerations also include measures of market risk and operational risk, in addition to counterparty risk. These two aspects of risk are much smaller economically than counterparty risk. Our findings hold if we employ a composite measure of all three types of risk.

sample period. The mean (median) value for *Bank concentration* is 77% (76%); the top five banks in the respective countries constitute some three-quarters of the total banking system.

As briefly mentioned in our discussion of the research design, our main empirical specification requires a matched sample. The statistics discussed above are based on this matched sample, which includes treatment as well as control banks. To create this matched sample, we employ a propensity-score-matching model with no replacement. We run this model for each year of treatment (2011–2016) and limit our attention to countries that do not belong to the treatment group.¹⁷ The first stage model, omitted for brevity, is estimated using *Size*, *Capital*, *Profitability*, *Loan intensity*, *Loan growth*, *Loan loss provisions*, *Employees*, *Cost-to-income ratio*, and *Basel* on the right-hand side and an indicator that signifies *Treatment* on the left-hand side. We verify that at the time of the matching year, these variables are statistically indistinguishable between the treatment and control group of banks.

In additional analyses, we conduct our tests on a sample that does not rely on matching and on a within-country sample (UK). We provide descriptive statistics for all additional variables and samples in the respective discussions of their results.

5. Results

This section presents our estimation results. Recall that our survey tracks two major types of regulations: additional reporting and ratio assurance. In our main analysis, we focus on the former because additional reports are likely more comprehensive than assurance in prudential

¹⁷ For example, when the PSM model is estimated for year 2016 (for the UK), it does not include Spanish banks in the potential pool even though these banks were treated in 2011. We believe this requirement is more consistent and objective. We also think that this bank-by-bank matching approach is empirically more sensible than matching countries with each other, which works under the assumption that reforms are adopted by countries, not banks.

ratios (an institutional reason) and because reforms relating to ratio assurance tend to coincide with a regulation on additional reporting (an empirical reason). However, in additional analyses, we assess the impact of ratio assurance and mandated auditor-regulator meetings on the treatment of additional reporting.

5.1 ANALYSIS OF BANK RISK

We begin by discussing the results from the estimation of equation 1 on the main sample. Table 3 presents the pertinent results from difference-in-differences regressions that account for bank and year fixed effects. In column (1), we report a simple specification with no control variables. The coefficient of interest, $Treatment \times Post$, is -0.068 and significant at the 1% level. Economically, this coefficient suggests a 6.57% decline ($= \exp(-0.068) - 1$) in the counterparty risk of treatment banks, relative to control banks in the same period and relative to themselves pre-regulation. In column (2), we estimate our full equation (1) with control variables and observe slightly stronger results, with a coefficient suggesting a decline in counterparty risk of 8.24%. Given we control for time trends (year fixed effects) and time-invariant bank-specific features (bank fixed effects), this mitigates the concern that our results are driven by macroeconomic trends or time-invariant national or corporate factors.

Regarding the control variables, 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, are able to engage in more risky arrangements. In macroeconomic terms, we observe that bank risk is greater in wealthy countries and in regimes with faster economic growth.

Overall, these inferences suggest that requirements for auditor-regulator interaction have economic consequences for bank risk. Following the passage of regulations that enhance auditor-regulator interactions, banks seem to reduce their risk, which we observe via banks' regulatory/financial reports (*Counterparty risk*).

5.2 ANALYSES TO ADDRESS IDENTIFICATION CONCERNS

In this sub-section we discuss the empirical identification challenges that may threaten the validity of our inferences and perform several tests to alleviate these concerns. Given the decision to introduce a regulation is susceptible to selection at the country level, this may lead to significant differences between our treatment and control groups. While we perform our matching at the bank level (as opposed to country level), we also establish that the pre-regulation trend in counterparty risk are statistically identical for the treatment and control groups (i.e., verification of the parallel trends assumption). In column (1) of Panel A, Table 4 we add a control to account for pre-regulation trends, $Treatment \times Pre1$. $Pre1$ is an indicator variable that switches on the year before treatment. We verify that a necessary condition for the validity of inferences from a difference-in-differences model (i.e., the parallel trends assumption) holds—the coefficient on $Treatment \times Pre1$ is indistinguishable from zero. We also note that the main effect remains similar in this specification (coefficient of -0.087). In untabulated tests, we partition $Post$ into individual years and observe that the treatment effect increases monotonically over time (i.e., the treatment effects are larger for years $t+3$ and $t+4$ than for years $t+1$ and $t+2$), which is in line with the idea that the effects are gradual and structural.

Another 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. In particular, mandatory auditor involvement could be just one part of broader regulatory initiatives,

and this composite package of reforms might in fact be responsible for our observed treatment effect. Given that we focus on adoptions that are staggered over time and across multiple countries, this concern is a serious threat to our findings only if countries in our treatment group implement systemically similarly bundled regulations precisely at the time the auditor-related regulations are implemented.

Still, we undertake a systematic approach to understand the extent of this concern by we reviewing the specific regulations for our treatment countries and searched for other circulars, directives, or regulations both nationally and from the ECB. From our reading of the national regulations, we did not find many instances where additional auditor- or bank-specific regulation occurred around the same time as our enhanced auditor-regulator requirements.¹⁸

Moreover, to the extent that additional directives were mandated at the EU level (e.g. ECB monitoring etc.) then this would impact both treatment and control countries in the same manner. During our sample period, the main requirements of Basel II were enacted in 2007 and early 2008, which pre-dates all of our additional reporting requirements within our treatment countries, with the exception of Portugal and Denmark. 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 13 treatment countries.

