Disclosure Regulation in the Banking Industry: The Case of Exiting the SEC Disclosure System[1]

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Abstract
I examine the effect of exiting the SEC disclosure system on bank productivity by exploiting a threshold-based policy of Section 601 of the JOBS Act. This deregulation made it easier for bank holding companies (BHCs) to deregister with the SEC and thereby exit the SEC disclosure system. Using a fuzzy regression discontinuity design, I estimate that the marginal BHC exit from the SEC disclosure system leads to an economically significant increase in their bank subsidiaries' liquidity creation. This increase in liquidity creation is driven by both attracting more deposits and funding more illiquid assets. My evidence supports the argument that the opacity reduces the cost of liquidity transformation, consistent with the predictions of Dang, Gorton, Holmstrom, and Ordonez (2017).

JEL codes: E44; E51; G21; G28; G38; K22; K23; L51; M41; M48; N22; N42

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1. Introduction

The Securities Exchange Act of 1934 (hereafter "the Exchange Act"), which established the Securities and Exchange Commission (SEC), is the most expansive securities regulation enacted in the history of the United States. The SEC's primary mandate has since been to promote transparency through disclosure (Paredes 2013). The SEC disclosure system is often viewed as the cornerstone of U.S. capital markets (Sutton 1997; Bushee and Leuz 2005). Prior work has investigated the economic consequences of disclosure regulation (or deregulation) by the SEC (e.g., Bushee and Leuz 2005; Leuz, Triantis, and Wang 2008; Doidge, Karolyi, and Stulz 2010; Fernandes, Lel, and Miller, 2010). However, despite policy debate concerning the effects of banks' disclosures on the development and stability of the financial system (Acharya and Ryan 2016) and the SEC's recent regulatory efforts to modernize disclosures for banking registrants (SEC 2020), we know little about the real effects of the SEC disclosure system in the banking industry.

Analyzing the implications of the SEC disclosure regulation for banking institutions entails many challenges. First, as described in Spatt (2010), banking institutions with a class of securities registered under the Exchange Act are subject to regulations by two types of regulators: the *financial stability regulators* such as the Federal Reserve, OCC, or FDIC and the *market integrity regulator*—the SEC. Although these two sets of regulators' disclosure requirements have significant overlap and some conflicts (Spatt 2010), many banking institutions are exposed to both systems. This dual reporting mandate makes the effects of SEC disclosure requirements difficult to distinguish from those of the financial stability regulators' requirements. Second, significant changes in the SEC disclosure system, such as the enactment of the Sarbanes-Oxley Act (SOX) in

2002 and the adoption of Rule 12h-6[2] in 2007, typically affect firms across industries, which makes it difficult to disentangle concurrent forces on banking outcomes. Finally, as policymakers react to crises or lobbying efforts by adopting new policies, causality can run in both directions. These empirical challenges may help explain the lack of causal evidence regarding the effects of the SEC disclosure regulation (Leuz and Wysocki 2016).

To address these empirical challenges, I exploit a threshold-based policy of Section 601 of the 2012 Jumpstart Our Business Startups Act (JOBS Act) as a quasi-natural experiment to identify the impact of exiting the SEC disclosure system on liquidity creation by U.S. banks. Section 601 of the JOBS Act modified the threshold for the SEC deregistrations for bank holding companies (BHCs) registered under Section 12(g) of the Exchange Act from 300 to 1,200 shareholders of record (SoR). This episode of disclosure deregulation made it easier for BHCs to deregister with the SEC and, as a result, exit the SEC disclosure system. Exiting BHCs remain subject to public financial reporting to prudential regulators, but they avoid requirements concerning proxy regulation, insider trading, and SOX compliance. They also no longer need to file SEC-specific filings and avoid SEC monitoring. Related work has shown that these disclosure requirements and enforcement lead to higher bank transparency. For example, Bens, Cheng, and Neamtiu (2016) suggest that the SEC's monitoring and enforcement of disclosure requirements can reduce market participants' uncertainty about fair values. Bischof, Laux, and Leuz (2020) state that "8-K filings

[2] The SEC commissioner Paul S. Atkins announced on March 21, 2007 the approval of Rule 12h-6 which makes it considerably easier for foreign firms to deregister with the SEC. Rule 12h-6 is considered the first significant deregulation of U.S. disclosure requirements since the passage of the Exchange Act (Fernandes, Lel, and Miller 2010). Prior to the implementation of Rule 12h-6, a U.S.-registered foreign firm can only deregister a class of its securities if that class is held by fewer than 300 U.S. record holders, or fewer than 500 U.S. record holders for foreign firms with less than $10 million in assets. Rule 12h-6 establishes a non-record holder benchmark: average daily trading volume. The foreign firm can, regardless of the number of U.S. securities holders or its asset size, terminate its registration and reporting obligations if the U.S. average daily trading volume has been no greater than 5% of the worldwide average daily trading volume of the same class of securities during the previous 12-month period.

are a natural place for banks to provide forward-looking loan loss disclosures." Therefore, exiting the SEC disclosure system is likely to increase bank opacity and make it more costly for outsiders to evaluate the future performance of bank assets. Moreover, because Section 601 of the JOBS Act imposed an arbitrary and unanticipated deregistration threshold (Mitts 2014), I can utilize a fuzzy regression discontinuity (RD) design to estimate the effect of the marginal deregistering bank. In my empirical design, BHCs with less than 1,200 SoR and comply with the Act by deregistering from the SEC constitute a treatment group, and BHCs with more than 1,200 SoR constitute a control group. Comparing outcomes between these two groups allows me to identify the causal effects of BHCs' exit from the SEC disclosure system.

Liquidity creation is a key contribution of banks to the broader economy (Bhattacharya and Thakor 1993) and arguably the best comprehensive measure of bank output (Berger and Bouwman 2009; Berger, Boubakri, Guedhami, and Li 2019). Banks create liquidity on the balance sheet by financing relatively illiquid assets such as business loans with relatively liquid liabilities such as transaction deposits (Bryant 1980; Diamond and Dybvig 1983). They can also create liquidity off the balance sheet by extending loan commitments or lines of credit to businesses (Holmstrom and Tirole 1998; Kashyap, Rajan, and Stein 2002). Not only does liquidity creation constitute an essential role of banks in theory (Bhattacharya and Thakor, 1993; Diamond and Rajan, 2001), but it also has significant real economic effects and financial stability implications (Berger and Sedunov 2017; Berger et al. 2019).

Meanwhile, as reaffirmed by the former SEC commissioner Michael Piwowar at the 2018 Symposium for Federal Judges on the Economics of Corporate & Securities Law, the SEC's statutory mission is threefold: "(i) protecting investors, (ii) maintaining fair, orderly, and efficient markets, and (iii) facilitating capital formation."[3] In general, capital formation refers to the increase in the stock of capital goods in an economy and requires capital to be invested in productive assets (Aguilar 2012). According to Zeidel, Negri, and Turner (2016), Congress created the JOBS Act to promote capital formation to "grow businesses, create jobs, and spur economic activity." Congress and the SEC have been monitoring and updating the JOBS Act rules to achieve the goal. Previous studies mostly examine how the JOBS Act provisions influence economic activities in public and private capital markets (Dambra, Field, and Gustafson 2015; Dharmapala and Khanna 2016). However, banking institutions can promote capital formation by encouraging saving and moving resources to productive uses through liquidity creation. Hence, to gain a thorough understanding of whether the SEC-related titles of the JOBS Act are conducive to capital formation, we need to understand the impact of exiting the SEC disclosure system on bank liquidity creation.

The theoretical literature offers two opposing perspectives on the impact of exiting the SEC disclosure system on bank liquidity creation. One view concerns the positive effects of bank transparency. Since exiting the SEC disclosure system makes banking institutions less transparent, bank managers may take advantage of the reduced external discipline and devote less effort to screening and monitoring firms (Nier and Baumann 2006; Shleifer 2011). In this sense, exiting the SEC disclosure should compromise bank productivity and credit allocation, leading to less liquidity creation. More recently, Dang, Gorton, Holmstrom, and Ordonez (2017) suggest a mechanism through which bank opacity boosts liquidity creation. According to Dang et al. (2017), "price discovery is not conducive to producing securities that have a stable value and can be used for transactions and storing value." Opacity reduces the cost of liquidity transformation. When it is more costly for depositors to acquire information to evaluate the future performance of bank

[3] https://www.sec.gov/news/speech/speech-piwowar-041318

assets, banks' ability as money producers are enhanced, and deposits, particularly uninsured ones, become more attractive. In this regard, opacity induced by banks' exit from the SEC disclosure system should increase banks' ability to fund growth opportunities in illiquid assets, leading to more liquidity creation. My evidence provides an empirical input to this debate.

BHCs under Section 12(g) with more than 300 but fewer than 1200 SoR became qualified to file for SEC deregistrations to exit the SEC disclosure system after the enactment of the JOBS Act. Hence, the probability of exiting the SEC disclosure system should increase discontinuously just below the 1200 threshold. I start my analysis by showing that relative to banks whose holding companies are just above the 1200 threshold, there is a 13 percentage point increase in the probability of exiting the SEC disclosure system for banks whose BHCs are just below the threshold immediately preceding the JOBS Act. In the meantime, the somewhat arbitrary nature of the threshold suggests that being just above or below the threshold right before the enactment of the JOBS Act should be locally random. Therefore, any discontinuous changes in bank liquidity creation can be attributed to the discontinuity in the probability of exiting the SEC disclosure system, which enables me to implement a fuzzy RD design to estimate the causal impact of BHCs' exit from the SEC disclosure system (Imbens and Lemieux 2008; Roberts and Whited 2013; Malenko and Shen 2016).

My fuzzy RD estimation shows a strong impact of exiting the SEC disclosure system on bank liquidity creation. I find that relative to remaining SEC registrants, exiting the SEC disclosure system leads to a 20 percentage point increase in bank subsidiaries' normalized liquidity creation. The average bank size in my RD bandwidth is $1.813 billion, and the average quarterly liquidity creation $724 million. As suggested by my RD estimate, a BHC exit from the SEC disclosure system would lead to a $362 million increase in quarterly liquidity creation for an average bank, which is economically significant. My main specification is a nonparametric local linear regression estimated on the optimal bandwidth minimizing the asymptotic mean squared error (MSE). My estimates are robust to covariate adjustment, higher-order polynomial functions, alternative liquidity creation measures, and multiple bandwidths. I then show that those exiting banks attract more deposits, particularly the uninsured ones,[4] and fund more illiquid assets, which is consistent with the theoretical predictions of Dang et al. (2017). These results should not be interpreted as evidence against the monitoring benefits of bank transparency. They imply that the benefits from the reduction in liquidity transformation costs might be more prominent. Using multiple banks' credit risk measures in previous research (Cantrell, McInnis, and Yust 2014; Balakrishnan and Ertan 2018), I also investigate the effects of exiting the SEC disclosure system on banks' asset quality. I do not find evidence supporting that BHCs' exits from the SEC disclosure system significantly compromise their bank subsidiaries' asset quality.

The JOBS Act provision aims to help smaller companies by reducing the regulatory burden (Knight 2016). Both anecdotal and empirical evidence suggests that exiting the SEC disclosure system leads to cost savings (Mitts 2014). Suppose the marginal cost savings due to escaping compliance burden under the SEC disclosure system are passed on to depositors. In that case, we should expect exiting banks whose BHCs are just below the 1200 threshold to exhibit higher deposit rates than banks whose BHCs are just above the threshold. Higher deposit rates might be the alternative economic channel through which BHC exits from the SEC disclosure system positively affect bank subsidiaries' deposits and illiquid assets, and in turn, overall liquidity

[4] Following Chen, Goldstein, Huang, and Vashishtha (2020), I define the uninsured deposits in this paper as the sum of the amount deposited in accounts of more than $250,000.

creation. I find some evidence supporting this economic mechanism. I also document the positive effects of exiting the SEC disclosure system on bank deposits, illiquid assets, and liquidity creation persist after controlling for deposit rates and interest income, which further corroborates the economic mechanism proposed by Dang et al. (2017).

The identifying assumption of my fuzzy RD design is local continuity, which indicates that whether a bank falls just below or above the threshold is locally random. I perform tests to verify the assumption. First, I show that the density of the running variable is smooth around the threshold by conducting the McCrary (2008) density test, which alleviates the concern that BHCs may manipulate their SoR in a way that pushes them just below the 1200 threshold before the enactment of the JOBS Act. Second, I show that the distribution of various bank characteristics, especially those related to liquidity creation, is smooth around the threshold, suggesting that banks around the JOBS Act threshold are largely comparable. Third, I conduct RD tests in the pre-JOBS Act period and do not find significant discontinuity in bank liquidity creation around the 1200 SoR threshold. This lack of discontinuity suggests that pre-existing differences do not drive the discontinuity in bank liquidity creation in my primary sample. Fourth, I consider placebo cutoffs and show continuity in both the probability of exiting the SEC disclosure system and bank liquidity creation around these cutoffs.

