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Bank Supervision

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Abstract

We provide a critical review of the empirical and theoretical literature on bank supervision. This review focuses on microprudential supervision: the supervision of individual banking institutions aimed at assessing the financial and operational health of those firms. Theory suggests that supervision is required not only to ensure compliance with regulation but also to allow for the use of soft information in mitigating externalities of bank failure. Empirically, more intensive supervision results in reduced risk-taking, but less consensus has been found on whether the risk-reducing impact of supervision comes at the cost of reduced credit supply. Theoretical costs and benefits of supervisory disclosure have been outlined, and this disclosure is informative to investors; however, it is difficult to identify the impact of disclosure distinct from supervisory and regulatory changes.

1. INTRODUCTION

Economists have extensively analyzed the regulation of banks and the banking industry but have devoted considerably less attention to bank supervision as a distinct activity. To some extent, the confusion may stem from a lack of information about what bank supervision is and what bank supervisors do, perhaps reflecting that most supervisory activities and outcomes are confidential (Eisenbach et al. 2017; Hirtle, Kovner & Plosser 2020). But it also reflects gaps in the existing economics literature about the goals and rationale for supervision as a complement to (or substitute for) regulation.

This article reviews the literature on supervision, covering broad empirical findings on supervision and highlighting gaps, including those in supervision's theoretical underpinnings. While much of the economics literature on this topic has used the terms supervision and regulation interchangeably, we highlight the roles of supervisors beyond that of enforcing regulatory compliance, including making qualitative assessments of banks' internal risk management and control processes and enforcing remedial actions tailored to the circumstances they uncover.

This review focuses principally on microprudential supervision: the supervision of individual banking institutions aimed at assessing the financial and operational health (safety and soundness) of those firms. The discussion does not directly address other forms of supervision of individual banking firms and their activities, such as compliance with consumer protection or market integrity regulations, though obviously there are overlaps among these areas. Supervision aimed at addressing macroeconomic or financial stability concerns (macroprudential supervision) is an increasing topic of interest, but one where the academic work tends to analyze regulation, rather than supervision. Finally, the discussion focuses on supervision of commercial banks and commercial bank holding companies, which for convenience are both referred to as banks.

The literature on supervision focuses largely on the impact that supervision has on supervised banks in terms of their profitability, risk-taking, and lending and on the incentives facing supervisors. The broad findings of this work suggest that more intensive supervision results in lower bank risk with little impact on profitability. Mixed evidence has been found about whether more intensive supervision reduces lending, either at supervised banks or for the banking system, and about whether incentives such as career concerns significantly impact supervisory outcomes, with more recent work suggesting that supervisory capture might not play a large role, at least in the United States and Europe.

Much of this work takes existing supervisory structures and approaches as a given but does not address more fundamental underlying questions about the goals and objectives of bank supervision. Why do we have supervision? What role does it play distinct from other mechanisms such as regulation and corporate governance? The emerging work addressing these fundamental questions draws on the long history of work on the motivation for bank regulation, drawing on theories of asymmetric information, soft and hard information, and rules versus discretion in policy. Developing a unifying theory of supervision would provide a better understanding of whether bank supervision, as it is currently implemented, is meeting its objectives and how those objectives might be better articulated and designed.

2. ECONOMIC THEORIES OF BANK REGULATION

A long history of economic research considers the rationale for the existence of banks and regulation of these firms. Theories of banking generally revolve around three key themes: asymmetric information and monitoring, liquidity and payments provision, and the synergies of combining deposit-taking with contingent credit provision (loan commitments). Theories about banking regulation focus on closely related issues through the lens of externalities or other market failures,

consistent with the broader economics literature on the rationale for regulation. A particularly important idea in this literature is that because bank owners and managers do not internalize the full set of costs of bank failure or severe distress, they will engage in riskier behavior or be willing to bear a higher risk of failure than is optimal from a social perspective.

In general, the economics literature suggests that regulation is warranted to address the negative impacts of externalities—situations in which the parties making decisions do not take into account the impact of their choices on others and thus make choices that differ from what might be optimal from a social or economy-wide perspective—or when there are market failures that cause the actions of individual parties to differ from the actions that would achieve the best outcomes for all. While supervision is distinct from regulation, these theories of bank regulation can be readily applied to the economic rationale behind bank supervision.

The need for prudential regulation and supervision is often linked directly to the moral hazard arising from deposit insurance and the government safety net [see, e.g., Merton's (1978) work, which adjusts the put option value of deposit guarantees based on the risk mitigant of supervisory audits]. However, externalities and market failures in and of themselves suggest banks' private incentives could result in higher risk and lower solvency probability than would be desirable from a social perspective. Banks are connected in an intricate network system, and the failure of one bank can cause direct losses at other banks. Perhaps more significantly, a failing bank's attempt to liquidate its asset holdings as it become increasingly stressed can result in fire sales that drive asset prices lower and cause mark-to-market losses at other banks holding similar positions (Brunnermeier et al. 2009; Tirole 2013). Thus, while deposit insurance provides one motivation for prudential regulation and supervision, the rationale is actually much broader, resting on the role that banks play in originating credit, monitoring borrowers, and supplying liquidity and payment services to depositors and borrowers. And in fact, in the United States, prudential regulation and supervision at the federal level existed prior to the establishment of the Federal Deposit Insurance Corporation (FDIC) in 1933 (White 2011).[1]

3. BANK SUPERVISION

Some of the literature on bank regulation explicitly describes a role for bank supervision—namely, to ensure compliance with regulation (Masciandaro & Quintyn 2016; Mishkin 2001). However, a theoretical approach that views the economic rationale for supervision solely as compliance with regulation falls short of capturing many important aspects of supervision in practice. This section expands the discussion of the theoretical basis for supervision by highlighting ways in which supervision may complement and substitute for regulation. However, little in the current theoretical economics literature addresses the role or motivation for these broader supervisory activities.