¹⁸ For example, in Belgium, the Banking Act on the status and supervision of credit institutions (25 April 2014) enshrined 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). Therefore, while the assurance on capital ratios coincides with the above regulations, the enhanced auditor-regulator requirements that are the focus of our study was adopted in 2012, two years prior to this.

We also address this concern empirically in a number of ways. First, we control for country-level indices that track concurrent changes in regulatory stringency, credit reforms, and country-specific economic trends. Column (2) of Panel A, Table 4 reports results from the inclusion of these four additional country-year variables: *Legal rights*, which is an index that is 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 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 treatment effect is virtually unchanged after the inclusion of these variables (coefficient = -0.087 and associated t-statistic of -4.24).

Second, we exploit the cross-sectional variation in the extent of information provision and report evidence that the findings are stronger in settings when greater information is shared. Specifically, in Panel B, Table 4 we partition our sample based on whether auditors also provide ratio assurance and whether regulators mandate at least one meeting with the bank auditor per year. These conditioning variables are based on our survey results as discussed in Section 2 and presented in Appendix A and Table 1. We document that the decrease in counterparty risk is economically stronger among countries that also require assurance on capital ratios and annual auditor meetings.

In addition, we exploit the UK setting to perform a more stringent identification test to rule out country level time-varying confounds, where rules regarding auditor-supervisor interactions are based on bank-size thresholds. We describe these results in detail in sub-section 5.4

5.3 CROSS-SECTIONAL ANALYSIS AND TEST OF CHANNELS

Having provided evidence on the main effects, we conduct two sets of investigations to add further credibility to our inferences and to shed light on the mechanism underlying the relationship between mandated auditor-regulator collaboration and credit risk.

5.3.1 Cross-Sectional Variation

We first examine the cross-sectional variation in the main treatment to ascertain which banks and countries exhibit the treatment effect the most—in the spirit of a treatment intensity estimation and validation of the main effect. To do so, we estimate equation (1) across different sub-samples that capture bank size, whether banks are private or publicly listed, and strength of supervisory power within a country. We present our findings in Table 5.

We first examine whether the treatment effect is stronger for medium-sized banks. To do so, we partition our sample banks into medium-sized banks (i.e., banks that are in the 20-80% of the distribution), and all others (i.e., large banks that fall into the top quintile of the size distribution, and small banks that fall into the bottom quintile of the size distribution). We estimate equation (1) within each sub-sample and find that the treatment effect is stronger for medium-sized banks. This finding is consistent with a cost-benefit trade-off inherent in auditor-regulation interactions. The largest banks are already heavily scrutinized—in some cases, bank examiners and regulators work *in* these banks on a daily basis to obtain first-hand information and inspect the bank. At the other end of the spectrum, the smallest banks do not appear to be a priority for bank

regulators, who focus on relatively important entities that can affect the country as a whole. In Section 5.4, we complement this inference with a within-country approach using the UK setting.

Next, we analyze how market discipline mediates the main effect we document. Our proxy for market discipline is whether the bank's equity is publicly listed within an EU regulated market, and thus subject to securities regulation and market forces, or private. The estimation results we present in Table 5, suggest that private banks benefit significantly from enhanced auditor-regulator interaction, in keeping with the idea that such collaborations are especially beneficial when existing market discipline is weak (or non-existent). In contrast, we do not observe any effect for public banks. This result also helps mitigate concerns that securities and exchange disclosure requirements may be driving our results.

Our third and final investigation in the cross-section pertains to supervisory power. We anticipate that mandating auditors to send additional reports to regulators will have an impact on banks as a whole if the supervisor has adequate power and influence. Specifically, weak supervisors may be susceptible to capture by auditors and, hence, markets may not react to the mandated requirements as favorably. To capture this cross-section, we utilize item *Sup_Power* from the survey of Barth, Caprio, and Levine [2013]. According to the authors, this measure captures “whether the supervisory authorities have the authority to take specific actions to prevent and correct problems.” *Sup_Power* varies between 6 and 14 in our sample, and we code countries as having stronger supervision if they have a *Sup_Power* value of 9 or above (which corresponds to a median split). As in Table 5, the benefit of enhanced auditor-regulator interactions is primarily observed in countries with strong bank regulators.

5.3.2 *Alternative Outcome Variables*

Next, to extend our inferences about the mechanism and corroborate our main results, we re-estimate our main regressions (equation 1) using four alternative measures of risk: the annual average of daily five-year CDS contract of a bank, in percentage points (*Credit Risk*), the ratio of risk-weighted assets to total assets (*Risk-weighted assets*), the ratio of nonperforming loans to total loans (*NPLs*), and ratio of one-year CDS spread to five-year CDS spread (*Information Risk*).