This study is related to several strands of literature. Most directly, this study adds to the extensive research on the economic consequences of SEC regulations (or deregulations). Research on the establishment of the SEC finds mixed results regarding its effects on firms (Stigler 1964; Benston 1973; Jarrell 1981; Chow 1983; Binz and Graham 2020). Over the past decade, most research in this area has treated each SEC regulation in isolation and emphasized the impact of individual rules (Leuz and Wysocki 2016). Studies investigating firms' SEC deregistrations show important associations between firm characteristics and deregistration decisions and provide inferences regarding why firms exit the SEC disclosure system (e.g., Leuz et al. 2008, Doidge et al. 2008). However, these research settings do not permit identifying the causal effects of firms' exit from the SEC disclosure system due to the selection concerns. Mitts (2014) first exploits Section 601 of the JOBS Act's threshold-based policy to study whether the SEC deregistrations benefit community banks by lowering compliance expenses. My paper expands the SEC deregistration sample in Mitts (2014). It uses nonparametric methods in a fuzzy RD design to identify the causal link between banking institutions' exit from the SEC disclosure system and liquidity creation. My empirical evidence suggests that the positive effects on bank liquidity creation are driven by not only the cost-savings from BHCs' escape from the SEC compliance burden, but also the reduced cost of liquidity transformation afforded by increased opacity concerning the future performance of bank assets.

This study contributes to the literature on the real effects of disclosure regulation and transparency in the banking sector (Beatty and Liao 2014). This study answers the call by Acharya and Ryan (2016) to contribute evidence to the debate regarding bank opacity and financial stability. Recent studies look at how changes in regulatory regimes that improve bank transparency affect the stability of banks. For example, Granja (2018) finds that the imposition of disclosure regulation for the state banks reduces state bank failures in the U.S. National Banking Era, and Balakrishnan and Ertan (2018) document that higher financial reporting frequency leads to higher loan portfolio quality. Both support the common view in the literature that "bank opacity impairs stability." Chen, Goldstein, Huang, and Vashishtha (2020) investigate the link between bank transparency and deposit flows and show "uninsured depositors of more transparent banks are significantly more sensitive to their banks' performance." Chen et al.'s (2020) results suggest that bank transparency can interfere with banks' liquidity creation. I further add to this literature by providing causal evidence regarding the positive effect of bank opacity induced by BHCs' exits from the SEC disclosure system on bank subsidiaries' deposits and overall liquidity creation. Both Chen et al. (2020) and this study are consistent with the opposing view raised by Dang et al. (2017) and suggest that bank opacity enhances deposit stability. Meanwhile, my empirical setting allows me to address the dual reporting systems facing most modern banks characterized by Spatt (2010). I find no evidence suggesting exiting the disclosure system by market integrity regulator comprises banks' asset quality to which the financial stability regulators pay close attention.

My paper also adds to the literature on bank liquidity creation. Motivated by Berger and Bouwman (2009) proposing comprehensive measures of bank liquidity creation, various studies have investigated the determinants of bank liquidity creation such as regulatory capital (Horváth, Seidler, and Weill 2014), bank competition (Horváth et al. 2016; Jiang, Levine, and Lin 2019), monetary policy (Berger and Bouwman, 2017), and bank governance (Diaz and Huang 2017; Huang, Chen, and Chen 2018). Moreover, Bowe, Kolokolova, and Michalski (2017) investigate how major policy developments in the aftermath of the financial crisis affect the liquidity creation by U.S. BHCs, while Nguyen, Ahmed, Chevapatrakul, and Onali (2020) examine the impact of Federal Reserves' stress tests on U.S. bank liquidity creation. However, despite the theoretical debate concerning bank opacity and bank liquidity creation and the important implications of SEC regulation on banks' accounting practices, to the best of my knowledge, there is no previous empirical study addressing the link between the SEC disclosure regulation and bank liquidity creation.

2. Institutional Background and Literature

2.1 BANK HOLDING COMPANIES AND THE SEC DISCLOSURE SYSTEM

According to Section 12(i) of the Securities Exchange Act of 1934, the prudential regulators of banking institutions are granted the authority to administer many Exchange Act provisions (Malloy 1990). As described in the most updated report on the U.S. financial regulatory framework from the Congressional Research Service[5], the Board of Governors of the Federal Reserve System regulates bank holding companies (BHC) at the holding company level as a prudential regulator, ensuring BHCs' compliance with Exchange Act. However, BHCs are subjective to very similar securities laws applying to other firms. Before the enactment of the JOBS Act, if a BHC's total assets exceeded $10 million, it must register a class of securities under Section 12(g) of the Exchange Act once its securities are held of record by 500 or more persons. Once this BHC was registered with the SEC, it would enter the SEC disclosure system and not be allowed to deregister and exit the system unless its SoR dropped below 300. Leuz et al. (2008) offer a thorough discussion regarding the two types of transactions a company can conduct to reduce its SoR number. According to Leuz et al. (2008), a company could either orchestrate a reverse stock split involving squeezing out fractional shareholders subsequently or issue a tender offer giving shareholders the option to sell their shares back to the company. Both types of transactions require filing Schedule 13E-3 with the SEC. In the case of a reverse stock split, a company must also go through the SEC review and solicit shareholder consent. There is "no guarantee that the number of record holders will fall below" a certain threshold in the case of a tender offer. In a sense, Section

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[5] https://fas.org/sgp/crs/misc/R44918.pdf

12 (g) makes the SEC deregistration eligibility dependent on a factor mostly out of a company's control.

On April 5, 2012, President Obama signed the JOBS Act into law. Title V and Title VI of the JOBS Act amended Section 12(g) of the Exchange Act. Notably, Section 601 of the JOBS Act increased the threshold for BHCs' SEC deregistration from 300 to 1,200. Therefore, BHCs with SoR above 300 but below 1200 were qualified to deregister with the SEC from then on. Section 601 made it easier for smaller BHCs to deregister and thereby exit the SEC disclosure system.

Previous research on SEC deregistrations (or exits from the SEC disclosure system) discusses the causes and consequences of firms' deregistration decisions. The passage of the Sarbanes-Oxley Act of 2002 (SOX) led to a substantial increase in regulatory compliance costs since it adds extensive internal control obligations for firms with over $75 million public float via Section 404 of SOX (Zhang 2007; Iliev 2010). Leuz et al. (2008) examine a comprehensive sample of SEC deregistrations filed by U.S. firms in which companies exit the SEC disclosure system but continue to trade publicly and conclude that the documented spike in leaving the SEC disclosure system is mainly attributable to the enactment of SOX. Marosi and Massound (2008) also investigate SEC deregistrations and suggest "the cost of regulatory compliance is a driving force" behind the deregistrations. Both studies show significant associations between firm characteristics and the deregistration decisions and suggest adverse effects of deregistration events on shareholders. Researchers also attempted to evaluate the impact of Rule 12h-6 that makes it easier for foreign firms to deregister with the SEC and investigate the deregistration cases under the new rule. Fernandes et al. (2010) note the adverse market reaction to the SEC announcement that firms from countries with weak disclosure and governance regimes could more easily exit the SEC disclosure system. By examining the SEC deregistrations before and after the adoption of Rule 12h-6, Doidge et al. (2010) provide strong evidence that the market reacts negatively to deregistration announcements in general, and firms tend to escape the SEC disclosure system when "they do not foresee the need to raise funds externally." This stream of literature highlights the trade-off between costs and benefits of compliance with the SEC disclosure regulations and provide vital input regarding the capital market consequences of events related to SEC deregistrations. However, their settings do not permit identifying causal effects of exiting the SEC disclosure system due to the self-selection concerns.

Furthermore, those previous studies focus their investigations on nonbank firms' exits from the SEC disclosure system. Spatt (2010) characterizes the two types of regulators regulating banking institutions with a class of securities registered under the Exchange Act: the *financial stability regulators* such as the Federal Reserve, OCC, or FDIC and the *market integrity regulator*—the SEC. Unlike nonbank firms, BHCs are still subject to continued public financial reporting to their financial stability regulator—the Federal Reserve after they effectively exit the SEC disclosure system. The financial statement required by the Federal Reserve, such as FR Y-9C and FR Y-9SP, collects basic financial data from a BHC under regulation in the form of a balance sheet, an income statement, and detailed supporting schedules, including a schedule of the BHC's off balance-sheet items. The question then arises: what information is lost after BHCs' exits from the SEC disclosure system?

2.2 WHAT INFORMATION IS LOST AFTER BANK HOLDING COMPANIES' EXITS FROM THE SEC DISCLOSURE SYSTEM?

Although the historically more common view in the academic literature is that information asymmetry between bank managers and depositors is undesirable (Beatty and Liao 2014), the idea that it may be optimal to hide information is not new. Hirshleifer (1971) first shows that the early revelation of precise information can destroy future insurance opportunities. Dang et al. (2017) build on Hirshleifer's (1971) insights to explain bank opaqueness. In their model, banks are unique in creating money-like securities to be used as a medium of exchange.[6] Those money-like securities are backed by risky assets such as illiquid loans. To make informed investment decisions, banks acquire information regarding those risky assets to evaluate those assets' future performance. However, bank opacity allows banks to hide that same information to keep those securities from fluctuating in value. In this sense, bank opacity enhances banks' ability to create safe debt and reduces banks' liquidity transformation costs. Dang et al. (2017) model bank transparency as the ease with which depositors can acquire information about the future performance of bank assets.

After a BHC registered under Section 12 (g) of the Exchange Act effectively deregister with the SEC and exit the SEC disclosure system, it escapes requirements concerning proxy regulation, insider trading, and SOX compliance. Meanwhile, it no longer needs to file SEC-specific filings such as 10-K and 8-K and avoids SEC monitoring. As Spatt (2010) pointed out, the SEC is not primarily concerned with ensuring the safety and soundness of the banking institutions it regulates as the financial stability regulators. The SEC is a market integrity regulator that promulgate regulations serving the mission of "protecting investors, maintaining fair, orderly, and efficient markets, and facilitating capital formation."[7] According to the Congressional

[6] See also Gorton and Pennacchi (1990).
[7] SEC, "What We Do," at https://www.sec.gov/about/what-we-do

Research Service's analysis of the U.S. financial regulatory framework, this distinction of regulatory approach largely arises from "the absence of government guarantees for securities investors comparable to deposit insurance." Hence, the SEC mandates more public disclosure by its BHC registrant than the Federal Reserve to promote external discipline over banking operations. Although both regulatory agents demand periodic financial statements, the SEC specific filings contain more information than the Call reports filed through the prudential regulatory system. For example, as Bishof et al. (2020) stated, banks usually provide forward-looking loan loss disclosures in their SEC 8-K filings. Such information helps outsiders better evaluate the future performance of bank assets.

Meanwhile, the SEC requires timely disclosures concerning corporate governance and insider trading. For instance, the SEC's BHC registrants have to file a Section 16 filing every time a corporate insider trades stock. The Exchange Act defines corporate insiders as those officers, directors, and other stockholders who own 10 percent or more of any equity class of securities (Spargoli and Upper 2018). Spargoli and Upper (2018) investigate the U.S. bank insider transactions and find that stock purchases by bank insiders yield abnormal profits and predict future stock returns, though less than those by nonbank insiders. Likely, those insider trading disclosures can inform outsiders of information about banks' prospects.

Furthermore, the Sarbanes-Oxley Act of 2002 heightened the SEC compliance requirements regarding registrants' board composition, auditor independence, and internal controls. For example, Section 404 of the Act states that all annual financial reports must include an internal control report. The report must declare that management is responsible for "an adequate internal control structure, an assessment of the effectiveness of the internal control structure and any shortcomings in the controls."[8] All such requirements and corresponding disclosure provide information regarding banks' governance and control over credit risk management, which can help outsides make predictions regarding bank assets' future performance. Overall, based on what we know about the information regarding BHCs after their exits from the SEC disclosure system, we can argue that exiting the SEC disclosure system increases bank opacity as modeled by Dang et al. (2017).

3. Methodology and Data

3.1 IDENTIFICATION STRATEGY

The primary empirical strategy for identifying the effect of exiting the SEC disclosure system on bank liquidity creation is a fuzzy RD design. Section 601 of the JOBS Act modified the threshold for BHCs to terminate registration under Section 12(g) of the Exchange Act from 300 to 1,200 SoR. As shown in Figure 1, this threshold change leads to a discrete jump in the probability of exiting the SEC disclosure system for the subsidiaries of BHCs with SoR between 300 and 1,200. I, therefore, implement the fuzzy RD design by instrumenting an exit from the SEC disclosure system with an indicator variable $BelowThreshold$, which equals one if a bank's holding company has fewer than 1200 SoR right before the enactment of the JOBS Act, and zero otherwise (Imbens and Lemieux 2008; Roberts and Whited 2012). Formally, for bank i, $BelowThreshold_i$ is given by

[8] See AuditBoard's overview of SOX compliance requirements. https://www.auditboard.com/sox-compliance/#:~:text=Section%20404%20states%20that%20all,any%20shortcomings%20in%20the%20controls.

$$BelowThreshold_i = \begin{cases} 1 \text{ if } NSoR_i \leq 1200, \\ 0 \text{ if } NSoR_i > 1200, \end{cases} \quad (1)$$

where $NSoR_i$ is the running variable defined as the holding company of bank i's the number of SoR right before the enactment of the JOBS Act on April 5, 2012.