3.1. What Do Bank Supervisors Do?

It is helpful to describe what bank supervisors do, as a way of highlighting how supervision differs from regulation. At a high level, regulation is the set of rules under which banking organizations must operate, involving issues such as who can own and manage commercial banks, what corporate form banking companies must adhere to, what activities commercial banks and parent

[1]The importance of official sector oversight in banks' role in money creation is highlighted in early discussions of the Federal Reserve. Some literature focuses on how bank failures may impact the monetary base, creating a role for supervision and regulation. These considerations were particularly important in prior monetary control regimes, particularly the gold standard prior to 1933.

banking companies can and cannot pursue, how much capital and liquidity banks must have to operate without additional sanctions or restraints, and what financial transactions are permitted between subsidiaries within a banking organization. Supervision, in contrast, involves monitoring and oversight of banks, including evaluating banks' risk management processes, assessing corporate governance and internal controls, identifying risks to a bank's continued financial health and viability, and critically, taking action to ensure that banks remediate deficiencies identified through these reviews (Eisenbach et al. 2017).

Supervision occurs in a range of different entities, depending on the country, with some countries combining supervisors with the central bank and others operating independent supervisors. The United States and the European Union effectively do both with some supervision done by local (state or country supervisory authorities) and other by the central bank. Because of these complex structures, it is difficult to calculate the overall resources spent on supervisory activities or to make comparisons over time or across jurisdictions, even for relatively basic information.[2]

Supervisory staff come from a variety of professional backgrounds. In the United States, supervisors frequently have educational backgrounds and professional experience in risk management, financial analysis, accounting, or public policy. In addition, some have direct experience in specialized banking or financial market activities, such as lending, structured finance, derivatives, or trading. Supervisors also go through relatively extensive in-house training. The Federal Reserve, for instance, operates three multiyear examiner commissioning programs for its supervisory staff—one each for supervisors working with large financial institutions, with community banking organizations, and on consumer compliance issues—as well as a range of programs aimed at continuing professional development, which provide specialized training on topics of emerging significance such as financial technology (Board Gov. Fed. Reserve Syst. 2017).

Supervisors engage in a broad series of monitoring activities intended to identify any weaknesses in banks' risk management and controls, internal processes and procedures, governance, and financial and operational soundness. These monitoring activities include review of banks' internal documents and reports; discussions with internal auditors, risk managers, business leaders, senior management, and directors; and independent analysis of compliance with internal policies and procedures.

This monitoring is sometimes targeted at an individual bank but is often coordinated across institutions to provide peer perspective and to develop insights into industry best practices. The Federal Reserve's Comprehensive Capital Analysis and Review (CCAR) program and its associated stress testing are examples of programs, authorized by regulation, in which supervisory work is coordinated across institutions. Some of this information is aggregated and quantified into supervisory ratings, for example uniform composite CAMELS ratings. Assigned by the Federal Reserve, the OCC, the FDIC, or state banking supervisors, the composite CAMELS rating is based on the individual ratings of the following components: (C) capital adequacy, (A) asset quality, (M) management, (E) earnings, (L) liquidity, and (S) sensitivity to market risk. Composite CAMELS ratings

[2]The World Bank maintains a global database of bank regulation and supervision, with information from surveys of bank regulatory agencies updated every few years. Information on supervisory resources may not be available for countries with more fragmented supervisory approaches, including the United States. In the United States, the Federal Reserve reports that it has approximately 3,700 professional supervisory staff (out of approximately 23,000 employees overall), while the Office of the Comptroller of the Currency (OCC) and FDIC report that they have approximately 3,500 and 5,800 employees, respectively (Board Gov. Fed. Reserve Syst. 2021; Fed. Dep. Insur. Corp. 2021; Off. Comptrol. Curr. 2021). However, the reported figures are not comparable across the agencies—for instance, the FDIC includes employees engaged in managing the deposit insurance fund and in resolving failed banks in addition to those directly involved in supervisory activities.

are not simply an average of the component ratings but reflect examiners' informed judgment.[3] Beyond these quantitative ratings, the assessment and judgments made by supervisors are often qualitative in nature, aimed at determining whether banks are operating in a manner that supports (or threatens) the continued health and viability of the organization (Eisenbach et al. 2017).