While changes in *Counterparty risk* reflect an important section of the spectrum of bank risk, this metric ultimately is a reported figure based on fundamental decisions. Complementing these inferences using alternative approaches has two important benefits. First, it adds credibility to the idea that changes in counterparty risk are important enough to affect banks' assessed credit risk. Second, it helps us shed light on how outside stakeholders (e.g., credit market participants) view the new regimes under which bank auditors and regulators interact to a larger extent. Given that market discipline and supervision by banks work in tandem to analyze bank risk, an analysis of CDS spreads (*Credit risk*) and interest expenses (*Funding costs*) can provide insights into market's perception of the mandatory auditor involvement in the supervisory process.¹⁹

Accordingly, we estimate equation 1 using *Credit risk* and *Funding costs* as the dependent variable and present the results in column (1) of Panel B, Table 6. We find that *Credit Risk* (as measured by CDS Spreads) for treatment banks decline by a relative 116 basis points after the implementation of bank audit reforms (the coefficient on *Treatment* \times *Post* is -116.4 basis points with a t-statistic of -2.04). This is an economically meaningful finding, given the sample standard

¹⁹ CDS spreads are relevant for our analysis because financial markets supplement supervisory assessments of bank risk. Investors and analysts have significant incentives to price risk correctly and may uncover evidence of risky behavior that eludes supervisors. Also, financial markets penalize risk more granularly than bank supervisors do. Enforcement actions are blunt instruments; supervisors reserve these tools for institutions with serious safety-and-soundness problems. Financial markets, in contrast, can add or subtract basis points when risk premiums need tweaking.

deviation of *CDS spreads*, 250 basis points. Overall, this finding suggests that market participants perceive an increase in the stability of the bank after greater auditor-supervisor collaboration.

We also observe a reduction in both *Risk-weighted assets* (column 2) and *NPLs* (column 3). The coefficients on $Post \times Treatment$ indicate declines of 4.37% for *Risk-weighted assets* and 1.70% for *NPLs*. These figures are meaningful, given the sample standard deviations of 25.44% for *Risk-weighted assets* and 14.70% for *NPLs*. Overall, our findings on reduced *Risk-weighted assets* and *NPLs* provide two insights. First, we verify that our conclusions extend to other measures of bank risk, which is a reassuring robustness inference. Second, the results in Table 6 shed further light on the mechanism. Reductions in *NPLs* suggest better ex-post lending decisions, while the decline in risk-weighted assets implies a risk reduction in banks' assets as a whole. We note that improved screening or monitoring could give rise to the *NPL* results. Likewise, the decrease in risk-weighted assets could be because banks change their real asset allocations or reduce the risk weights they assign to their assets (because they were overly conservative pre-regulation). While these considerations are potentially interesting, they are not within the scope of our paper. Rather, the main takeaway from this analysis is the influence of enhanced auditor-regulator interaction on banks' real decisions.

Finally, we include our measure of information risk. This analysis is predicated on the notion that a firm's information environment, conditional on its inherent credit risk, is of higher quality if external investors demand a lower short-term credit spread for a given level of long-term credit spread (e.g., Duffie and Lando [2001]; Arora et al. [2014]; Ertan et al. [2016]). Put differently, for two banks, Bank A and Bank B, with identical long-term credit spreads, we consider Bank A to have a higher level of information quality than Bank B if Bank A has a smaller short-term credit spread than Bank B. Our findings in column (4) of Panel B, Table 6 suggest a

decline in the information risk of the treatment banks. This inference implies that even when credit risk is constant, credit market participants deem bank reports more reliable following enhanced interaction between auditors and supervisors.

5.4 ADDITIONAL ANALYSES: EVIDENCE FROM ALTERNATIVE SUBSAMPLES

Our difference-in-differences empirical design makes important assumptions about the quality of matching between control firms and treatment firms. To relax these assumptions, in the following two tests, we perform our analyses on samples that do not rely on the PSM procedure.

First, we examine our research question on a sample of all banks we have in our European sample from 2009–2018, this yields a sample of 17,850 bank-years. To infer the treatment effect, we estimate equation 3, which reflects the approach of Bertrand and Mullainathan [2003]. Panel A of Table 7 presents the descriptive statistics. Overall, this large sample is not much different from our main PSM sample. Banks in this sample seem to be slightly smaller, less well-capitalized, and less profitable.

We present the estimation results in Panel B of Table 7. The relative decline in *Counterparty risk* of treatment banks is -0.056 and statistically significant. We also note that the coefficients on control variables are in line with prior work. Well-capitalized and larger banks tend to have higher counterparty risk.

Our second additional analysis is from a within-country setting. As described in Section 3, the rules in the UK are not universal; rather, auditors 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. We utilize this institutional feature to exploit the within-country variation, which, by design, alleviates the confounding effects of local economic trends and

regulations. Panel A of Table 8 presents the statistics for the UK sample, which suggests that the UK banks are quite similar to the PSM sample in terms of several key variables like *Counterparty risk, Size, Capital, and Basel*.

The regression results are presented in Table 8, Panels B and C. In these tests, the treatment group includes banks with total assets between £50 and £500 billion. The objective of this definition is to minimize the confounding size effect. If we coded as treatment all banks with total assets greater than £50 billion, we could just be capturing the size effect. This alternative definition creates two natural control groups: the largest banks (those with total assets greater than £500 billion) and the smallest banks (those with total assets less than £50 billion). The sample presented in column (1) does not specify a lower bound and includes all banks in the UK sample. The sample we examine in column (2) excludes banks with total assets less than £10 billion to ensure a more balanced sample. Overall, in both specifications, we find economically and statistically significant coefficients for the difference-in-differences estimator ($Post \times Treatment$), which lends support to the argument that our inferences hold in a within-country setting.