The identifying assumption of the RD model is local continuity, which implies that banks around the 1200 SoR threshold should be comparable so that the relationship between bank liquidity creation and the variable $NSoR$ would be smooth around the threshold in the absence of differential SEC reporting statuses (Hahn, Todd, and Van Der Klaauw 2001; Malenko and Shen 2016). This assumption is plausible because the 1200 SoR threshold was somewhat arbitrary based on the JOBS Act's legislative history (Mitts 2014). American Banker Association (ABA) started to lobby for a higher SEC deregistration cutoff for banking institutions in 2008. ABA suggested an SoR threshold "between 900 and 1,800" in a comment letter on the SEC's proposed amendments to rules governing when a foreign private issuer may terminate registration under section 12(g) of the Exchange Act.[9] The 2011 Himes-Womack bill first proposes to raise the deregistration threshold for a bank holding company to 1,200 SoR and directs the Chief Economist and the Director of the Division of Corporation Finance of the SEC to conduct a cost-benefit analysis of shareholder registration thresholds. According to Mitts (2014), while a few banking institutions might have been aware of this proposed threshold, "it is unlikely many could have anticipated the precise number prior to the Acts' introduction." To verify the identifying assumption, I first perform the procedure proposed by McCrary (2008). This procedure tests for a discontinuity in the density of the running variable. Figure 2 plots the estimated density of variable

[9] https://www.sec.gov/rules/proposed/s71205/s71205-86.pdf

$NSoR$ using all sample banks and shows that the distribution is smooth. The McCrary (2008) t-statistic is -0.142040384, which indicates a failure to reject the hypothesis of no sorting at the threshold.[10] To further support the assumption, I also show the lack of discontinuity in major pre-JOBS Act determinants of bank liquidity creation around the 1200 SoR threshold in Figure 3.

I conduct the nonparametric two-stage least-squares (NP2SLS) estimation[11] procedure as follows:

$$ExitSEC = \alpha_0 + \alpha_1 BelowThreshold + f_1(NSoR_i - 1200) + BelowThreshold \cdot f_2(NSoR_i - 1200) + \alpha X + u,$$

$$\frac{CATFAT}{GTA} = \beta_0 + \beta_1 \widehat{ExitSEC} + g_1(NSoR_i - 1200) + BelowThreshold \cdot g_2(NSoR_i - 1200) + \beta X + \varepsilon, \quad (2)$$

where $CATFAT$ is the preferred measure of bank liquidity creation introduced in Section 3.2; GTA indicates gross total assets;[12] $ExitSEC$ is an indicator variable equal to one if the holding company of the bank has exited the SEC disclosure system and zero otherwise; $\widehat{ExitSEC}$ is the fitted value of $ExitSEC$ from the first-stage regression; f_1, f_2, g_1, and g_2 are continuous functions of $(NSoR_i - 1200)$; X is a vector of control variables. Following the standard practice in the literature (Imbens and Lemieux 2008; Malenko and Shen 2016). I estimate a linear probability model for the first

[10] To ensure that the choice of bandwidth does not drive the result, I performed the test repeatedly with arbitrary bandwidths. The results are given in the Appendix.

[11] Newey and Powell (2003) lay out the theoretical framework for nonparametric two-stage least squares. I choose the nonparametric model to allow flexible functional forms (Hahn, Todd, and Klaauw 2001; Lee and Lemieux 2010)

[12] As defined in Berger and Bouwman (2009), gross total assets are total assets plus the allowance for loan and lease losses and the allocated transfer risk reserve.

stage. The coefficient β_1 captures the local average treatment effects (LATE) of a BHC exit from the SEC disclosure system on bank liquidity creation.

My main specification is a nonparametric local linear regression, i.e., f and g are linear functions.[13] Following the practical considerations in Lee and Lemieux (2010) and Joshi (2020), I use a triangular kernel placing more weight on observations close to the threshold. Choosing a bandwidth for an RD design involves a critical trade-off: a broader bandwidth would increase the statistical power of the empirical tests. However, it would challenge the assumption that banks are comparable around the threshold as if they are randomly assigned to either side of the 1200 SoR threshold. Based on the minimization of mean square error (MSE), Imbens and Kalyanaraman (2012) propose an optimal bandwidth selection method. Their proposed method trades off the bias introduced by the selection of a broader bandwidth against "the reduction in the standard error attributable to a larger sample size" (Bessembinder, Hao, and Zheng 2020). Calonico, Cattaneo, and Titiunik (2014) introduce a nonparametric method refining the method proposed by Imbens and Kalyanaraman (2012), which identifies the optimal bandwidth and removes the estimated bias at the same time. In my main analysis, I adopt the MSE-optimal bandwidth selection procedure developed by Calonico, Cattaneo, and Titiunik (2014).

3.2 MEASURES OF BANK LIQUIDITY CREATION

I use four Berger and Bouwman (2009) measures of bank liquidity creation in this paper. Their bank liquidity creation measures are based on "the ease, cost, and time for customers to

[13] Imbens and Kalyanaraman (2012) view local non-parametric methods as attractive compared to methods based on glocal approaximations to the regression function "because local methods build in robustness by ensuring that observations with values for the running variable far away from the threshold do not affect the point estimate." Meanwhile, they argue that local linear methods are preferred because of "the attractive bias properties in estimating regression functions at the boundary (Fan and Gijbel 1992)" and "rate optimality (Porter 2003)."

obtain liquid funds from the bank, and the ease, cost, and time for banks to dispose of their obligations in order to meet these liquidity demands." Berger and Bouwman (2009) 's preferred measure is called "CATFAT," which is a category-based measure accounting for both on- and off-balance sheet liquidity creation.[14] To build CATFAT, Berger and Bouwman (2009) first classify each on- and off-balance sheet bank item as either liquid, semi-liquid, or illiquid. Table A2 in the appendix details how Berger and Bouwman (2009) classify bank activities. Second, they assign a weight to those classified bank items. According to the liquidity creation theory, they assign a weight of ½ to illiquid assets, liquid liabilities, and illiquid off-balance sheet items, a weight of -½ to liquid assets, illiquid liabilities, and liquid off-balance sheet items, and a weight of 0 to semi-liquid assets and liabilities. In this way, a bank creates $1 liquidity when it transforms $1 of illiquid assets or off-balance sheet items into liquid liabilities, such as when $1 of transaction deposits is used to finance $1 of commercial loans. Similarly, a bank destroys $1 liquidity when it transforms $1 of liquid assets or off-balance sheet items into $1 illiquid liabilities (plus equity), such as when $1 bank equity is used to finance $1 treasury securities. Finally, Berger and Bouwman (2009) compute CATFAT as follows:

$$CATFAT = LC\_A + LC\_L + LC\_OBS \tag{3}$$

where LC_A denotes the asset-side liquidity creation and LC_A=½ Illiquid Assets -½ Liquid Assets; LC_L represents the liability-side liquidity creation and LC_L=½ Liquid Liabilities -½ Illiquid Liabilities plus Equity; and LC_OBS indicates off-balance sheet liability creation and LC_OBS=½ Illiquid Off-Balance Sheet Items -½ Liquid Off-Balance Sheet Items.

[14] According to Berger and Bouwman (2009), "CAT" indicates that bank activities are classified based on category when consutructing the measure, while "FAT" is used to suggest that the measure includes off-balance sheet liquidity creation.

Berger and Bouwman (2009) also construct multiple other measures of bank liquidity creation. For example, they build an alternative measure, "CATFATLC30", that incorporate the frequency with which customers obtain liquid funds on off-balance sheet guarantees and exclude the off-balance sheet items to compute the on-balance sheet liquidity creation "CATNONFACT." Furthermore, they create CATFATSECADJ that is identical to CATFAT except that they use an alternative way of establishing which bank assets are securitizable. I use these measures and the components of CATFAT, which are LC_A, LC_L, and LC_OBS, to examine the robustness of my main findings.

3.3 DATA, SAMPLE, AND SUMMARY STATISTICS

My primary sample consists of bank subsidiaries of BHCs satisfying three criteria. First, the BHCs were registered under Section 12 (g) of the Securities Exchange Act of 1934 as of the enactment of the JOBS Act. Second, these BHCs must have more than 300 but fewer than 1900 SoR. Third, these BHCs either remain registered with the SEC throughout the sample period, which is from the third quarter of 2012 to the fourth quarter of 2016, or effectively exited the SEC disclosure system and continued to report financial performance to prudential regulators. The list of BHCs is hand-collected via the SEC EDGAR system based on the SIC code. Filing the SEC Form 15-12G allows firms for certification of deregistering a class of security under Section 12(g). Therefore, I identified cases of BHC exits from the SEC disclosure system based on the SEC Form 15-12G filings.[15] Following Mitts (2014), I exclude bank subsidiaries whose holding companies registered with the SEC under Section 12(b) since Section 601 of the JOBS Act did not affect them

[15] I thank Michael Ewens for sharing the SEC deregistration cases filed between April 5, 2012 to October 30, 2012, which helped me greatly in the early stage of the research.

and those whose holding companies were acquired, liquidated, or went private right after deregistration.[16]

As illustrated in Section 3.1, the number of reported SoR immediately preceding the enactment of the JOBS Act would be the ideal running variable for the RD design. Most SEC reporting companies report their number of SoR on their annual 10-K filings. Therefore, I construct the variable $NSoR$ by collecting the SoR number reported on the most recent 10-K filings of the BHCs before the enactment of the JOBS Act, which is the best possible approximation for the ideal running variable.[17] Figure A1 in the Appendix shows one excerpt of a 10-K filing containing SoR information. BHCs are linked to their bank subsidiaries based on the unique BHC ID and bank certificate number. The link between a BHC ID and a bank certificate number is identified via FDIC's Bank Data & Statistics Platform.[18]

I gather the bank subsidiaries' financial information from Wharton Research Data Services (WRDS). The Bank Regulatory Database on WRDS provides accounting data for U.S. commercial and savings banks based on banks' prudential regulatory forms filed for supervising purposes. Meanwhile, I download the quarterly bank liquidity creation data from Christa Bouwman's website. Besides providing the dollar amounts of bank liquidity creation as calculated in Section 3.3, this dataset offers each bank subsidiary's unique identifier RSSD9001, name, location, and a few general bank size measures including gross total assets (GTA), total deposits, and gross loans.

[16] Leuz, Triantis, and Wang (2008) thoroughly discuss the difference between going-dark and going-private. Going-private transactions usually involves infusion of new capital and additional legal complexities such as compliance with more stringent SEC regulations. To focus on testing the effects of exiting the SEC disclosure system, I do not consider going-private cases in this paper.

[17] Most of the BHCs report their number of SoR as of February or March in 2012, which offers excellent approximation for those BHCs' number of SoR immediately preceding the enactment of JOBS Act on April 5, 2012.

[18] The correspondence between a BHC ID and a bank certicate number can be retrieved through the following FDIC platform https://www7.fdic.gov/idasp/advSearchLanding.asp

My final sample for the fuzzy RD estimation contains 4,489 bank-quarter observations from 286 banks during 2012Q3-2016Q4. 77 out of 235 sample BHCs effectively filed for SEC deregistration to exit the SEC disclosure system during the sample period. 68 of them filed to deregister with SEC in 2012 and 2013, and 9 from 2014 to 2016. In total, 79 sample bank subsidiaries were affected by these BHC exits. Panel A of Table 1 presents descriptive statistics of the sample banks. The average bank liquidity creation, as measured by CATFAT, is $1.062 billion; the average bank assets are $2.183 billion, and the average bank deposits are $1.220 billion. Panel A also presents summary statistics for my subsamples of firms in the corresponding MSE-optimal bandwidths around the 1200 threshold. The last column in Panel A shows the p-value for the difference in means test between the full sample and each MSE-optimal bandwidth. I discuss the comparison between samples and the external validity of my research design in Appendix B[19].

I divide sample banks into two distinct groups: the "above threshold" (i.e., $NSoR > 1200$) vs. "below threshold" (i.e., $NSoR \leq 1200$) banks. The "below threshold" banks are those whose holding companies qualified to deregister with the SEC after the enactment of the JOBS Act based on their holding companies' SoR number immediately preceding the Act. The number of bank-quarter observations in the "below threshold" group is 3,155, which constitutes about 70% of the full sample. 193 unique banks are in the "below threshold" group, and 75 out of them effectively exited the SEC disclosure system during the sample period. The other 93 banks are above the 1200 SoR threshold, and 4 of them experienced significant changes in their number of SoR and managed to deregister with the SEC after the enactment of the JOBS Act. These statistics are consistent with the strong positive association between being in the "below threshold" group and the probability

[19] Appendix B is still a work in progress.

of exiting the SEC disclosure system. I discuss the 4 BHCs' changes in $NSoR$ and potential manipulation concerns in Appendix B.[20] Panel B presents the means for the outcome variables in the empirical analyses for the "above threshold" vs. "below threshold" observations. The third column shows the p-value for the difference in means test between the two groups in the full sample. Meanwhile, the last column presents the p-value for the difference in means test between the two groups of observations in each MSE-optimal bandwidth. These p-values suggest that the two groups are more comparable in terms of group observation means when I select MSE-optimal bandwidths.