Beyond monitoring, bank supervisors also take actions intended to ensure that banks address shortcomings identified through monitoring and examinations. In the United States, these actions include public enforcement actions; downgrades to supervisor ratings, which, under US regulation, can affect a bank's ability to expand into new activities or to acquire other institutions through mergers; and confidential supervisory actions such as Matters Requiring Attention (MRAs) and Matters Requiring Immediate Attention (MRIAs), which stipulate steps that banks must take to improve their internal processes, financial condition, or operating procedures. Failure to comply with these actions can result in more serious supervisory steps, such as escalation from a confidential MRA to a public enforcement action, limits on asset growth or expansion, or fines (Eisenbach et al. 2017).

The key message from this overview is that while bank supervision and bank regulation are entwined and have areas of overlap, in practice, the two are distinct. In their day-to-day activities, supervisors indeed seek to enforce compliance with regulation. But they also make qualitative assessments concerning the safe and sound operation of banks that go beyond the enforcement of regulations. These assessments and the resulting remediation actions are important due to the continual and often rapid evolution of financial markets; innovation in financial products; and changes in technology, climate, and nonfinancial regulation that impact borrowers and depositors, as well as the banks themselves. The theoretical literature is just now beginning to address the impact and motivation for these activities.

3.2. Theories of Bank Supervision

As noted, little in the current economics literature directly addresses the role that bank supervision plays relative to regulation.[4] What purpose does or should supervision have, if any, beyond addressing regulatory compliance? Is it a substitute or complement for regulation, or does it serve a wholly separate purpose? Should supervision consider only microprudential concerns, or should it address macroprudential implications? Does supervision address the same set of externalities as regulation, or does it address a different set of market failures? How would we know if the resources devoted to supervision are well spent or allocated optimally from a social perspective?

3.2.1. Supervision and information. A few papers do provide some insight into these questions, nearly all related to information asymmetries, information gathering, and monitoring.

[3]The CAMELS rating system was adopted by the Federal Financial Institutions Examination Council (FFIEC) in 1979, and the (S) was added in 1996. Bank holding companies are also evaluated with a composite risk rating. From 1979 through 2004, this was the BOPEC rating, which included (B) bank subsidiaries, (O) other nonbank subsidiaries, (P) the parent company, (E) earnings, and (C) capital adequacy. This rating system was replaced in 2005 with RFI/C(D), including (R) risk management, (F) financial condition, (I) impact on depositories, and the (C) composite (D) depository institution rating. In 2018, this changed to a large financial institution (LFI) rating system that evaluates firmwide capital, liquidity, and governance and controls.

[4]A small set of papers written in the late 1940s and early 1950s addresses the question of what bank supervision should be attempting to achieve and the ways in which supervision should (or should not) be integrated with monetary policy to create countercyclical impacts (Bach 1949, 1950; Warburton 1950). The discussion in those papers focuses predominantly on supervision's role in evaluating banks' lending but also presages contemporary discussions about macroprudential supervisory policies such as countercyclical capital buffers. We thank Peter Conti-Brown for pointing out these papers.

Berger & Davies (1998), for instance, argue that "the main purpose of bank examinations is information acquisition" about a bank's risk exposures and financial condition (p. 117). They find evidence that bank examinations both have an auditing effect on the reported value of loans on a bank's balance sheet and generate new information about the bank's underlying financial condition. This latter effect is particularly pronounced for weaker banks. These findings are consistent with the idea that bank balance sheets are difficult for outsiders to assess, as theories related to banks' roles in information gathering and monitoring opaque borrowers suggest. Implicitly, the role of supervision—via examinations—is to generate more precise information about a bank's condition to enable supervisors to take appropriate action to reduce failure risk. Dewatripont & Tirole (1994), for instance, argue that the goal of bank regulation should be to represent depositors, who are exposed to loss when banks fail and who might not be well-suited to monitoring bank risk.

Eisenbach, Lucca & Townsend (2016) develop a model that expands on the idea of information acquisition as a primary role for supervision. Their model assumes two types of information about banks' condition and risk exposures: hard information that can easily be verified (e.g., whether capital ratios exceed minimum required levels) and soft information that requires effort to obtain and judgment to assess, such as the quality of risk management. In the model, verifiable hard information forms the basis of regulation, while acquiring and assessing soft information is the role of supervision.[5]

The distinction between hard and soft information and its role in supervision is closely related to ideas raised in papers that discuss the role of hard and soft information in lending. As summarized by Liberti & Petersen (2019), hard information is "quantitative, is easy to store and. . .is independent of its collection," while soft information is "difficult to completely summarize in numeric score, . . . requires a knowledge of its context to fully understand, and. . .becomes less useful when separated from the environment in which it was collected" (p. 1). This literature argues that smaller banks who are closer to their customers are better equipped to deal with soft information (e.g., from local small businesses), while larger banks with more hierarchy and greater geographic scope use hard information more successfully (e.g., credit card scoring). An alternative approach to supervisory information acquisition could be matching the intensity of supervision to the systemic importance of banks, which is consistent with macroprudential goals.

3.2.2. Supervisory flexibility. In the model by Eisenbach, Lucca & Townsend (2016), supervisors intervene to alter banks' risk-taking behavior after acquiring and assessing the soft information, basing their intervention on the signal they receive about the bank. These interventions are intended to reduce the probability of bad outcomes (e.g., loan losses) at the bank. Interventions are flexible, tailored to the particular circumstances supervisors discover about the bank.