5.5 ANALYSIS OF AUDIT FEES

The mandatory requirements of the supervisor on audit firms go above and beyond their traditional obligations to the bank. Thus, audit firms will likely have to expend additional resources and effort incremental to the amount contracted with the bank. An obvious question, then, is: 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 estimate equation 1 by using audit fees (as a percentage of total operating expenses) on the left-hand side.

We present the results of this analysis in Table 9. The coefficients for the difference-in-differences estimator suggest a relative increase in audit fees by approximately 0.11%. For context, the sample standard deviation of audit fees is 0.462%, which indicates an economically meaningful increase in these costs. In summary, our findings from the auditor tests suggest that banks bear (at least some of) the cost of the enhanced auditor-regulator interaction. We note also that this finding is a validation of our main results. If our inferences were driven by non-audit regulations that happen to coincide with audit regulations, we would not find a relative increase in audit fees.

6. Conclusion

This study focuses on the role of bank auditors in prudential supervision, and it sheds light on the current landscape of the interactions between auditors and bank supervisors. Focusing on rules that require auditors to provide long-form audit reports, give assurance on capital ratios, and attend face-to-face meetings, we document the divergent requirements regulators impose on auditors. We also reach some conclusions as to the effect of mandatory auditor-regulator collaboration on market perceptions of risk in the banking system.

In addition to the considerable heterogeneity we observe in the interaction between bank auditors and supervisors, we investigate the effects of reforms that enhance these communications. We find that banks' riskiness declines following regulations that require bank auditors to provide additional material information to national banking supervisors. Specifically, we find an 8.7% decline in banks' credit risk after enhanced auditor-regulator interaction. These findings are stronger for countries with more powerful supervisors and for middle-sized banks, as well as banks that operate under weak market discipline. Finally, consistent with banks bearing the costs of the additional audit work, we observe a relative increase in audit fees paid by treatment banks.

There are several directions for future research. Our paper focuses on banks' risk-taking as indicated by regulatory and financial disclosures, as well as from the perspective of the market. Since these regulations were adopted relatively recently, a full examination of their impact on bank performance volatility (e.g., Hodder, Hopkins, and Wahlen 2006), individual bank failures, and systemic risk appears to be the natural next step. In addition to shedding light on different costs and benefits, researchers should also examine institutional features that may determine the choice and extent of auditor involvement in supervision.

Appendix A. Results from the Survey on Auditor-Regulator Interactions

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	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/systematically 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.

Appendix B. Variable Definitions

Variable Name	Definition	Source and field code
<i>Audit fees</i>	Annual audit fees as a percentage of total operating expenses (in logarithm form).	SNL: (custom query)
<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 (Basel I), 2 (Basel II), 2.5 (Basel II Pillar 3), or 3 (Basel III) 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>CDS spread</i>	Five-year average annual CDS spread (%)	Markit: spread5y
<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>Employees</i>	The number of full-time-equivalent employees working for the company and its subsidiaries.	SNL: #134875
<i>Flatness</i>	The ratio of the annual average of the one-year CDS spread to that of the five-year CDS spread.	Markit: spread1y and spread5y
<i>GDP growth</i>	Year-over-year growth in gross domestic product (%).	World Bank: NY.GDP.MKTP.CD
<i>GDP per capita</i>	Gross domestic product per capita (constant prices in 2010 USD thousands).	World Bank: NY.GDP.PCAP.KD
<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

Appendix B. Variable Definitions (Continued)

Variable Name	Definition	Source and field code
<i>Loan intensity</i>	The ratio of loans to assets (%).	SNL: #132264 and #131923
<i>Loan loss provisions</i>	Loan loss provisions divided by total loans (%).	SNL: #131958 and #132264
<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 year-ahead nonperforming loans to total loans	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 (Appendix A)
<i>Profitability</i>	Return on equity (%).	SNL: #132006
<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 (Appendix A)

† SNL collects this information from Pillar III disclosures. This amount is the charge that banks calculate for all exposures that give rise to counterparty credit 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 credit risk (CCR) 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, CCR 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. Summary Results of the Survey

This table summarizes the results of the survey on auditor-regulator interactions. The first column denotes countries. The second column shows the implementation dates of the rules that require that auditor provide additional reports including long-form audit reports. For countries without such rules, the fields take the value “No.” A detailed description of the survey as well as references to the pertinent regulations are presented in Appendix A.

Country	Additional reporting (e.g. private LFAR)	Ratio assurance
Austria	1994	1994
Belgium	2012	2014
Bulgaria	No	No
Croatia	2014	2014
Cyprus	No	No
Czech Republic	No	No
Denmark	2008	No
Estonia	2014	2014
Finland	No	No
France	No	No
Germany	1998	1998
Greece	No	No
Hungary	2014	2014
Ireland	No	No
Italy	No	No
Latvia	No	No
Lithuania	No	2004
Luxembourg	2013	No
Malta	No	No
Netherlands	No	2014
Poland	No	No
Portugal	2008	No
Romania	No	No
Slovakia	2001	No
Slovenia	2015	No
Spain	2011	2011
Sweden	No	No
UK	2016	No

Table 2. Descriptive Statistics

This table presents the sample statistics for the main estimation sample, which is constructed using a PSM method. Each observation is a bank-year. Variable definitions appear in Appendix B. All control variables are winsorized at the 1% and 99%.