4. Primary Results

4.1 GRAPHICAL ANALYSIS

Figure 1 plots the distribution of the SEC deregistrations and normalized bank liquidity creation (as measured by $CATFAT/GTA$) on the full sample around the threshold. Visual inspections of Figure 1 reveals a discontinuity in both variables around the threshold. According to the fitted lines of first-degree polynomials of $NSoR$ estimated on the interval $300 < NSoR \leq 1800$ (as shown in Part A1 and B1), there is about a 13 percentage point increase in the probability of exiting the SEC disclosure system and about a 2.6 percentage point increase in normalized liquidity creation for banks just below the 1200 threshold relative to banks just above the threshold.

[20] Four BHCs in my sample experienced material changes in their number of SoR (i.e., moved from above 1200 to below 1200) during the sample period and effectively deregistered with the SEC when their number of SoR dropped below 1200. All my documented results are robust to excluding the bank subsidiaries of these four BHCs from the sample.

When the identifying assumption is met, the discontinuity in bank liquidity creation can be attributed to the causal impact of BHCs' exits from the SEC disclosure system.

In an NP2SLS estimation illustrated in Section 3.1, the causal effect estimate is the ratio of the discontinuities in the two stages. Essentially, the estimate can be calculated by dividing the difference in expected outcomes around the threshold by the difference in the probability of the treatment around the threshold. Based on the fitted lines of first-degree polynomials of $NSoR$ in Figure 1, the rough estimate of the causal effect of BHC exits from the SEC disclosure system on bank liquidity creation is 2.6/13, or 20 percentage points.

4.2 NONPARAMETRIC RESULTS

I use the NP2SLS regression discontinuity design, as illustrated by Equation (2). Table 2 reports the results of the estimation. Panel A reports the first-stage regression estimated on the MSE-optimal bandwidth. Models 1 and 2 in Panel A follow the first stage of equation (1), a nonparametric local linear regression on either side of the 1200 SoR threshold. Model 1 does not allow for covariate adjustment. The coefficient on $BelowThreshold$ is about 0.52, which indicates the probability of a BHC exit for banks just below the threshold is 52 percentage points higher than for banks just above the threshold. As shown in other columns, this effect is robust when I include covariate adjustment and higher-order polynomials. The magnitude of the first-stage discontinuity is substantial. The sample average probability of a BHC exit from the SEC disclosure system is 25.4%. Therefore, the 52% jump around the threshold is economically significant.

Panel B presents the second-stage estimates for several specifications corresponding to those in Panel A. In model 1, the coefficient on $\widehat{ExitSEC}$ is about 0.20 and is significant at the 1%

level, suggesting that relative to staying as an SEC registrant, exiting the SEC disclosure system increases normalized bank liquidity creation by 20 percentage points. To put this estimated effect in dollars for an average size bank, consider a bank i whose holding company is an SEC registrant at time t (i.e., $ExitSEC_{i,t} = 0$) and that is of average size in the MSE-optimal bandwidth so that its GTA is about $1.813 billion. Suppose the holding company of bank i exits the SEC disclosure system through deregistration. In that case, the quarterly liquidity creation of bank i will increase by $362 million, as suggested by the estimate from Column 1 of Panel B. Given the average CATFAT per quarter within the full sample and the optimal bandwidth are $1,062 million and $724 million, respectively, such an increase is economically significant.

As expected under the identifying assumption, the effect is quantitatively similar and remain significant at the 1% level when I allow covariate adjustment. In model 2, I adjust for capital ratio and normalized deposit-to-GTA ratio, which are bank characteristics highly likely to affect bank liquidity creation (Berger and Bouwman 2009; Gorton and Winton 2017). I also verify this effect's robustness to the inclusion of higher-order polynomial controls via models 3 to 6.

According to research by SNL Financial (now a part of S&P Global Market Intelligence), a major business intelligence service provider then, 2012 and 2013 witnessed a massive flow of SEC deregistrations among small BHCs as banking companies queued up to take advantage of the relaxed provision soon after the enactment of the JOBS Act (Mali 2013). Mali (2013) indicates that "the total number of companies that filed to deregister their common stock in 2012 is greater than the combined total of the previous five years", and the SEC "deregistration rush continued in 2013." As shown in my sample, approximately 88% of the BHC deregistrations filed in 2012 and 2013, although my sample period span over 2012Q3-2016Q4. Table 3 presents fuzzy regression discontinuity estimation for bank liquidity creation with banks whose BHC exited in 2012 and 2013. Banks whose holding companies filed to deregister with the SEC after 2013 are excluded from the sample. Similar to that of Table 2, Panel A of Table 3 reports the first-stage estimates and shows that the probability of a BHC exit increases discontinuously for banks whose holding companies are below the 1200 SoR threshold. Panel B shows that a BHC exit from the SEC disclosure system causes a significant increase in a bank subsidiary's liquidity creation. The results are qualitatively similar to my main nonparametric RD estimation results presented in Table 2. Column 1 reports the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold without covariate adjustment. According to column 1, the coefficient on $\widehat{ExitSEC}$ is about 0.25, which is slightly higher than the one estimated using the full sample.

4.3 THE ECONOMIC MECHANISM

Recently, Holmstrom (2015) and Dang et al. (2017) argue that bank opacity can reduce the cost of liquidity transformation. According to those authors, banks' essential role in the financial system is to create money-like debt claims, which is safe liquidity useful for transactions and storing value. To effectively fulfill this role, banks must collateralize those debt claims so well that their value is "information insensitive." In this sense, bank depositors can share liquidity risks and use those money-like claims as a medium of exchange without concerns regarding adverse selection (Diamond and Dybvig 1983; Gorton and Pennacchi 1990). They "do not have to pay attention to transient fluctuation in the mark-to-market value of bank assets," as described in Hanson et al. (2015). From this perspective, bank opacity impeding the price discovery of bank assets makes deposits more attractive. The increased depositor stability afforded by bank opacity should allow banks more flexibility to fund illiquid assets such as business loans (Dang et al. 2017; Chen et al. 2020). Overall, bank opacity enhances banks' ability in liquidity creation.

Table 4 presents the nonparametric fuzzy RD estimates of changes in bank subsidiaries' total deposits, uninsured deposits, the average size of uninsured deposit accounts, and illiquid assets resulting from BHCs' exit from the SEC disclosure system. I normalize the total deposits and total illiquid assets by banks' GTA and the uninsured deposits and the average size of uninsured deposit accounts by total deposits. All columns report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. To alleviate the concerns regarding the impact of bank size and bank capital on banks' ability to attract deposits and fund illiquid assets, I allow for covariate adjustment in all models. The covariates include the natural logarithm of banks' GTA and bank capital ratio. In model 1, the coefficient on $\widehat{ExitSEC}$ is about 0.09 and is significant at the 1% level, suggesting that relative to staying as an SEC registrant, exiting the SEC disclosure system increases normalized total deposits by 9 percentage points. To put this estimated effect in dollars for an average size bank, consider a bank i whose holding company is an SEC registrant at time t (i.e., $ExitSEC_{i,t} = 0$) and that is of average size in the MSE-optimal bandwidth so that its GTA is about \$1.813 billion. Suppose the holding company of bank i exits the SEC disclosure system through deregistration. In that case, the total deposits of bank i will increase by \$163 million, as suggested by the estimate from Column 1 of Table 4.

The coefficient in column 2 is about 0.21, meaning that the increase in uninsured deposits mostly drives the total deposits growth. Deposit insurance is one of the significant benefits of having an account at a bank insured by the Federal Deposit Insurance Corporation(FDIC). FDIC protects depositors' money in the unlikely event of a bank failure. The standard insurance amount is $250,000 per depositor, per insured bank, for each account ownership category. Since FDIC backs those insured deposits, insured depositors should be indifferent to be less concerned about banks' transparency level and its impact on banks' ability to produce safe liquidity. These results suggest that bank opacity induced by exiting the SEC disclosure system makes deposits more attractive, particularly the uninsured ones, consistent with the theoretical predictions in Dang et al. (2017). Column 3 shows exiting the SEC disclosure system increases the normalized average size of deposit accounts of more than $250,000 as well.

Column 4 shows that a BHC exit from the SEC disclosure system causes a significant increase in bank subsidiaries' illiquid assets. This result is again consistent with the idea that the net benefit of bank opacity is to increase banks' ability to raise stable deposits to fund illiquid assets such as higher yield business loans. Overall, my results suggest that bank opacity induced by BHCs' exit from the SEC disclosure system contributes to bank liquidity creation by reducing the liquidity transformation cost.

One big concern regarding bank opacity induced by BHCs' exit from the SEC disclosure system is that it might weaken the external discipline over bank management. As a result, bank managers may devote less effort to screening and monitoring loan applicants, which compromise asset quality (Nier and Baumann 2006; Shleifer 2011). Following Balakrishnan and Ertan (2017), I employ three measures of banks' asset quality as follows: the nonperforming loans that "represent economic losses and forgone interest revenue related to the poor credit quality of the borrower," the loan loss reserves that serve as "an *ex ante* measure of credit risk," and the ratio of unreserved nonperforming loans to shareholders' equity that is informative of "owners' exposure to credit losses." I normalize the nonperforming loans and loan loss reserves by gross loans. Table 5 presents the fuzzy RD estimates of change in bank asset quality resulting from BHCs' exit from the SEC disclosure system. I do not find evidence supporting BHCs' exits from the SEC disclosure system compromise bank asset quality. One explanation is banks' prudential regulators implement effective supervision over banks' risk-taking, so exiting the SEC disclosure system does not weaken banks' external discipline to the extent that significantly compromises their asset quality.

5. The Alternative Explanation

5.1 THE COST SAVINGS MECHANISM

Section 601 of the JOBS Act allowed smaller banking institutions to have more discretion over escaping the SEC compliance burdens. Anecdotal evidence suggests that many banking institutions took advantage of the regulatory change to achieve a significant amount of cost savings. For example, as reported in Mali (2012), on May 25, 2012, which is only about 50 days after the enactment of the JOBS Act, the PA-based BHC, Peoples Financial Services Corp., issued a press release saying "it intends to deregister its common stock as the incremental cost of compliance with general SEC regulation, the Sarbanes-Oxley, and other reporting requirements does not provide a discernible benefit to its shareholder." The BHC expected to save about $150,000 annually after deregistration. Mitts (2014) estimates the SEC deregistration effects on community banks and finds that the deregistrations significantly lower banks' pretax expenses.

Holding all other bank characteristics constant, if the marginal cost savings due to BHCs' exits from the SEC disclosure system are passed on to bank depositors, we should expect an increase in deposit rates due to BHC exits. It is possible that BHCs' compliance cost savings lead to more favorable deposit rates, which drives the rise in bank deposits. Table 6 presents the fuzzy regression discontinuity estimates of change in bank subsidiaries' core deposit rate, large time deposit rate, and interest income normalized by gross loans resulting from BHCs' exits from the SEC disclosure system. Following Chen et al. (2020), I deem transaction deposits, savings deposits, and small time deposits core deposits. Those deposits are likely the insured deposits. Large time deposits are more likely to be uninsured since many of those deposit account balances are usually larger than $250,000. In model 1, the coefficient on $\widehat{ExitSEC}$ is about 0.0007 and is significant at the 1% level, suggesting that relative to staying as an SEC registrant, exiting the SEC disclosure system increases the core deposit rate by 0.07 percentage points. Column 2 shows that the positive effect of BHC exits on the large time deposit rate is less significant in terms of both statistical significance and economic magnitude. I do not find a significant impact of BHC exits on normalized interest income, as suggested by the column 3 result.

5.2 ROBUSTNESS OF THE OPACITY EFFECTS

I rerun the tests presented in Table 4 but include the deposit rates and normalized interest income as covariates. Table 7 shows these results. Models 1, 3, 5 and 7 are the same as models 1, 2, 3 and 4 in Table 4, respectively. To alleviate concerns regarding the distortion of bandwidth selection due to missing values of covariates, I keep the main bandwidth used to construct the RD point estimator in Table 4 and the bias bandwidth used to build the bias-correction estimator as I add covariates in models 2, 4, 6, and 8. After controlling for the deposit rates and the normalized interest income, I observe a reduced effect of BHCs' exits from the SEC disclosure system on total deposits. However, the effects of BHC exits on uninsured deposits, the average size of uninsured deposit accounts, and illiquid assets remain qualitatively and quantitatively similar, as suggested by results in columns 3-8. Overall, the results indicate that banks pass on some of the cost savings to depositors by improving the deposit rates, which helps banks attract more deposits. However, the opacity induced by exiting the SEC disclosure system still plays a significant role in shaping bank liquidity creation, as is evidenced by its impact on banks' ability to secure uninsured deposits and invest in illiquid assets. Table 8 empirically shows the robustness of the effect of BHC exits from the SEC disclosure system on bank liquidity creation. After adjusting for covariates, including deposit rates and normalized interest income, the fuzzy RD estimate of the change in bank liquidity creation resulting from BHC exits remain similar.

6. Additional Robustness Tests

As illustrated in Section 3.2, Berger and Bouwman (2009) also construct a few alternative bank liquidity measures for robustness checks. Panel A of Table 9 presents the fuzzy RD estimates of changes in the alternative bank liquidity measures resulting from BHCs' exits from the SEC disclosure system. The results suggest that my main results are robust to those alternative measures. Panel B of Table 9 presents the fuzzy RD estimates of changes in the components of the preferred measure as a result of BHCs' exits from the SEC disclosure system. The results indicate that both asset-side and liquidity-side liquidity creation experience a significant increase, consistent with our proposed economic mechanism through which bank opacity enables banks to attract more deposits and grant more illiquid loans.