The paper argues that this flexibility has both benefits and costs. On the benefit side, supervisors' ability to tailor remediation actions allows them to respond optimally based on what they learn from the information they discover. If the full range of potential future conditions is difficult to specify in advance, this flexibility can be an effective supplement to hard-wired regulation in curbing banks' risk-taking. However, precommitting via regulation to certain actions could successfully curb risk-taking even if these actions turn out to be harsher than necessary given

[5]In a different setting, Repullo (2018) develops a related model in which the supervisor's role is to collect unverifiable information on bank solvency and to make decisions using that information about whether the bank should be liquidated. The Basel Committee on Banking Supervision also recognizes supervisors' role in assessing qualitative information in the supervisory review pillar (Pillar 2) of the Basel II capital standards adopted prior to the global financial crisis (Basel Comm. Bank. Superv. 2004).

information eventually discovered by supervisors. Which of these two approaches is optimal from a social perspective depends on a variety of factors, including the degree of uncertainty surrounding a bank's health and performance (the extent of the information asymmetries) and how difficult (costly) it is for supervisors to uncover accurate information about the firm.

The costs and benefits of supervisory flexibility mirror themes widely addressed in the economics literature in other settings, including the literature on rules versus discretion in monetary policy (see, e.g., Fischer 1990 and Kocherlakota 2016) and the incomplete contracting literature (Grossman & Hart 1986; Hart 1995; Hart & Moore 1990). This work addresses a series of issues that are relevant to banking regulation and supervision, such as dynamic inconsistency (the optimal action in the future could differ from the optimal action today, since future conditions are uncertain), credibility in committing to future actions (because future conditions are uncertain, it can be difficult to convincingly pledge what steps will be taken in the future), and the holdup problem (because parties can renegotiate in the future, they can have incentives not to cooperate fully today, resulting in underinvestment).

Supervisory flexibility may also be optimal at times when macroprudential concerns are heightened and many banks are vulnerable. Borio (2003) posits that the high costs of financial instability mean achieving macroprudential goals may be key to obtaining microprudential objectives. Further, he argues that stricter microprudential approaches may be less likely to deliver safe and sound financial systems. Both would argue for a supervisory approach that considers the implications of a firm's distress on the financial system and the economy.[6] Morrison & White (2013) model how the optimal supervisory response may be forbearance if a loss of confidence in regulatory competence can lead to a systemic crisis. In considering design principles for macroprudential supervision, Yellen (2011) highlights discretionary supervisory interventions as an inevitable supplement to macroprudential regulation, citing financial institutions' ability to game regulation. Hirtle, Schuermann & Stiroh (2009) propose the Supervisory Capital Assessment Program (SCAP) as an example of a supervisory framework that addresses macroprudential concerns.

3.3. Empirical Evidence of Supervision's Impact on Supervised Banks

In contrast to the small body of theoretical work exploring the rationale for supervision, a growing empirical literature is assessing the impact of supervision on banks. Interest in this topic increased following the global financial crisis of 2008 and the subsequent changes to bank supervision and regulation, especially for large, globally systemically important banks. Through a variety of lenses, these papers examine how supervision affects the risk-taking, lending, and profitability of supervised banks. The papers generally find that more intensive supervision results in reduced risk-taking. This raises questions as to whether the risk-reducing impact of supervision comes at the cost of reduced lending or lower profits. If this trade-off exists, is it socially optimal? Some papers find that more intense supervision results in reduced credit supply, while others find that supervision reduces risk without significantly reducing lending. Most papers that examine the question find that supervision has a neutral to positive impact on profitability.[7]

[6]For example, Yilla & Liang (2020) mix supervision and regulation in their discussion of macroprudential tools.

[7]A related body of work assesses the effects of the stress testing conducted by the Federal Reserve and European supervisory authorities during and after the global financial crisis of 2008. As described by Hirtle & Lehnert (2015), the Federal Reserve's CCAR program, which embeds stress testing, involves both regulation (compliance with minimum post-stress capital requirements) and supervision (assessment of banks' internal stress testing and capital management programs).

3.3.1. The information content of supervision. Understanding the information and monitoring produced by supervisors requires both measures of bank outcomes and measures of supervisory information. One measure used to proxy for supervisory information is confidential supervisory ratings. Studies of the information produced by supervision establish relationships between supervisory ratings and a range of bank outcomes, often in the context of trying to compare supervisory monitoring to investor monitoring. Supervisory ratings are related to stock market returns (Berger, Davies & Flannery 2000; Hirschhorn 1987), bond returns and ratings downgrades (DeYoung et al. 2001), accounting variables (Kupiec & Lee 2012), and failures (Cole & Gunther 1998). However, supervisor information appears to decay over time (Hirtle & Lopez 1999). Gaul & Jones (2021) review the literature on CAMELS ratings and update analysis using data through 2020, finding significant predictive power for supervisory ratings for financial market and accounting variables.