	Mean	stdev	p10	p50	p90	N
<i>Counterparty risk</i>	14.281	2.324	11.475	14.035	17.619	3,139
<i>Credit risk</i>	2.056	2.500	0.509	1.242	4.447	189
<i>Funding costs</i>	1.358	1.337	0.251	1.065	2.779	3,120
<i>RWAs to assets</i>	50.284	25.436	22.900	49.937	75.901	3,721
<i>Nonperforming loans</i>	8.749	14.697	0.510	3.418	22.137	1,552
<i>Information risk</i>	0.515	0.317	0.175	0.469	0.918	177
<i>Audit fees</i>	0.517	0.463	0.079	0.353	1.230	788
<i>Size</i>	22.130	2.403	19.279	21.791	25.614	3,139
<i>Capital</i>	10.113	8.080	4.392	8.310	16.023	3,139
<i>Profitability</i>	4.719	13.452	-3.222	4.966	16.071	3,139
<i>Loan intensity</i>	52.293	23.898	14.750	57.369	80.117	3,139
<i>Loan growth</i>	8.461	35.142	-11.607	3.635	27.353	3,139
<i>Loan loss provisions</i>	0.960	3.165	-0.171	0.248	2.210	3,139
<i>Employees</i>	5.930	2.070	3.466	5.541	8.730	3,139
<i>Cost-to-income ratio</i>	67.442	26.685	39.767	65.982	91.670	3,139
<i>Basel</i>	2.708	0.498	2.000	3.000	3.000	3,139
<i>GDP growth</i>	-0.102	7.842	-12.821	1.724	9.375	3,139
<i>GDP per capita</i>	40.654	19.633	14.997	41.642	55.395	3,139
<i>Bank concentration</i>	77.040	11.359	69.710	76.279	92.624	3,139
<i>Market volatility</i>	18.997	6.511	12.584	18.340	27.330	3,139
<i>Legal rights</i>	6.220	2.067	3.000	7.000	9.000	3,139
<i>Credit information</i>	5.741	1.979	4.000	6.000	8.000	3,139
<i>Insolvency resolution</i>	75.334	18.583	45.580	82.040	95.330	3,139
<i>Significant reform dummy</i>	0.681	0.466	0.000	1.000	1.000	3,139

Table 3. Auditor-Regulator Interaction and Credit Risk: Main Results

This table presents the results from bank-year-level regressions for our main dependent variable, *Counterparty risk*. We measure *Counterparty risk* as the natural logarithm of the counterparty credit risk disclosures obtained by SNL from regulatory disclosures. This metric is the charge that banks calculate for all exposures that give rise to counterparty credit risk, including over-the-counter derivatives, exchange-traded derivatives, long settlement transactions, and securities financing transactions. *Treatment* is an indicator variable that switches on only if the bank is from a country that requires Long-Form Audit Reports during the sample period (Belgium 2012, Croatia 2014, Estonia 2014, Hungary 2014, Luxembourg 2013, Slovenia 2015, Spain 2011, and the UK 2016). *Post* switches on for years after the treatment; for control observations, this is the year of their respective matched bank. *Size* is the natural logarithm of total assets (in USD). *Capital* is percentage ratio of equity to assets. *Profitability* is the percentage return on equity. *Loan intensity* is the percentage ratio of loans to assets. *Loan growth* is the percentage year-over-year growth in total loans. *Loan loss provisions* is the percentage ratio of annual loan loss provisions to total loans. *Employees* is the number of full-time-equivalent employees (logged). *Cost-to-income ratio* is calculated as the percentage ratio of operating expenses to operating income. *Basel* stands for regulatory reporting of the bank, where it equals 0 (for no identifiable Basel reporting), 1 (Basel I), 2 (Basel II), 2.5 (Basel II Pillar 3), and 3 (Basel III). *GDP growth* denotes the percentage year-over-year growth in gross domestic product. *GDP per capita* is gross domestic product per capita (in 2010 USD thousands). *Bank concentration* is the assets of the five largest banks in the country as a percentage of the country's total banking assets. *Market volatility* is measured as the 360-day volatility of the national stock market index. Standard errors presented in parentheses are robust to within-bank and within-month correlation and heteroscedasticity. ***, **, and * denote statistical significance at the one-tailed 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	<i>Counterparty risk</i>	<i>Counterparty risk</i>
<i>Treatment × Post</i>	-0.084*** (-4.05)	-0.087*** (-4.24)
<i>Post</i>	0.029* (1.88)	0.039** (2.40)
<i>Treatment × Pre1</i>		-0.007 (-0.40)
<i>Pre1</i>		0.026* (1.71)
<i>Size</i>	0.651*** (15.09)	0.652*** (15.12)
<i>Capital</i>	0.013*** (5.27)	0.013*** (5.29)
<i>Profitability</i>	0.001 (1.03)	0.001 (1.07)
<i>Loan intensity</i>	0.011*** (8.89)	0.011*** (8.90)