Although the optimal bandwidth selection procedure of Calonico, Cattaneo, and Titiunik (2014) should produce the most efficient bandwidth for the fuzzy RD estimation, I test the sensitivity of the robustness of the results to the three other fixed bandwidths ($\pm$100, 200, and 600). Table 10 presents the results of those tests and shows my main results' robustness to bandwidth choices. Notably, I find the economic magnitude of the bank liquidity creation effects when using the $\pm$100 bandwidth, a narrow bandwidth around the threshold, similar to those generated by following the optimal bandwidth selection procedure.

I plot the banking institutions' exits from the SEC disclosure system and bank liquidity creation normalized by GTA around two placebo cutoffs—800 SoR and 1600 SoR. Figure 4 illustrates that there is little to no discontinuity in the probability of exiting the SEC disclosure system and bank liquidity creation around those placebo cutoffs. I also estimate a nonparametric local linear regression on either side of the 1200 SoR threshold for the pre-JOBS Act period. I do not find any significant discontinuity in bank liquidity creation around the JOBS Act threshold in the pre-JOBS Act period. Those tests alleviate the concern that pre-existing differences drive the positive effects on liquidity creation.

7. Conclusions

Heated debates regarding bank opacity are focused on whether to provide bank outsiders, especially depositors, more information concerning bank assets' performance. I exploit a threshold-based policy in the JOBS Act of 2012 to investigate the impact of exiting the SEC disclosure system on bank liquidity creation. Using a nonparametric fuzzy RD design, I show that the BHC exits from the SEC disclosure system contribute to bank subsidiaries' liquidity creation. In the meantime, the bank subsidiaries attract more deposits and fund more illiquid assets without taking additional credit risks. According to my empirical results, the documented effects are driven by not only the cost-savings enabled by BHCs' escape from the SEC compliance burdens, but also the reduced cost of liquidity transformation afforded by increased opacity concerning the future performance of bank assets. I provide causal evidence supporting bank opacity's positive effects on depositor stability and liquidity creation predicted by Dang et al. (2017).

My results speak to the trade-off between investor protection and capital formation (including credit access). My research suggests that with adequate supervision by banks' prudential regulators, the SEC's disclosure deregulation as the JOBS Act amendments can improve bank productivity without compromising bank asset quality. However, while the RD design has strong internal validity, its external validity is usually limited due to the narrow bandwidth selected for the estimation. I plan to conduct further tests to examine the generalizability of my results.

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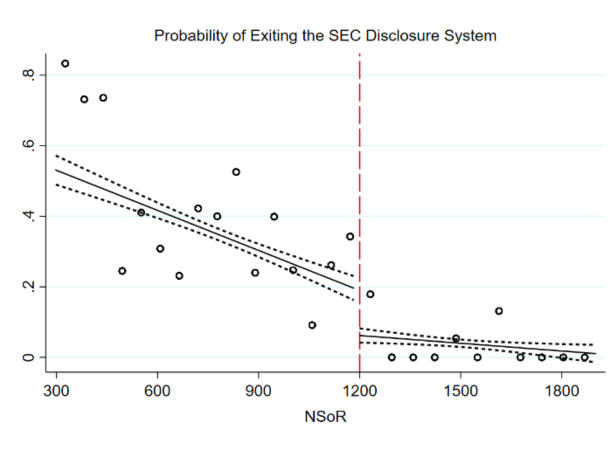

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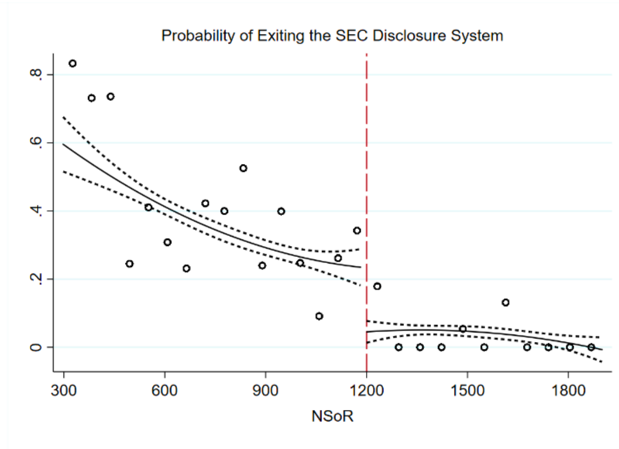

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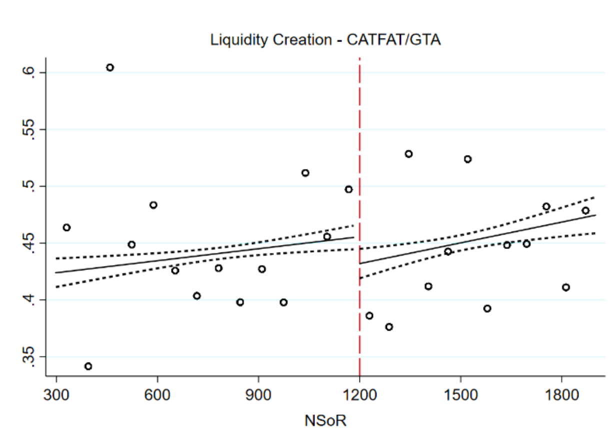

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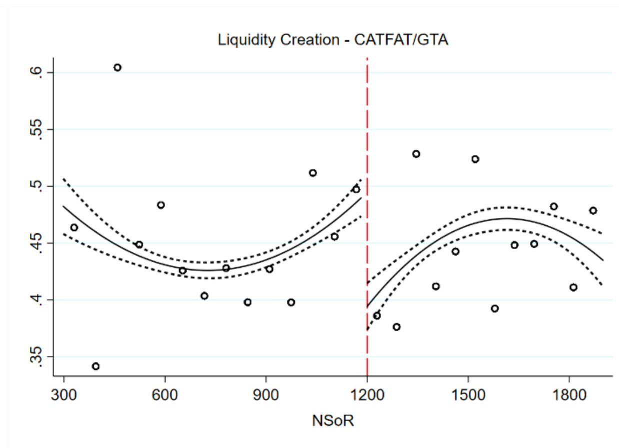


Figure 1
Probability of exiting the SEC disclosure and bank liquidity creation
The figure plots the distribution of the exits from the SEC disclosure system and bank liquidity creation normalized by gross total assets (as measured by CATFAT/GTA) on the full sample around the threshold. The x-axis presents the running variable $NSoR$, as defined in Section 3.1, around the threshold. The y-axis in Part A corresponds to the probability of exiting the SEC disclosure. The y-axis in Part B corresponds to normalized bank liquidity creation, as measured by CATFAT/GTA. The bins are selected based on IMSE-optimal evenly-spaced method using polynomial regression. The hollow circles indicate sample means of the outcome variables within the corresponding bin for each observation. In Part A1 and B1, the solid lines represent the fitted lines of a first-degree polynomial of $NSoR$ estimated on the interval $300 < NSoR \leq 1800$. In Part A2 and B2, the solid lines represent the fitted lines of a second-degree polynomial of $NSoR$ estimated on the same interval. The dashed lines show the confidence intervals.

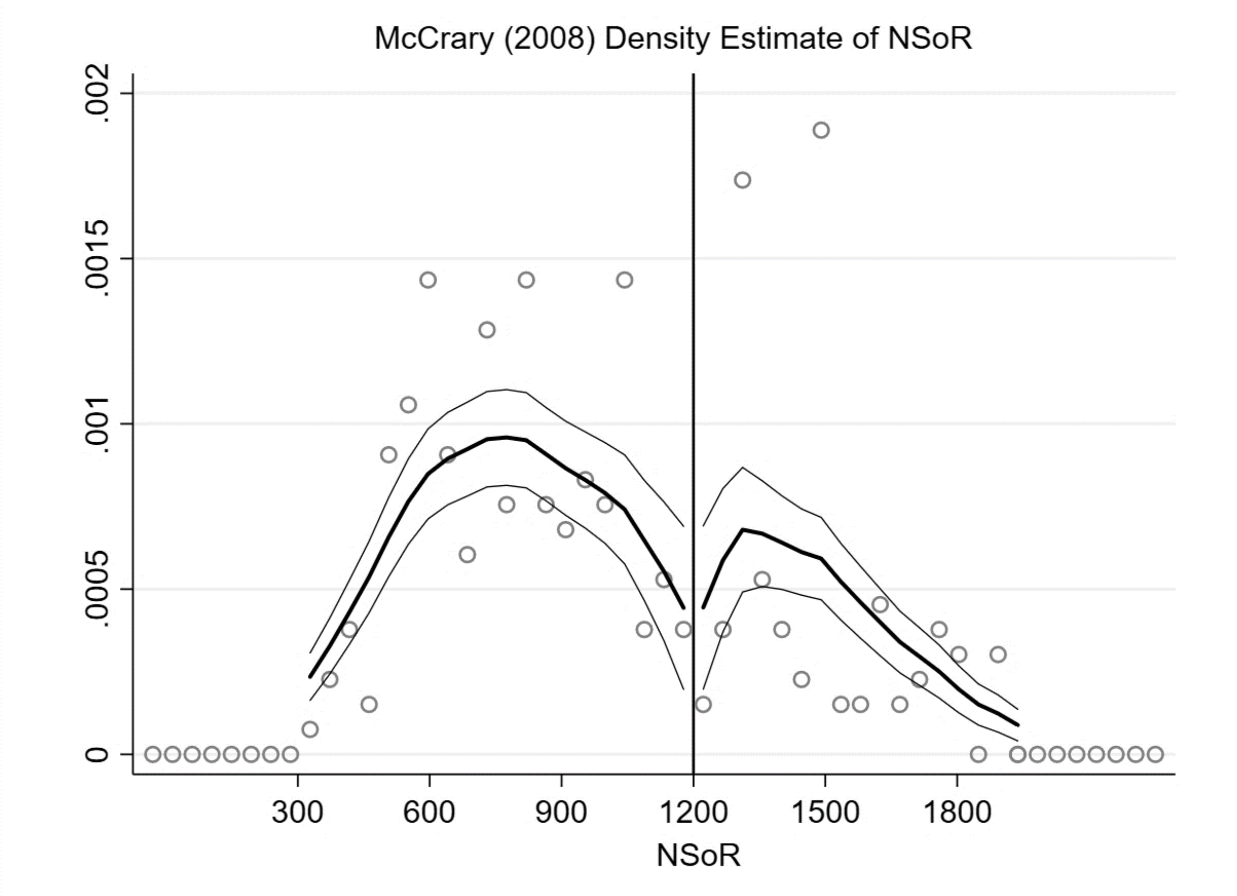


Figure 2
McCrary (2008) density estimate of $NSoR$
The figure plots the estimated density of the variable $NSoR$ using all sample banks. The x-axis presents the running variable $NSoR$, as defined in Section 3.1, around the threshold. The y-axis corresponds to the McCrary (2008) density estimate of $NSoR$. The figure shows the sample means within each bin, estimated density, and 95% confidence intervals of $NSoR$. The McCrary (2008) t-statistic is -0.142040384, which indicates a failure to reject the hypothesis of no sorting at the threshold. Both the figure and the McCrary test statistic were generated using the code provided by Justin McCrary on his website: http://eml.berkeley.edu/~jmccrary/DCdensity/.