3.3.2. Bank lending. The longest-standing economics literature on supervision examines how the stringency of the bank examination process—in particular, the standards examiners apply when reviewing a bank's loan portfolio or assessing bank safety and soundness—affects bank lending supply (Bassett, Lee & Spiller 2015; Berger, Kyle & Scalise 2001; Curry, Fissel & Ramirez 2008; Kiser, Prager & Scott 2016; Krainer & Lopez 2009; Peek & Rosengren 1995; Swindle 1995). In general, these papers find that increased supervisory stringency is associated with reduced loan origination or slower loan growth, though the estimated economic effects of the impact vary, with some finding statistically significant but economically small effects and others finding more meaningfully sized impacts. Estimates do not explore macroprudential implications, although many of the episodes explored make use of the tightening of supervisory standards following downturns, suggesting that supervision has been procyclical.

More recently, Bassett & Marsh (2017) and Kim, Plosser & Santos (2018) find that supervisory guidance related to commercial real estate and leveraged lending, respectively, reduced these forms of lending at targeted banks, though banks may take on additional risk via other types of lending or the targeted lending may shift to other institutions. Finally, several papers have examined the impact of the introduction of the Single Supervisory Mechanism (SSM) for large banks in Europe; results suggest that the resulting more intense supervision of these banks results in lower risk but is also associated with a reduction in credit supply, at least in the period immediately following the introduction of the new regime (Abbassi et al. 2020; Cerulli, Fiordelisi & Marques-Ibanez 2021; Eber & Minoiu 2016; Haselmann, Singla & Vig 2019). Passalacqua et al. (2021) find similar results at small Italian banks following unanticipated inspections by supervisors, with the reduction in lending coming entirely from reduced lending to troubled firms. They find that overall lending rebounds over subsequent quarters, as banks reallocate credit to healthy firms. Ivanov & Wang (2022) explore the impact of less lenient supervisors on lending supply, causally linking stricter supervisory evaluations to reduced lending using quasi-random assignment of supervisors to Shard National Credit (SNC) reviews.

3.3.3. Bank risk-taking and performance. A growing series of papers have looked at the impact of formal supervisory enforcement actions in the United States, such as cease and desist orders, written agreements, or fines, on risk-taking and performance. In general, this work finds that public enforcement actions are associated with subsequent reductions in bank risk (e.g., Delis & Staikouras 2011; Delis, Staikouras & Tsoumas 2017). Pereira et al. (2019) find that equity prices decline and deposit growth falls in response to public enforcement actions, especially those that are more severe, but that these effects reverse and are sometimes positive when the enforcement action is seen as correcting a management deficiency. Other work finds that the costs (borrowing

rates and fees) faced by a bank's syndicated loan borrowers decline following enforcement actions, largely reflecting decreased market power of the penalized bank (Deli et al. 2019).

While these papers have focused on particular supervisory activities, others have taken a broader approach to assessing differences in supervisory attention and intensity. This work focuses on discrete events that result in more or less intense supervisory focus for some banks, such as changes in asset size cutoffs for particular types of supervisory reviews or closures of regional supervisory offices. For instance, Rezende & Wu (2014) examine banks before and after a regulatory change in the asset size cutoff determining the frequency of examinations and find that, after the regulatory change, banks receiving more frequent exams experience higher profitability and lower loan losses than banks just below the new asset size cutoff. Bisetti (2020) finds that market-to-book ratios fall for banks with reduced reporting requirements following an increase in asset size cutoff for certain regulatory reports, as these banks increase spending on internal controls and external audit.

Papers examining the impact of supervisory office closures—that is, when a supervisory agency closes a regional office and reassigns oversight responsibilities to staff located farther away—generally find that the office closures result in greater risk and lower profitability for banks with now more-distant supervisors (Hagendorff, Lim & Armitage 2017; Kandrac & Schlusche 2021; Leuz & Granja 2020). These papers interpret greater physical distance as a proxy for reduced supervisory attention and familiarity. Using a different identification approach based on asset size ranking within a Federal Reserve district, Hirtle, Kovner & Plosser (2020) find that banks receiving more supervisory attention have less risky loan portfolios, have less volatile income, and are less negatively impacted by economic downturns but are no less profitable and do not have slower asset or loan growth than similar banks receiving less intensive supervisory scrutiny.[8]

Taken as a whole, the findings in these papers suggest supervision decreases the risk of bank failure, with little cost to bank profitability. The evidence on credit supply is more mixed, though some papers find that banks' intermediation activities are not reduced in an economically meaningful way. Finding that the additional safety that supervision provides comes at little cost to lending or to bank profitability would be an important conclusion, because it would suggest that supervision enhances welfare. Still, none of the papers directly address whether the current structure and resources devoted to supervisory activities are fully socially optimal. Few address the direct costs of supervision (salaries and other expenses associated with maintaining supervisory agencies).

The work by Eisenbach, Lucca & Townsend (2021) is an exception. Using an extension of their 2016 model discussed in the previous section, they assess whether supervisory resources within the Federal Reserve System are allocated optimally and find that resources could be more efficiently allocated among districts and toward riskier banks. They also do a back-of-the-envelope exercise to assess the impact of increasing the overall pool of resources spent on supervision and find positive net benefits. Ivanov, Ranish & Wang (2019) suggest that benefits of supervision may vary with bank size, finding that small banks change syndicate structure to remain in SNC supervisory coverage while large banks shift lending to avoid the supervisory program. However, the evidence from the resource reallocation changes associated with the SSM for large banks in Europe suggests that increasing supervision may result in reduced credit provision. Whether the amount of supervision being conducted is socially optimal in terms of the degree of risk-reduction or the impact on economic activity remains an open question that the economics literature has yet to address fully and may vary by region.