<i>Loan growth</i>	0.000 (0.13)	0.000 (0.17)
<i>Loan loss provisions</i>	-0.004 (-1.62)	-0.004 (-1.61)
<i>Employees</i>	0.059 (1.35)	0.059 (1.35)
<i>Cost-to-income ratio</i>	-0.000 (-1.01)	-0.000 (-1.00)
<i>Basel</i>	-0.000 (-0.01)	0.001 (0.02)
<i>GDP growth</i>	-0.003** (-2.37)	-0.003** (-2.36)
<i>GDP per capita</i>	-0.009** (-2.18)	-0.009** (-2.22)
<i>Bank concentration</i>	-0.001 (-0.29)	-0.001 (-0.32)
<i>Market volatility</i>	-0.001 (-0.28)	-0.000 (-0.18)
<i>Legal rights</i>	0.002 (0.23)	0.002 (0.23)
<i>Credit information</i>	-0.010 (-0.61)	-0.011 (-0.68)
<i>Insolvency resolution</i>	0.001 (1.03)	0.001 (0.98)
<i>Significant reform dummy</i>	0.010 (0.90)	0.008 (0.66)
Observations	3,139	3,139
Within R-squared	0.421	0.421
Bank and Year FE	Yes	Yes

Table 4. Auditor-Regulator Interaction and Credit Risk: Identification Issues

Panel A presents the results from bank-year-level regressions for our main dependent variable, *Counterparty risk*, with additional time-varying country-level controls and inclusion of parallel trend variables. Panel B reports results from All variables are defined in Appendix B.

	(1)		(2)		(3)		(4)	
	Conditioning variable: Ratio assurance				Conditioning variable: At least annual meetings			
	With		Without		Yes		No	
	<i>Counterparty risk</i>		<i>Counterparty risk</i>		<i>Counterparty risk</i>		<i>Counterparty risk</i>	
<i>Treatment</i> × <i>Post</i>	-0.083**		-0.064**		-0.081***		-0.073*	
	(-2.41)		(-2.53)		(-3.51)		(-1.70)	
Observations	712		2,427		2,443		696	
Within R-squared	0.498		0.411		0.391		0.485	
All lower order terms	Y		Y		Y		Y	
All previous controls	Y		Y		Y		Y	
Bank and Year FE	Y		Y		Y		Y	

Table 5. Auditor-Regulator Interaction and Credit Risk: The Cross-Section

This table presents results from the bank-year-level regressions of bank risk on auditor-regulator reforms across partitions based on bank size, market discipline and supervision strength. *Medium-sized* banks are those that belong to the 20-80% of the size distribution. *Private* banks are those without listed equity, while *Public* banks are those whose equity is listed on an EU regulated exchange. *High Supervision* banks are those that are based in countries with Barth et al. supervisory power of more than eight. *Post* switches on for years after the treatment; for control observations, this is the year of their respective matched bank. 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*, *GDP per capita*, *Bank concentration*, *Market volatility*, *Legal Rights*, *Credit Information*, *Insolvency Resolution*, and *Significant Reform Dummy*. All variables, including these controls, are defined in Appendix B. Standard errors presented in parentheses are robust to within-country and year correlation and heteroscedasticity. ***, **, and * denote statistical significance at the one-tailed 1%, 5%, and 10% levels, respectively.

	(1) Conditioning variable: Bank size		(2) Conditioning variable: Market discipline		(3) Conditioning variable: Supervision strength	
	Medium-sized	Other	Private	Public	High	Low
	<i>Counterparty risk</i>	<i>Counterparty risk</i>	<i>Counterparty risk</i>	<i>Counterparty risk</i>	<i>Counterparty risk</i>	<i>Counterparty risk</i>
<i>Treatment × Post</i>	-0.106*** (-3.59)	-0.045 (-1.26)	-0.081*** (-3.41)	-0.066 (-1.61)	-0.116*** (-2.97)	0.013 (0.24)
Observations	1,865	1,274	2,585	554	1,515	1,624
Within R-squared	0.351	0.442	0.419	0.458	0.298	0.467
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

Table 6. Alternative Measures of Credit Risk and Assessment of Information Risk

This table presents the results from bank-year-level regressions in with alternative measures of credit risk and outcomes. Our alternative measures include: *Credit Risk*, *Nonperforming loans*, *Risk-weighted assets*, and *Information Risk*. *Credit Risk* is captured by the *CDS spread*, measured as the annual average of daily five-year CDS contract of a bank (in percentage points); *RWA* is the percentage ratio of total risk-weighted assets (SNL item 248884) to total assets; *Nonperforming loans* is the percentage ratio of year-ahead nonperforming loans (SNL item 243681) to total loans; and *Information Risk* is the ratio of the annual average of the one-year CDS spread to that of the five-year CDS spread. *Treatment* is an indicator variable that switches on only if the bank is from a country that requires Long-Form Audit Reports during the sample period (Belgium 2012, Croatia 2014, Estonia 2014, Hungary 2014, Luxembourg 2013, Slovenia 2015, Spain 2011, and the UK 2016). *Post* switches on for years after the treatment; for control observations, this is the year of their respective matched bank. All other variables are as defined in Appendix B. Panel A reports descriptive statistics for these alternative measures and outcomes, and Panel B reports coefficient estimates from our regressions. Standard errors presented in parentheses are robust to within-country and year correlation and heteroscedasticity. ***, **, and * denote statistical significance at the one-tailed 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	<i>Credit risk</i>	<i>Funding costs</i>
<i>Treatment × Post</i>	-1.164** (-2.04)	-0.273* (-1.89)
<i>Post</i>	0.888* (1.97)	0.078 (1.12)
<i>Size</i>	0.166 (0.16)	-0.093 (-1.03)
<i>Capital</i>	-0.140 (-0.83)	0.006 (0.76)
<i>Profitability</i>	-0.049*** (-3.54)	-0.004* (-1.90)
<i>Loan intensity</i>	0.038 (1.51)	-0.003 (-0.54)
<i>Loan growth</i>	-0.018* (-1.73)	-0.000 (-0.83)
<i>Loan loss provisions</i>	-0.177 (-0.80)	0.005 (0.71)
<i>Employees</i>	-0.320 (-0.48)	0.192* (1.85)
<i>Cost-to-income ratio</i>	0.005 (0.91)	0.000 (0.18)
<i>Basel</i>	-0.519* (-1.84)	-0.045 (-0.56)
Observations	189	3,120
Within R-squared	0.894	0.792
Macroeconomic controls	Yes	Yes
Bank and Year FE	Yes	Yes