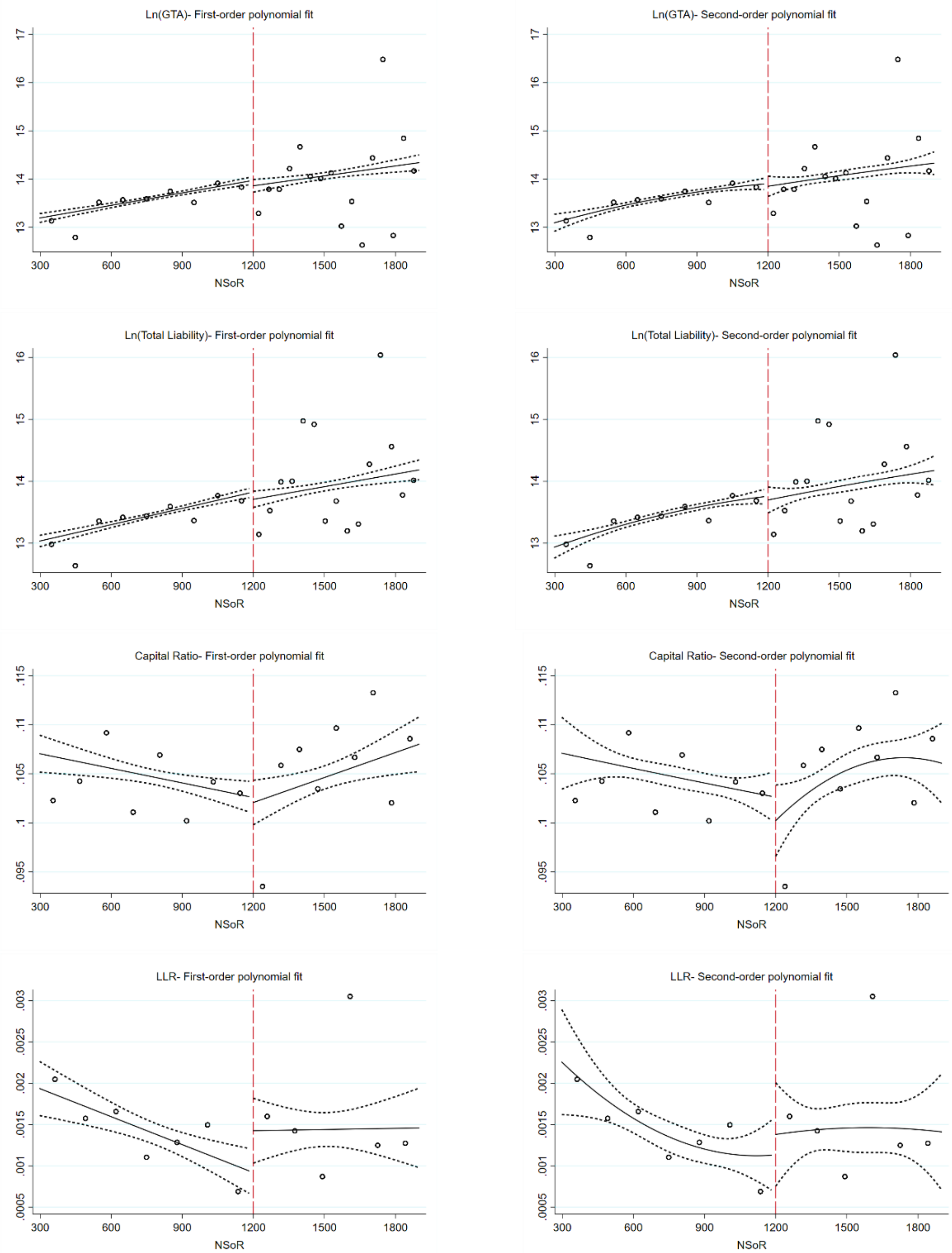
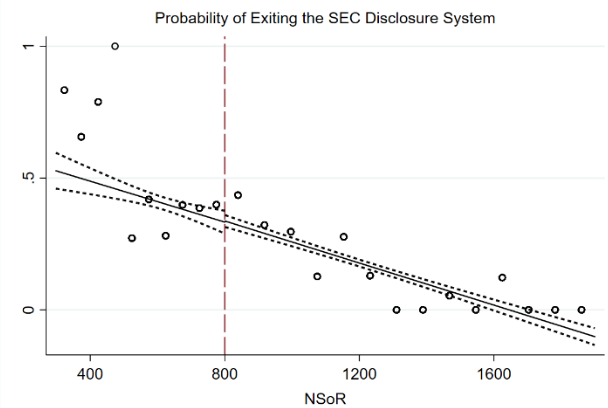


Figure 3

Distribution of bank characteristics around the NSoR threshold

The figure shows that the distribution of bank characteristics is smooth around the NSoR threshold, which is consistent with the local continuity assumption. The figure plots the distribution of the natural logarithm of banks' gross total assets and total liability, capital ratio, and loan loss reserves (LLR) on the full sample around the threshold. The x-axis presents the running variable $NSoR$ around the threshold. The y-axis corresponds the bank characteristics. The bins are selected based on IMSE-optimal evenly-spaced method using polynomial regression. The hollow circles indicate sample means of the bank characteristics within the corresponding bin for each observation. In graphs on the left side, the solid lines represent the fitted lines of a first-degree polynomial of $NSoR$ estimated on the interval $300 < NSoR \leq 1800$. In graphs on the right side, the solid lines represent the fitted lines of a second-degree polynomial of $NSoR$ estimated on the same interval. The dashed lines show the confidence intervals.

A1.



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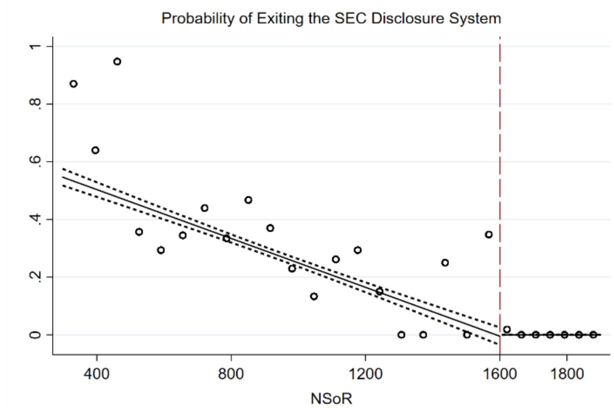

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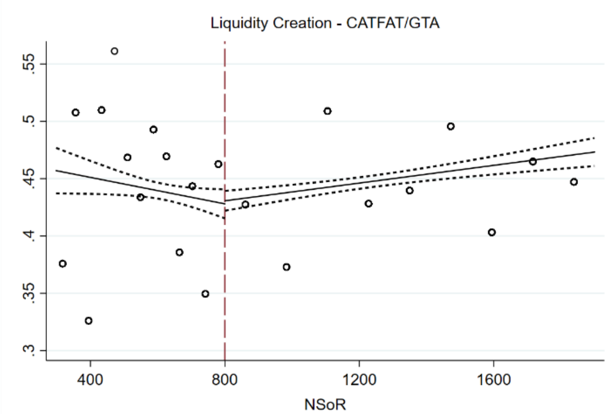

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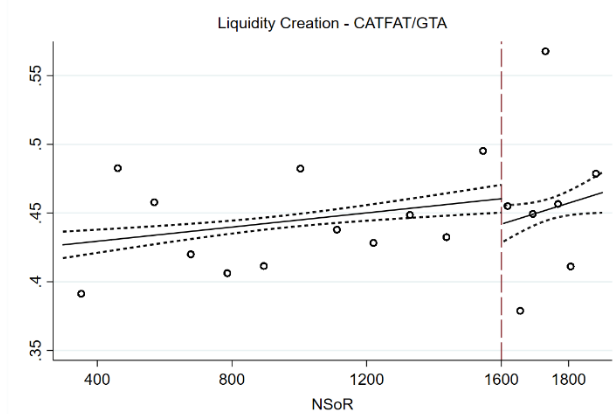

Figure 4
Distribution of Exits from the SEC and bank liquidity creation with placebo cutoffs
The figure plots the distribution of the exits from the SEC disclosure system and bank liquidity creation normalized by gross total assets (as measured by CATFAT/GTA) on the full sample around the threshold. The x-axis presents the running variable $NSoR$, as defined in Section 3.1, around the threshold. The y-axis in Part A corresponds to the probability of exiting the SEC disclosure. The y-axis in Part B corresponds to normalized bank liquidity creation, as measured by CATFAT/GTA. The bins are selected based on IMSE-optimal evenly-spaced method using polynomial regression. The hollow circles indicate sample means of the outcome variables within the corresponding bin for each observation. The solid lines represent the fitted lines of a first-degree polynomial of $NSoR$ estimated on the interval $300 < NSoR \leq 1800$. The dashed lines show the confidence intervals. In Part A1 and B1, I use the placebo cutoff $NSoR = 800$. In Part A2 and B2, I use the placebo cutoff $NSoR = 1600$.

Table 1
Summary statistics
Panel A

	Full Sample					MSE-Optimal Bandwidths					Diff. in Means
	Mean	25th	50th	75th	SD	Mean	25th	50th	75th	SD	p-value
Bank Liquidity Creation											
CATFAT ($M)	1,062	166	354	883	2,483	724	200	352	780	940	0.036
CATFATSECADJ ($M)	1,149	195	395	984	2,620	939	219	416	1,248	1,243	0.274
CATFATLC30 ($M)	898	147	311	758	1,986	711	156	296	990	945	0.093
CATNONFAT ($M)	827	138	293	711	1,779	666	148	281	921	880	0.105
LC_A ($M)	219	17	78	218	632	179	28	83	247	239	0.392
LC_L ($M)	609	99	200	517	1,590	430	124	217	266	601	0.128
LC_OBS ($M)	235	25	57	145	752	151	40	67	171	197	0.130
CATFAT/GTA	0.444	0.345	0.445	0.539	0.138	0.472	0.430	0.479	0.539	0.091	0.006
CATFATSECADJ/GTA	0.496	0.404	0.502	0.597	0.134	0.576	0.509	0.582	0.646	0.086	0.000
CATFATLC30/GTA	0.391	0.308	0.393	0.474	0.121	0.418	0.380	0.430	0.465	0.079	0.002
CATNONFAT/GTA	0.368	0.291	0.372	0.447	0.115	0.380	0.339	0.389	0.429	0.078	0.107
LC_A/GTA	0.117	0.035	0.118	0.203	0.111	0.110	0.057	0.116	0.171	0.073	0.371
LC_L/GTA	0.251	0.213	0.256	0.294	0.062	0.272	0.246	0.280	0.308	0.041	0.000
LC_OBS/GTA	0.076	0.048	0.070	0.094	0.039	0.077	0.058	0.071	0.097	0.027	0.877
Other Bank Characteristics											
GTA ($M)	2,183	433	788	1,809	4,790	1,813	387	895	2,262	2,102	0.141
Total Deposits ($M)	1,774	363	657	1,487	3,995	1,220	418	703	1,297	1,405	0.033
AS_UDA ($M)	0.787	0.610	0.731	0.883	0.293	0.792	0.608	0.727	0.900	0.243	0.7560
Gross Loans ($M)	1,373	285	531	1,171	2,707	1,338	289	493	1,782	1,765	0.883
Capital Ratio	0.105	0.092	0.103	0.116	0.022	0.104	0.095	0.102	0.113	0.012	0.492
Total Deposits/GTA	0.797	0.769	0.803	0.834	0.054	0.792	0.759	0.797	0.829	0.048	0.032
Uninsured Deposits/Total Deposits	0.349	0.245	0.318	0.430	0.150	0.370	0.285	0.358	0.423	0.128	0.001
Illiquid Assets/GTA	0.824	0.780	0.848	0.890	0.093	0.832	0.797	0.847	0.887	0.072	0.155
NPL/Gross Loans	0.016	0.006	0.010	0.020	0.019	0.018	0.007	0.011	0.018	0.029	0.006
Unreserved NPL/Equity	0.117	0.031	0.063	0.117	0.365	0.194	0.037	0.064	0.111	0.808	0.000
LLR/Gross Loans	0.001	0.000	0.001	0.002	0.004	0.001	0.000	0.001	0.002	0.003	0.026

Panel B

Outcome Variables	Full Sample Mean: Above Threshold	Full Sample Mean: Below Threshold	Diff. in Means: *p*-value	MSE-Optimal Bandwidth Mean: Above Threshold	MSE-Optimal Bandwidth Mean: Below Threshold	Diff. in Means: *p*-value
In Bank Liquidity Creation Analysis						
CATFAT/GTA	0.450	0.441	0.047	0.452	0.473	0.611
CATFATSECADJ/GTA	0.501	0.494	0.115	0.464	0.533	0.161
CATFATLC30/GTA	0.392	0.390	0.638	0.433	0.417	0.654
CATNONFAT/GTA	0.367	0.368	0.750	0.426	0.379	0.188
LC_A/GTA	0.114	0.118	0.324	0.163	0.133	0.176
LC_L/GTA	0.253	0.250	0.236	0.263	0.272	0.614
LC_OBS/GTA	0.083	0.073	0.000	0.064	0.078	0.000
In Bank Deposit Flow Analysis						
Deposits/GTA	0.793	0.798	0.003	0.793	0.790	0.518
Uninsured Deposits/Deposits	0.361	0.344	0.000	0.346	0.375	0.111
Illiquid Assets/GTA	0.828	0.822	0.029	0.825	0.836	0.227

Panel A presents summary statistics for the variables used in the study for the full sample of 4,489 bank-quarter observations from 2012Q3 to 2016Q4 and for the observations in the MSE-optimal bandwidths around the cutoff. The last column in Panel A shows the p-value for the difference in means test between the full sample and each MSE-optimal bandwidth.

Panel B presents the means for the outcome variables in the empirical analyses for the "above threshold" vs. "below threshold" bank observations. The third column shows the *p*-value for the difference in means test between "above threshold" vs. "below threshold" groups in the full sample. In contrast, the last column presents the *p*-value for the difference in means test between "above threshold" vs. "below threshold" groups in each MSE-optimal bandwidth.