[8]In a different setting, Jackson & Roe (2009) reach similar conclusions about the positive impact of supervisory intensity, finding that countries allocating more resources to public enforcement by securities regulators tend also to have more robust capital markets.

3.3.4. Disclosing supervisory information. Another strand of the literature considers disclosure of supervisory information, specifically, the costs and benefits of supervisors disclosing to the public the outcomes of their monitoring and assessments of bank risk. Traditionally, supervisory information such as CAMELS ratings and many remediation actions (MRAs and MRIAs) have not been disclosed to the public, even on an ex post basis.

The Federal Reserve's 2009 SCAP stress tests broke with the tradition of confidentiality by disclosing firm-specific stress test results, and the subsequent Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) and CCAR stress tests have continued to make results available to the public. The Federal Reserve argued that disclosing the SCAP results would reduce uncertainty and enhance confidence in the banking system at a time of considerable stress (Board Gov. Fed. Reserve Syst. 2009; Hirtle, Schuermann & Stiroh 2009). A number of papers have examined the impact and content of the SCAP and subsequent DFA/CCAR stress test disclosures, finding that they conveyed new information to the market (Fernandes, Igan & Pinheiro 2020; Flannery, Hirtle & Kovner 2017; Morgan, Peristiani & Savino 2014). A parallel set of work has examined disclosure of European stress test results, finding somewhat more mixed evidence of market impact (see, e.g., Petrella & Resti 2013 or Candelon & Sy 2015).

These papers address whether the stress test disclosures affect the market's perception of a bank's risk and performance, but few papers directly address whether the disclosures themselves affect banks' risk-taking. In part, this is because identifying the impact of disclosure as distinct from the overall impact of the stress test program is very difficult, and the counterfactual—the existence of the stress test program without disclosure of results—cannot be tested. Goldstein & Sapra (2014) discuss some theoretical costs to disclosure of supervisory information and stress test results, including disruptions to risk-sharing in interbank markets and distortions to banks' risk-taking behavior. Sahin, de Haan & Neretina (2020) find that systematic risk, as measured by the beta of a bank's stock, is reduced following stress test disclosures. Based on interviews with current and former bankers and supervisors, Kohn & Liang (2019) conclude that banks have improved their risk management and capital planning as a result of the US stress test regime, largely due to the public disclosure of the Federal Reserve's qualitative review of internal processes. These conclusions echo findings about the impact of public disclosure by the Occupational Safety and Health Administration (OSHA) of workplace safety violations and fines, which resulted in reduced risk not only at the firms in question but also at other unrelated facilities (Johnson 2020).

3.4. Supervisory Incentives and Outcomes

A final strand of the economics literature on supervision considers how the incentives of supervisors at both the institutional and individual levels affect outcomes. At the individual level, this literature focuses on the delegated monitoring problem and the concept of regulatory or supervisory capture, where for a variety of posited reasons, individual supervisors are assumed to adopt the perspective and objectives of the supervised bank, rather than those of the public. At the level of a supervisory agency, the literature considers questions such as whether bank supervision and regulation should be done by a central bank or by a separate supervisory authority and how supervisory responsibility should be distributed between local and national or supranational supervisors.[9] This literature is relevant in the United States, which has a dual banking system of licensing, regulation,

[9]A related body of work discusses the optimal division of responsibilities among the deposit insurer, the central bank, and a stand-alone supervisory agency. For example, Kahn & Santos (2005) argue that there are advantages to investing the deposit insurer with supervisory authority but that there are trade-offs in housing the lender of last resort and deposit insurance function in the same agency. These trade-offs are complicated if there

and supervision by both state and federal authorities, and in Europe, especially since the creation in 2014 of the SSM for large banks operating across borders within the European Union. The advent of macroprudential bank regulation following the global financial crisis of 2008 also led to renewed discussion of the links between financial regulation and supervision and the monetary policy authority.

3.4.1. Supervision and central banking. A long-standing literature examines the question of whether banking regulation and supervision should be done by the central bank or by a separate agency. The role of asymmetric information and the role of supervisors in generating information about banks' true underlying condition again play important roles in this literature. As summarized by Masciandaro & Quintyn (2016), the advantages of having the central bank conduct supervision include that (*a*) the central bank may have better information about the economic and financial market conditions affecting the banking industry, (*b*) combining the information insights from supervising banks with information about the economy generated as part of the monetary policy process can improve both supervision and monetary policy, (*c*) there are potential efficiencies to having liquidity provision (lender of last resort) and supervision housed in the same entity, and (*d*) central banks may have a human capital advantage, since their staffs are exposed to a wider range of issues and perspectives. On the one hand, supervisory data may be informative about financial conditions and macroprudential policies enacted by monetary authorities [e.g., the BIS (2020) summary of the impact of macroprudential policies made use of cross-country supervisory data]. On the other hand, combining responsibility for supervision and monetary policy in a single agency may create conflicts between the safety and soundness goals of supervision and the objectives of monetary policy, if monetary policy actions have potential negative effects on banks. More broadly, combining the activities could create public concerns about centralization of power in a single agency that could threaten the independence of the central bank and its monetary policy authority.