	(1)	(2)	(3)
	<i>RWAs to assets</i>	<i>Nonperforming loans</i>	<i>Information risk</i>
<i>Treatment × Post</i>	-4.374*** (-5.57)	-1.703*** (-2.74)	-0.167** (-2.38)
<i>Post</i>	1.284** (2.04)	-0.167 (-0.39)	0.097* (1.72)
<i>Size</i>	-5.831*** (-4.41)	0.938 (1.05)	-0.170 (-1.14)
<i>Capital</i>	0.228 (1.08)	-0.057 (-0.76)	-0.019 (-1.05)
<i>Profitability</i>	0.028 (1.12)	-0.025 (-1.60)	-0.000 (-0.23)
<i>Loan intensity</i>	0.209*** (3.94)	0.042 (1.57)	-0.002 (-0.72)
<i>Loan growth</i>	-0.003 (-0.43)	-0.001 (-0.27)	-0.000 (-0.30)
<i>Loan loss provisions</i>	0.030 (0.13)	0.238** (2.58)	0.103** (2.01)
<i>Employees</i>	4.896*** (4.30)	0.921 (1.18)	-0.015 (-0.09)
<i>Cost-to-income ratio</i>	-0.027* (-1.88)	-0.029*** (-2.83)	0.001 (1.07)
<i>Basel</i>	-0.160 (-0.09)	-0.572 (-1.61)	0.018 (0.43)
Observations	3,721	1,552	177
Within R-squared	0.085	0.177	0.341
Macroeconomic controls	Yes	Yes	Yes
Bank and Year FE	Yes	Yes	Yes

Table 7. Auditor-Regulator Interaction and Credit Risk: Results without Matching

This table repeats the main analysis shown in Table 3 on sample that does not rely on matching. Panel A includes the sample statistics, and Panel B presents the regression results. In the spirit of Bertrand and Mullainathan (2003), *Post-Treatment* is defined as a composite variable that takes the value of 1 for bank-years that are in countries that passed a Long-Form Audit Report requirement, following the year of the reform (Austria 1994, Belgium 2012, Croatia 2014, Denmark 2008, Estonia 2014, Germany 1998, Hungary 2014, Luxembourg 2013, Portugal 2008, Slovakia 2001, Slovenia 2015, Spain 2011, and the UK 2016). This variable equals zero for these banks prior to the reform and, again, zero throughout the sample period for non-reform countries. All other variables are as defined in Appendix B and in the caption of Table 3. Standard errors presented in parentheses are robust to within-country and year correlation and heteroscedasticity. ***, **, and * denote statistical significance at the one-tailed 1%, 5%, and 10% levels, respectively.

Panel A. Descriptive Statistics

	Mean	stdev	p10	p50	p90	N
<i>Counterparty risk</i>	13.569	2.150	11.082	13.274	16.593	17,850
<i>Size</i>	21.245	2.226	18.706	20.870	24.381	17,850
<i>Capital</i>	9.709	5.847	5.053	8.630	14.511	17,850
<i>Profitability</i>	3.548	8.449	0.116	3.243	10.715	17,850
<i>Loan intensity</i>	58.089	18.891	33.189	60.712	79.426	17,850
<i>Loan growth</i>	5.864	19.272	-5.722	3.429	15.946	17,850
<i>Loan loss provisions</i>	0.584	1.595	-0.365	0.264	1.924	17,850
<i>Employees</i>	5.341	1.907	3.178	5.094	7.959	17,850
<i>Cost-to-income ratio</i>	67.089	17.886	47.505	67.225	83.722	17,850
<i>Basel</i>	2.656	0.490	2.000	3.000	3.000	17,850
<i>GDP growth</i>	0.479	8.535	-12.821	2.632	10.417	17,850
<i>GDP per capita</i>	41.569	11.879	29.008	44.259	48.078	17,850
<i>Bank concentration</i>	79.868	8.911	70.610	78.494	91.565	17,850
<i>Market volatility</i>	21.225	5.815	14.440	20.442	27.659	17,850
<i>Legal rights</i>	5.839	1.980	2.500	6.500	8.000	17,850
<i>Credit information</i>	6.107	1.445	4.500	6.000	8.000	17,850
<i>Insolvency resolution</i>	80.752	14.041	62.440	84.780	91.930	17,850
<i>Significant reform dummy</i>	0.782	0.413	0.000	1.000	1.000	17,850

Table 7. (Continued)

Panel B. Results	
	(1)
	<i>Counterparty risk</i>
<i>Post_Treatment</i>	-0.056*** (-2.91)
<i>Size</i>	0.663*** (11.45)
<i>Capital</i>	0.011*** (4.59)
<i>Profitability</i>	0.000 (0.49)
<i>Loan intensity</i>	0.010*** (9.90)
<i>Loan growth</i>	0.000 (1.61)
<i>Loan loss provisions</i>	-0.002 (-0.74)
<i>Employees</i>	0.089*** (3.08)
<i>Cost-to-income ratio</i>	-0.001 (-1.59)
<i>Basel</i>	-0.002 (-0.14)
Observations	17,850
Within R-squared	0.378
Macroeconomic controls	Yes
Bank and Year FE	Yes