Table 2
Effect of BHC exits from the SEC disclosure system on bank liquidity creation
Panel A. Probability of a BHC exit from the SEC disclosure system (first stage)

	ExitSEC					
	Local Linear		Local Quadratic		Local Cubic	
	(1)	(2)	(3)	(4)	(5)	(6)
BelowThreshold	0.5185***	0.5539***	0.3466***	0.3959***	0.3075***	0.3868***
	(0.1008)	(0.0858)	(0.0957)	(0.1073)	(0.1177)	(0.1433)
Covariate-Adjustment	No	Yes	No	Yes	No	Yes
Effective Observations	189	225	741	843	1,143	1,091

Panel B. Effect of BHC exits from the SEC disclosure system on bank liquidity creation (second stage)

	CATFAT/GTA					
	Local Linear		Local Quadratic		Local Cubic	
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{ExitSEC}$	0.1989***	0.2107***	0.5093***	0.5146***	0.7601***	0.7803***
	(0.0452)	(0.0345)	(0.1167)	(0.1056)	(0.2489)	(0.2319)
Covariate-Adjustment	No	Yes	No	Yes	No	Yes
Effective Observations	189	225	741	843	1,143	1,091

Panel A presents the first-stage estimates and shows that the probability of a BHC exit increases discontinuously for banks whose holding companies are below the 1200 SoR threshold. The outcome variable is $ExitSEC$, which equals one if the holding company of the bank has exited the SEC disclosure system, and zero otherwise. The variable of interest is $BelowThreshold$, which equals one if the holding company of the bank is below the 1200 SoR threshold ($NSoR \leq 1200$), and zero otherwise. Column 1 and 2 report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold using a triangle kernel. Model 1 does not allow for covariate adjustment, while model 2 does, and the covariates include capital ratio and deposits-to-GTA ratio. As indicated, nonparametric local quadratic and cubic regressions are used to estimate results shown in other columns. All specifications are estimated on corresponding MSE-optimal bandwidths following Calonico, Cattaneo, and Titiunik (2014). I estimate a linear probability model, and thus the coefficient on $BelowThreshold$ measures the difference in the probability of a BHC exit between banks just below and just above the threshold.
Panel B shows that a BHC exit from the SEC disclosure system causes a significant increase in a bank subsidiary's liquidity creation. The outcome variable is CATFAT/GTA, i.e., the preferred measure of bank liquidity creation normalized by bank GTA. The estimation is conducted via NP2SLS, where $\widehat{ExitSEC}$ is the instrumented variable with predicted values from the first stage. Column 1 and 2 report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold using a triangle kernel. Model 1 does not allow for covariate adjustment, while model 2 does, and the covariates include capital ratio and deposits-to-GTA ratio. Nonparametric local quadratic and cubic regressions are used to estimate results shown in other columns. All specifications are estimated on corresponding MSE-optimal bandwidths following Calonico, Cattaneo, and Titiunik (2014). All estimates in the table are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 3
Fuzzy regression discontinuity estimation for bank liquidity creation with banks whose BHC exited in 2012 and 2013
Panel A. Probability of a BHC exit from the SEC disclosure system (first stage)

	ExitSEC					
	Local Linear		Local Quadratic		Local Cubic	
	(1)	(2)	(3)	(4)	(5)	(6)
BelowThreshold	0.5416***	0.6685***	0.3220***	0.3457***	0.3217**	0.7106***
	(0.1396)	(0.1774)	(0.0953)	(0.1056)	(0.1260)	(0.2499)
Covariate-Adjustment	No	Yes	No	Yes	No	Yes
Effective Observations	113	131	669	789	903	369

Panel B. Effect of BHC exits from the SEC disclosure system on bank liquidity creation (second stage)

	CATFAT/GTA					
	Local Linear		Local Quadratic		Local Cubic	
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\text{ExitSEC}}$	0.2496***	0.2014***	0.5020***	0.5288***	0.6269**	0.4053***
	(0.0493)	(0.0410)	(0.1271)	(0.1315)	(0.2447)	(0.1168)
Covariate-Adjustment	No	Yes	No	Yes	No	Yes
Effective Observations	113	131	669	789	903	369

The table presents the fuzzy regression discontinuity of changes in the measure of bank liquidity creation as a result of BHCs' exit from the SEC disclosure system. Similar to the results reported in Table 2, they are obtained via NP2SLS with a triangular kernel. All estimations use the MSE-optimal bandwidth following Calonico, Cattaneo, and Titiunik (2014). Banks whose BHC filed to deregister from the SEC after 2013 are excluded from the sample. Panel A reports the first-stage estimates and shows that the probability of a BHC exit increases discontinuously for banks whose holding companies are below the 1200 SoR threshold. The outcome variable is $ExitSEC$, which equals one if the holding company of the bank has exited the SEC disclosure system, and zero otherwise. The variable of interest in $BelowThreshold$, which equals one if the holding company of the bank is below the 1200 SoR threshold ($NSoR \leq 1200$), and zero otherwise. Column 1 and 2 report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold. Model 1 does not allow for covariate adjustment while model 2 does, and the covariates include capital ratio and deposits-to-GTA ratio. As indicated, nonparametric local quadratic and cubic regressions are used to estimate results shown in other columns. I estimate a linear probability model, and thus the coefficient on $BelowThreshold$ measures the difference in the probability of a BHC exit between banks just below and just above the threshold.

Panel B shows that a BHC exit from the SEC disclosure system causes a significant increase in a bank subsidiary's liquidity creation. The outcome variable is CATFAT/GTA, i.e., the preferred measure of bank liquidity creation normalized by bank GTA. $\widehat{ExitSEC}$ is the instrumented variable with predicted values from the first stage. Column 1 and 2 report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. Nonparametric local quadratic and cubic regressions are used to estimate results shown in other columns. All estimates in the table are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 4
Effect of BHC exits from the SEC disclosure system on deposits and illiquid assets

	Total Deposits/GTA	**Uninsured Deposits/Total Deposits**	**AS_UDA/Total Deposits**	**Illiquid Assets/GTA**
	Local Linear			
	(1)	(2)	(3)	(4)
$\widehat{ExitSEC}$	0.0871***	0.2069***	0.0005***	0.1236***
	(0.0209)	(0.0375)	(0.0001)	(0.0162)
Covariate-Adjustment	Yes	Yes	Yes	Yes
Effective Observations	611	537	593	293

The table shows that a BHC exit from the SEC disclosure system causes a significant increase in the bank subsidiaries' total deposits, uninsured deposits, average size of uninsured deposit accounts, and illiquid assets. I normalize the total deposits and illiquid assets by GTA and the uninsured deposits and average size of uninsured deposit accounts by total deposits. Similar to the results reported in Panel B of Table 2, they are obtained via NP2SLS with a triangular kernel. All estimations use the MSE-optimal bandwidth following Calonico, Cattaneo, and Titiunik (2014). The variable of interest, $\widehat{ExitSEC}$, is the instrumented variable with predicted values from the first stage $ExitSEC = \alpha_0 + \alpha_1 BelowThreshold + f_1(NSoR) + BelowThreshold \cdot f_2(NSoR) + \alpha X + u$ as illustrated in Section 3.1. All columns report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. All specifications allow for covariate adjustment, and the covariates include capital ratio and the natural logarithm of GTA. All estimates are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 5
Effects of BHC exits from the SEC disclosure system on asset quality

	NPL/Gross Loans	**LLR/Gross Loans**	**Unreserved NPL/Equity**
		Local Linear	
	(1)	(2)	(3)
$\widehat{ExitSEC}$	0.0026	0.0002	0.0098
	(0.0030)	(0.0004)	(0.0792)
Covariate-Adjustment	Yes	Yes	Yes
Effective Observations	227	390	329

The table presents the fuzzy regression discontinuity estimates of change in bank subsidiaries' asset quality as a result of BHCs' exit from the SEC disclosure system. Following Balakrishnan and Ertan (2018), I use three measures of banks' asset quality. The outcome variable in model 1 is nonperforming loans (NPL) normalized by Gross Loans, which represent economic losses and foregone interest revenue related to the low credit quality of the borrower. The outcome variable in model 2, loan loss reserves (LLR) normalized by Gross Loans, often serve as an *ex-ante* measure of credit risk. The outcome variable in model 3, unreserved NPL scaled by Equity, reflects the amount of nonperforming loans above loan loss reserves as a fraction of shareholders' equity, which measures owners' exposure to credit losses. Similar to the results reported in Panel B of Table 2, they are obtained via NP2SLS with a triangular kernel. All estimations use the MSE-optimal bandwidth following Calonico, Cattaneo, and Titiunik (2014). The variable of interest, $\widehat{ExitSEC}$, is the instrumented variable with predicted values from the first stage $ExitSEC = \alpha_0 + \alpha_1 BelowThreshold + f_1(NSoR) + BelowThreshold \cdot f_2(NSoR) + \alpha X + u$ as illustrated in Section 3.1. All columns report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. Models 1 and 2 include covariates Loan Growth and normalized LLR, and model 3 includes loan growth and the natural logarithm of Gross Loans. All estimates are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 6
Effects of BHC exits from the SEC disclosure system on deposit rates and interest income

	Core Deposit Rate	**Large Time Deposit Rate**	**Interest Income/Gross Loans**
		Local Linear	
	(1)	(2)	(3)
$\widehat{ExitSEC}$	0.0007***	0.0003*	-0.0134
	(0.0001)	(0.0002)	(0.0087)
Covariate-Adjustment	Yes	Yes	Yes
Effective Observations	223	131	591

The table presents the fuzzy regression discontinuity estimates of change in bank subsidiaries' core deposit rate, large time deposit rate, and interest income normalized by gross loans as a result of BHCs' exit from the SEC disclosure system. Similar to the results reported in Panel B of Table 2, they are obtained via NP2SLS with a triangular kernel. All estimations use the MSE-optimal bandwidth following Calonico, Cattaneo, and Titiunik (2014). The variable of interest, $\widehat{ExitSEC}$, is the instrumented variable with predicted values from the first stage $ExitSEC = \alpha_0 + \alpha_1 BelowThreshold + f_1(NSoR) + BelowThreshold \cdot f_2(NSoR) + \alpha X + u$ as illustrated in Section 3.1. All columns report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. All specifications allow for covariate adjustment, and the covariates include capital ratio, the natural logarithm of GTA, and the lagged ROE and wholesale funding with a lag of one quarter. All estimates are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 7
The opacity effects of BHC exits from SEC disclosure system on deposits and illiquid assets

	Total Deposits/GTA		Uninsured Deposits/Total Deposits		As_UDA/Total Deposits		Illiquid Assets/GTA	
	Local Linear							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ExitSEC	0.0871***	0.0591***	0.2069***	0.2088***	0.0005***	0.0004***	0.1236***	0.1274***
	(0.0209)	(0.0176)	(0.0375)	(0.0373)	(0.0001)	(0.0001)	(0.0162)	(0.0158)
Covariate-Adjustment								
Capital Ratio Ln(GTA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Core Deposit Rate Large Time Deposit Rate Interest Income/Gross Loans	No	Yes	No	Yes	No	Yes	No	Yes
Effective Observation	611	611	537	537	593	593	293	293

The table shows that a BHC exit from the SEC disclosure system causes a significant increase in the bank subsidiaries' total deposits (particularly the uninsured ones) and illiquid assets even after controlling for bank deposit rates and interest income (normalized by gross loans). I normalize the total deposits and illiquid assets by GTA and the uninsured deposits by total deposits. Similar to the results reported in Panel B of Table 2, they are obtained via NP2SLS with a triangular kernel. The variable of interest, $\widehat{ExitSEC}$, is the instrumented variable with predicted values from the first stage $ExitSEC = \alpha_0 + \alpha_1 BelowThreshold + f_1(NSoR) + BelowThreshold \cdot f_2(NSoR) + \alpha X + u$ as illustrated in Section 3.1. All columns report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. All specifications allow for covariate adjustment. In models 1, 3, and 5, the covariates include capital ratio and the natural logarithm of GTA as in models in Table 4. In models 2, 4, and 6, the covariates include not only capital ratio and the natural logarithm of GTA but also core deposit rate, large time deposit rate, and the interest income scaled by gross loans. Model 1, 3, and 5 use the MSE-optimal bandwidth following Calonico, Cattaneo, and Titiunik (2014). To alleviate concerns regarding the distortion of bandwidth selection due to missing values, I keep the main bandwidth used to construct the RD point estimator as well as the bias bandwidth used to construct the bias-correction estimator as I add controls. All estimates are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 8
Robustness to the inclusion of deposit rates and interest income as covariates
Panel A. Probability of a BHC exit from the SEC disclosure system (first stage)

	ExitSEC					
	Local Linear		Local Quadratic		Local Cubic	
	(1)	(2)	(3)	(4)	(5)	(6)
BelowThreshold	0.5539***	0.5097***	0.3959***	0.3948***	0.3868***	0.4046***
	(0.0858)	(0.0889)	(0.1073)	(0.1122)	(0.1433)	(0.1471)
Covariate-Adjustment						
Capital Ratio Ln(GTA)	Yes	Yes	Yes	Yes	Yes	Yes
Core Deposit Rate Large Time Deposit Rate Interest Income/Gross Loans	No	Yes	No	Yes	No	Yes
Effective Observations	225	225	843	843	1,091	1.091

Panel B. Effect of BHC exits from the SEC disclosure system on bank liquidity creation (second stage)

	CATFAT/GTA					
	Local Linear		Local Quadratic		Local Cubic	
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{ExitSEC}$	0.2107***	0.2282***	0.5146***	0.4837***	0.7803***	0.6674***
	(0.0345)	(0.0440)	(0.1056)	(0.1085)	(0.2319)	(0.1967)
Covariate-Adjustment						
Capital Ratio Ln(GTA)	Yes	Yes	Yes	Yes	Yes	Yes
Core Deposit Rate Large Time Deposit Rate Interest Income/Gross Loans	No	Yes	No	Yes	No	Yes
Effective Observations	225	225	843	843	1,091	1,091

This table shows the effects of BHC exits from the SEC disclosure system on bank liquidity creation are robust to the inclusion of deposit rates and interest income as covariates. Panel A presents the first-stage estimates and shows that the probability of a BHC exit increases discontinuously for banks whose holding companies are below the 1200 SoR threshold. The outcome variable is $ExitSEC$, which equals one if the holding company of the bank has exited the SEC disclosure system, and zero otherwise. The variable of interest is $BelowThreshold$, which equals one if the holding company of the bank is below the 1200 SoR threshold ($NSoR \leq 1200$), and zero otherwise. Column 1 and 2 report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold using a triangle kernel. As indicated, nonparametric local quadratic and cubic regressions are used to estimate results shown in other columns. All specifications allow for covariate adjustment. In models 1, 3, and 5, the covariates include capital ratio and the natural logarithm of GTA as in models in Table 4. In models 2, 4, and 6, the covariates include not only capital ratio and the natural logarithm of GTA but also core deposit rate, large time deposit rate, and the interest income scaled by gross loans. Model 1, 3, and 5 use MSE-optimal bandwidths following Calonico, Cattaneo, and Titiunik (2014). To alleviate concerns regarding the distortion of bandwidth selection due to missing values, I keep the main bandwidth used to construct the RD point estimator as well as the bias bandwidth used to construct the bias-correction estimator as I add controls. I estimate a linear probability model, and thus the coefficient on $BelowThreshold$ measures the difference in the probability of a BHC exit between banks just below and just above the threshold.