Empirical evidence on the impact of central banks as supervisors on the health and performance of banks is mixed. For instance, Dincer & Eichengreen (2012) find that bank risk, as measured by nonperforming loans, is lower in countries where the supervisor is the central bank, though credit provision may also be lower. In contrast, Barth et al. (2002) find that nonperforming loans are higher in countries where the central bank is the supervisor but that the structure of supervision has little impact on bank profitability. Fraccaroli (2019) finds that bank risk is unrelated to whether the central bank is involved in supervision but that nonperforming loans are lower when supervisory authority is shared between the central bank and a separate supervisory agency. The paper attributes lower banking sector risk under the shared supervision approach to increased barriers and coordination costs of supervisory capture when supervisory authority is spread across multiple agencies. In terms of trade-offs with monetary policy objectives, Ampudia et al. (2019) find that in countries where the central bank is the supervisor, credit booms are less likely to become banking crises and that this stability does not come at the cost of slower GDP growth or larger deviations from inflation targets.

3.4.2. Local and national/supranational supervisors. The question of shared supervisory responsibility has also been examined in the context of supervising large banking companies that operate across multiple jurisdictions. The key idea in the theoretical literature on this topic is a trade-off between local supervisors having better information about the true condition of a bank

is asymmetric information, as supervisory agencies can have disincentives to sharing information with one another.

relative to a more distant national or supranational supervisor and the incentives of local supervisors to allow troubled banks to continue to operate, due to factors such as career concerns or concerns about the impact of bank closure on the local economy. National or supranational supervisors, in contrast, may be more willing to liquidate a troubled bank or take more stringent supervisory actions (Carletti, Dell'Ariccia & Marquez 2020; Repullo 2018). The optimal balance between local and national/supranational authority depends on the relative strengths of these two sets of factors. Calzolari, Colliard & Loranth (2019) note that this problem is further complicated because banks' corporate structures—in particular, whether to operate cross-jurisdiction via branches or subsidiaries—are endogenous and banks can change their corporate structures in ways that offset coordination gains from coordinated or supranational supervision.

The empirical literature generally supports the idea that supervision by national or supranational authorities results in more stringent assessments of banks and lower banking sector risk. For instance, Altavilla et al. (2020) find that supranational supervision in the Euro area is associated with reduced credit supply to riskier borrowers and increased credit supply to safer firms and that these effects are stronger in countries experiencing greater degrees of economic stress. They attribute these findings to superior human capital at supranational supervisors rather than to regulatory capture of local supervisors. Haselmann, Singla & Vig (2019) find that banks subject to the SSM evaluate loan risk more stringently (e.g., apply higher risk weights). Working with a global sample of banks, Beck, Silva-Buston & Wagner (2022) find that cross-border supervisory cooperation enhances bank stability. Finally, in the US setting, Agarwal et al. (2014) find that federal supervisors are systematically more stringent than state supervisors in assigning supervisory ratings, attributing the differences to greater concern by state regulators about local economic conditions. They find no evidence of supervisor self-interest (e.g., career concerns) driving the results.

3.4.3. Supervisors' incentives. An important thread that runs through this literature concerns supervisors' incentives to impose corrective actions on supervised banks. One idea that repeatedly surfaces is that individual supervisors may be motivated by concerns other than the safety and soundness of the banking system and the banks they supervise or that they place excessive weight on near-term economic conditions in their local jurisdictions. Quintyn & Taylor (2007) argue that the lack of a measurable objective for bank supervision complicates insulating supervisors from political pressure, much of which could be focused on supporting local banks or local economic activity.

A separate strand of the literature focuses on possible conflicts arising from supervisors' career concerns. The key idea in this literature is that in choosing whether to take disciplinary actions against banks, supervisors will be influenced not only by the public good but also by their private career goals. In particular, supervisors may hesitate to discipline a bank if they believe that problems at the bank will not become public until after the supervisor has moved on to another job, most likely in the private sector (Kane 1989a,b). Boot & Thakor (1993) model the delegated monitoring problem of the supervisor, focusing on bank closures and offering implications for optimal supervision, including appointment of supervisors, the extent of supervisory discretion relative to regulation, and emphasizing the importance of additional public information about banks that may help additional monitoring by investors. An extreme form of this concern is the idea that a supervisor would deliberately give favorable assessments or prevent disciplinary actions from being taken as a way of currying favor and a future job at the bank (quid pro quo). An alternative version is that a supervisor who has worked extensively with a bank may unconsciously begin to adopt the perspective of the bank, rather than the perspective of the public good.

Both forms of this concern might be more acute within a revolving door job market in which supervisors become bankers and bankers become supervisors. For instance, Kane (1989b) argues

that supervisory forbearance driven by career concerns played an important role in the savings and loan crisis during the 1980s. More recent work by Lucca, Seru & Trebbi (2014) uses publicly available data to track the careers of supervisors into and out of the private sector. They find that both flows into and flows out of the banking industry are strongest during periods of high supervisory enforcement activity, which they interpret as being more consistent with the idea that supervisors and banks are learning from one another (regulatory schooling) than with a quid pro quo view. This finding is consistent with the work on local versus national or supranational supervisors, which also finds little evidence of the capture of local supervisors (Agarwal et al. 2014; Altavilla et al. 2020).