Table 8. Auditor-Regulator Interaction and Credit Risk: Evidence from the UK

This table repeats the main analysis shown in Table 3 in a within-country specification. Panel A includes the sample statistics, and Panels B and C present the regression results. *Treatment* is defined as banks with total assets between £50 billion and £500 billion. In Panel B, the control group includes all UK banks with assets outside this range. In Panel C, the control group excludes banks with assets less than £10 billion to ensure a more balanced sample, *Post* switches on 2016 onward. *Post*, *Treatment*, and macroeconomic controls (*GDP growth*, *GDP per capita*, *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 Appendix B and in the caption of Table 3. Standard errors presented in parentheses are robust to within-bank correlation and heteroscedasticity. ***, **, and * denote statistical significance at the one-tailed 1%, 5%, and 10% levels, respectively.

Panel A. Descriptive Statistics

	Mean	stdev	p10	p50	p90	N
<i>Counterparty risk</i>	14.257	2.342	11.555	14.031	17.976	730
<i>Size</i>	22.130	2.485	19.409	21.644	26.478	730
<i>Capital</i>	9.862	7.874	4.675	7.404	17.453	730
<i>Profitability</i>	5.234	10.549	-2.884	5.410	13.912	730
<i>Loan intensity</i>	56.919	25.763	14.290	66.308	83.504	730
<i>Loan growth</i>	17.163	74.310	-11.577	5.181	40.759	730
<i>Loan loss provisions</i>	0.755	2.987	-0.063	0.098	1.435	730
<i>Employees</i>	6.067	2.380	3.418	5.325	9.795	730
<i>Cost-to-income ratio</i>	72.150	26.963	43.268	70.248	96.966	730
<i>Basel</i>	2.772	0.446	2.000	3.000	3.000	730

Table 8. Continued

Panel B. Results		
	(1)	(2)
	Full UK sample	Obs. around threshold only
	<i>Counterparty risk</i>	<i>Counterparty risk</i>
<i>Treatment × Post</i>	-0.125** (-2.35)	-0.115** (-2.17)
<i>Size</i>	0.794*** (11.38)	0.728*** (7.46)
<i>Capital</i>	0.013** (2.44)	-0.018 (-0.82)
<i>Profitability</i>	-0.002 (-1.12)	-0.003 (-1.21)
<i>Loan intensity</i>	0.009*** (3.71)	0.003 (0.92)
<i>Loan growth</i>	0.000 (1.41)	0.000 (0.49)
<i>Loan loss provisions</i>	-0.010*** (-3.06)	0.019 (0.74)
<i>Employees</i>	0.121* (1.80)	0.130 (1.58)
<i>Cost-to-income ratio</i>	-0.002*** (-3.31)	-0.003** (-2.53)
<i>Basel</i>	0.024 (0.37)	0.082 (0.42)
Observations	709	158
Within R-squared	0.284	0.153
Bank and Year FE	Yes	Yes

Table 9. Costs of Enhanced Auditor-Regulator Interaction: Audit Fees

This table presents the results from bank-year-level regressions in which the dependent variable is *Audit Fees* (annual audit fees as a percentage of annual operating expenses). *Treatment* is an indicator variable that switches on only if the bank is from a country that requires Long-Form Audit Reports during the sample period (Belgium 2012, Croatia 2014, Estonia 2014, Hungary 2014, Luxembourg 2013, Slovenia 2015, Spain 2011, and the UK 2016). *Post* switches on for years after the treatment; for control observations, this is the year of their respective matched bank. *Pre1* switches on the year before the regulation. All other variables are as defined in Appendix B and in the caption of Table 3. Standard errors presented in parentheses are robust to within-bank correlation and heteroscedasticity. ***, **, and * denote statistical significance at the one-tailed 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	<i>Audit fees</i>	<i>Audit fees</i>
<i>Treatment</i> × <i>Post</i>	0.113** (2.38)	0.113** (2.37)
<i>Post</i>	-0.060 (-1.64)	-0.060 (-1.63)
<i>Treatment</i> × <i>Pre1</i>		0.042 (0.68)
<i>Pre1</i>		-0.002 (-0.10)
<i>Size</i>	0.043 (1.03)	0.043 (1.02)
<i>Capital</i>	-0.002 (-0.43)	-0.002 (-0.43)
<i>Profitability</i>	-0.000 (-0.22)	-0.000 (-0.22)
<i>Loan intensity</i>	0.004** (2.50)	0.004** (2.50)
<i>Loan growth</i>	-0.000 (-1.09)	-0.000 (-1.09)
<i>Loan loss provisions</i>	0.007 (0.80)	0.007 (0.80)
<i>Employees</i>	0.003 (0.06)	0.003 (0.06)
<i>Cost-to-income ratio</i>	-0.000 (-0.11)	-0.000 (-0.11)
<i>Basel</i>	-0.023 (-0.68)	-0.023 (-0.68)
Observations	788	788
Within R-squared	0.084	0.086
Macroeconomic controls	Yes	Yes
Bank and Year FE	Yes	Yes