4. OPEN QUESTIONS: DIRECTIONS FOR FUTURE RESEARCH

As this review suggests, a growing body of literature examines the role and impact of bank supervision. The key innovation in all this work is the recognition of the difference between bank supervision and bank regulation. Earlier literature has examined the motivations, objectives, efficiency, and effectiveness of regulation, but supervision involves practices and outcomes that have yet to be fully addressed—and carefully distinguishing between the two is particularly valuable.

In particular, the theoretical literature examining the motivation for supervision as a distinct activity from regulation has considerable room to grow. The emerging literature explores motivations related to information acquisition—in particular, the distinction between hard and soft information. This observation has the potential to provide insight into important questions about the design and implementation of bank supervision, including how supervision should interact with regulation, the role of qualitative assessments and judgment in fostering the safety and soundness of individual banks and of the banking system, and the appropriate balance between flexibility and precommitment in supervisory assessments.

Acquisition of soft information is not the only motivation for supervision. Banks face considerable uncertainty about future outcomes through their exposure to a variety of microeconomic (individual borrower) and macroeconomic (business cycle) risks that resolve only over time. In that context, how do we think about principles-based versus rules-based approaches to supervisory actions? How does uncertainty about future outcomes affect the costs and benefits of supervisory judgment and supervisory discretion? The economics literature is only just beginning to address these questions. Developing a coherent theory of supervision would help in assessing these and other important real world questions.

The empirical literature assessing the impact of supervision is more substantial, with initial results suggesting that supervision reduces risk at supervised banks without meaningfully reducing profitability. The evidence is more mixed about whether more intensive supervision reduces credit supply. The channels through which supervision achieves these results have yet to be fully explored, however. If supervision results in reduced risk with little impact on profitability, why don't banks take these steps without supervisory intervention? Does supervision provide incentives for banks to invest in information technology and risk-management infrastructure that have large up-front costs but that facilitate better risk-return decisions? Are supervisors, who see a range of banks, fostering the spread of best practices across the industry? Are there internal governance problems that supervisors solve by increasing weight on the concerns of risk managers relative to the concerns of business managers, who might be more concerned with near-term profits? Understanding this last question is particularly important to understanding the role supervisors should play with respect to risks that may emerge over time horizons longer than managerial tenure, such as climate change.

A related body of work explores how supervisory incentives—at both individual and institutional levels—affect outcomes. Understanding the impact of supervisory incentives is critical in

any assessment of whether the goals of supervision are being met. The costs and benefits of the revolving door between supervisory agencies and the banking industry seems to be a particularly good area for further work. Lucca, Seru & Trebbi's (2014) suggestion of regulatory schooling is related to questions about the channels through which supervision works to improve the risk-return trade-off at supervised banks. Is one potential channel coming from the revolving door, which may foster learning best practices? Understanding how supervisors' career paths affect the quality and impact of supervision seems a fruitful area for additional empirical work.

The focus of this review has been on microprudential supervision—that is, the supervision of individual banks from a safety and soundness perspective. A growing literature explores macroprudential supervision, which focuses on the performance and stability of the financial sector to continue to provide critical intermediation and credit services over time.[10] Clearly, the safety and soundness of individual financial firms is related to the stability of the overall financial system and vice versa, but neither is a sufficient condition to ensure the other. How should macroprudential concerns affect the objectives, tools, and implementation of microprudential supervision? What role should macroprudential concerns play in tailoring of microprudential supervisory approaches for banks of different sizes, complexity, or geographic reach?

Finally, the literature focuses on bank closure as a primary tool of bank supervision, while restrictions on dividends and relaxation of regulation imposed in response to the coronavirus disease 2019 (COVID-19) pandemic imply a wider range of ways in which supervisory actions may affect bank outcomes. Additional work on how supervision elicits and encourages the creation of information and reactions to that information that mirror the suite of supervisory responses would be very valuable.

As with many other parts of the emerging literature on supervision, more theoretical and empirical work addressing these questions would support the improved design and implementation of both macroprudential and microprudential approaches to supervision. However, an important challenge for new work in these areas is that much of the information about supervisory activities and outcomes is confidential and accessible only to researchers inside the supervisory agencies. Still, there is large scope for academic economists to explore the theoretical underpinnings of supervision, just as they have explored theories of banking and bank regulation. And just as those theories have drawn from the broader economics literature on topics such as symmetric information, moral hazard, adverse selection, networks and network externalities, and incomplete contracting, further development of theories of supervision can draw from many of these same literatures. Having deeply grounded theories of supervision could help frame the growing body of empirical analysis and make it easier to assess whether current and future supervisor efforts are successful and whether supervisory resources are being well spent. Being able to answer such questions is important for the stability and productivity of the banking and financial system and thus of the broader economy.

DISCLOSURE STATEMENT

Both authors are employees of the Federal Reserve Bank of New York, which supervises banking institutions under delegated authority from the Federal Reserve Board. The authors are not aware of any other affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of New York or of the Federal Reserve System. An earlier version of this article, written by Beverly Hirtle, was circulated under

[10]For a description of macroprudential regulation, see Hanson, Kashyap & Stein (2011).

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