Panel B shows that a BHC exit from the SEC disclosure system causes a significant increase in a bank subsidiary's liquidity creation. The outcome variable is CATFAT/GTA, i.e., the preferred measure of bank liquidity creation normalized by bank GTA. The estimation is conducted via NP2SLS, where $\widehat{ExitSEC}$ is the instrumented variable with predicted values from the first stage. Column 1 and 2 report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold using a triangle kernel. Nonparametric local quadratic and cubic regressions are used to estimate results shown in other columns. All specifications allow for covariate adjustment. In models 1, 3, and 5, the covariates include capital ratio and the natural logarithm of GTA as in models in Table 4. In models 2, 4, and 6, the covariates include not only capital ratio and the natural logarithm of GTA but also core deposit rate, large time deposit rate, and the interest income scaled by gross loans. Model 1, 3, and 5 use MSE-optimal bandwidths following Calonico, Cattaneo, and Titiunik (2014). To alleviate concerns regarding the distortion of bandwidth selection due to missing values, I keep the main bandwidth used to construct the RD point estimator as well as the bias bandwidth used to construct the bias-correction estimator as I add controls. All estimates in the table are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 9
Robustness to alternative measures of bank liquidity creation
Panel A. Three alternative measures by Berger and Bouwman (2009)

	CATFATLC30/GTA	CATFATSECADJ/GTA	CATNONFAT/GTA
		Local Linear	
	(1)	(2)	(3)
$\widehat{ExitSEC}$	0.2243***	0.4464***	0.2706***
	(0.0405)	(0.0768)	(0.0474)
Covariate-Adjustment	Yes	Yes	Yes
Effective Observations	225	225	261

Panel B. Components of the preferred measure—CATFAT

	LC_A/GTA	LC_L/GTA	LC_OBS/GTA
		Local Linear	
	(1)	(2)	(3)
$\widehat{ExitSEC}$	0.0583***	0.0434***	0.0447***
	(0.0217)	(0.0156)	(0.0093)
Covariate-Adjustment	Yes	Yes	Yes
Effective Observations	389	131	225

The table presents the fuzzy regression discontinuity estimates of change in the alternative measures of bank liquidity creation as a result of BHCs' exit from the SEC disclosure system. Similar to the results reported in Panel B of Table 2, they are obtained via NP2SLS with a triangular kernel. All estimations use the MSE-optimal bandwidth following Calonico, Cattaneo, and Titiunik (2014). The variable of interest, $\widehat{ExitSEC}$, is the instrumented variable with predicted values from the first stage $ExitSEC = \alpha_0 + \alpha_1 BelowThreshold + f_1(NSoR) + BelowThreshold \cdot f_2(NSoR) + \alpha X + u$ as illustrated in Section 3.1. Panel A reports the estimates of changes in the other three measures of bank liquidity creation (normalized by GTA) introduced in Section 3.2. CATFATLC30 is identical to CATFAT except for that it incorporates the frequency with which customers obtain liquid funds on off-balance sheet guarantees. CATFATSECADJ is same as CATFAT except for that it was constructed using an alternative way of establishing which bank assets are securitizable. CATNONFAT excludes all off-balance sheet bank activities. Panel B reports the estimates of changes in the three elements of the preferred measure of bank liquidity creation CATFAT (normalized by GTA) illustrated in Section 3.2. LC_A measures the asset-side liquidity creation, and LC_L the liability-side liquidity creation. LC_OBS quantifies the off-balance sheet liquidity creation. All columns report the results of estimating a nonparametric local linear regression on either side of the 1200 SoR. All specifications allow for covariate adjustment, and the covariates include not only capital ratio and the natural logarithm of GTA but also core deposit rate, large time deposit rate, and the interest income scaled by gross loans. All estimates are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 10
Robustness to the choice of the bandwidth
Panel A.

	CATFAT/GTA			CATNONFAT/GTA		
	(1)	(2)	(3)	(4)	(5)	(6)
	± 100	± 200	± 600	± 100	± 200	± 600
$\widehat{ExitSEC}$	0.2868***	0.3903***	0.9123***	0.1505**	0.2698***	0.7166***
	(0.1250)	(0.0657)	(0.1755)	(0.0850)	(0.0522)	(0.1410)
Covariate-Adjustment	Yes	Yes	Yes	Yes	Yes	Yes
Effective Observations	419	1,091	3,600	419	1,091	3,600

Panel B.

	CATFATLC30/GTA			CATFATSECADJ/GTA		
	(1)	(2)	(3)	(1)	(2)	(3)
	± 100	± 200	± 600	± 100	± 200	± 600
$\widehat{ExitSEC}$	0.1918***	0.3056***	0.7740***	0.5590***	0.6657***	0.9739***
	(0.0967)	(0.0560)	(0.1507)	(0.2154)	(0.0858)	(0.2441)
Covariate-Adjustment	Yes	Yes	Yes	Yes	Yes	Yes
Effective Observations	419	1,091	3,600	419	1,091	3,600

The table shows robustness to the choice of the bandwidth. Both panels present the estimate and standard error of the coefficient on the instrumented variable $\widehat{ExitSEC}$ in the second-stage of the NP2SLS estimations. I follow the local linear specification. Column 1-3 present the fuzzy regression discontinuity estimates of change in normalized bank liquidity creation as measured by CATFAT/GTA on bandwidths 100, 200 and 600. Estimates of changes in alternative measures CATNONFAT/FAT, CATFATLC30/GTA, and CATFATSECADJ/GTA are shown in other columns. All specifications allow for covariate adjustment, and the covariates include not only capital ratio and the natural logarithm of GTA but also core deposit rate, large time deposit rate, and the interest income scaled by gross loans. All estimates are adjusted for mass points in the running variable. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 11
Pre-JOBS Act period regression discontinuity estimation for bank liquidity creation

	CATFAT/GTA					
	MSE-Optimal		± 100		± 200	
	(1)	(2)	(3)	(4)	(5)	(6)
BelowThreshold	0.027	0.011	0.028	0.026	0.004	-0.012
	(0.019)	(0.018)	(0.026)	(0.0025)	(0.012)	(0.013)
Covariate-Adjustment	No	Yes	No	Yes	No	Yes
Effective Observations	102	128	493	493	1,310	1,310

This table reports the results of estimating a nonparametric local linear regression on either side of the 1200 SoR threshold using a triangle kernel for the pre-JOBS Act period (2008Q1-2012Q1). The outcome variable is the preferred measure of bank liquidity creation normalized by GTA. The variable of interest is $BelowThreshold$, which equals one if the holding company of the bank is below the 1200 SoR threshold immediately preceding the enactment of the JOBS Act ($NSoR \leq 1200$), and zero otherwise. Columns 1 and 2 are estimated using the optimal bandwidth selection method developed by Calonical, Cattaneo, and Titiuuik (2014). 100 and 200 bandwidths are used to estimate the nonparametric local linear regression in other columns. Columns 2, 4, and 6 allow for covariate adjustment, and the covariates include capital ratio and deposits-to-GTA ratio. Robust standard errors are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Appendix

Table A1
Definition of the main variables used in empirical analysis

Variable	Definition
NSoR	The holding company of Bank i's the number of shareholders of record (SoR) right before the enactment of the JOBS Act on April 5, 2012. NSoR is constructed based on the SoR number reported on the most recent 10-K filings of the BHCs before the enactment of the JOBS Act. Source: EDGAR Company Filings
BelowThreshold	The indicator variable that takes the value of one if NSoR is less than or equal to 1200, and zero otherwise. Formally, $BelowThreshold_i$ equals one if $NSoR_i \leq 1200$, and zero otherwise. Source: EDGAR Company Filings
ExitSEC	The indicator variable that takes the value of one if the holding company of the bank has exited the SEC disclosure system, and zero otherwise. Formally, $ExitSEC_{it}$ equals one if the BHC of bank i has exited the SEC disclosure system in quarter t, and zero otherwise. Source: EDGAR Company Filings
LC_A ($M)	The asset-side liquidity creation defined by Berger and Bouwman (2009). Formally, LC_A=½ Illiquid Assets -½ Liquid Assets. Table A2 details how Berger and Bouwman (2009) classify bank assets. Source: Bouwman's website
LC_L ($M)	The liability-side liquidity creation defined by Berger and Bouwman (2009). Formally, LC_L=½ Liquid Liabilities -½ Illiquid Liabilities plus Equity. Table A2 details how Berger and Bouwman (2009) classify bank liabilities. Source: Bouwman's website
LC_OBS ($M)	The off-balance sheet liquidity creation. Formally, LC_OBS=½ Illiquid Off-Balance Sheet Items -½ Liquid Off-Balance Sheet Items. Table A2 details how Berger and Bouwman (2009) classify off-balance sheet activities of banks. Source: Bouwman's website
CATFAT ($M)	Berger and Bouwman (2009)'s preferred measure of bank liquidity creation, including both on- and off-balance sheet activities. Formally, CATFAT=LC_A+LC_L+LC_OBS. Source: Bouwman's website

Table A1-Continued

Variable	Definition
CATNONFAT ($M)	Berger and Bouwman (2009)'s measure of on-balance sheet liquidity creation. Formally, CATFAT=LC_A+LC_L. Source: Bouwman's website
CATFATLC30 ($M)	An alternative measure of bank liquidity creation created by Berger and Bouwman (2009). It is identical to CATFAT except for that it incorporates the frequency with which customers obtain liquid funds on off-balance sheet guarantees. Source: Bouwman's website
CATFATSECADJ ($M)	An alternative measure of bank liquidity creation created by Berger and Bouwman (2009). It is identical to CATFAT except for that it is based on an alternative way of establishing which bank assets are securitizable. Source: Bouwman's website
GTA ($M)	Gross total assets. Following Berger and Bouwman (2009), I define gross total assets as assets plus the allowance for loan and lease losses and the allocated transfer risk reserve. Source: Bouwman's website
Illiquid Assets ($M)	Formally, Illiquid Assets=GTA-Liquid Assets. Liquid assets are the sum of cash, federal funds sold & reserve repos and securities excluding MBS/ABS securities. Source: Bouwman's website and WRDS Bank Regulatory Database
Total Deposits ($M)	Total bank deposit. Source: Bouwman's website
Uninsured Deposits ($M)	Following Chen, Goldstein, Huang, and Vashishtha (2020), I define the uninsured deposits as the sum of the amount of deposit accounts of more than $250,000. Source: WRDS Bank Regulatory Database
AS_UDA ($M)	The average size of uninsured deposit accounts. It is calculated as the amount of deposit accounts of more than $250,000 divided by the number of deposit accounts of more than $250,000. For simplicity, I exclude retirement accounts in the calculation.
Core Deposit Rate (%)	Formally, core deposit rate=within quarter interest expense on core deposits/sum of the quarterly average balance of core deposits. Following Chen et al. (2020), I deem transaction deposits, saving deposits, and small time deposits core deposits. Source: WRDS Bank Regulatory Database
Large Time Deposit Rate (%)	Formally, large time deposit rate=within quarter interest expense on large time deposits/the quarterly average balance of large time deposits. Source: WRDS Bank Regulatory Database

Table A1-Continued

Variable	Definition
Interest Income ($M)	Bank's total interest income Source: WRDS Bank Regulatory Database
Equity ($M)	Bank equity. Source: WRDS Bank Regulatory Database
Capital Ratio (%)	Formally, Capital Ratio=Equity/GTA. Source: WRDS Bank Regulatory Database and Bouwman's website
Gross Loans ($M)	Bank gross loans. Source: Bouwman's website
NPL ($M)	Nonperforming loans. Source: WRDS Bank Regulatory Database
Unreserved NPL ($M)	Nonperforming loans for which are not reserved. Source: WRDS Bank Regulatory Database
LLR ($M)	Loan loss reserves. Source: WRDS Bank Regulatory Database
Loan Growth (%)	Quarter percentage change in gross loans. Source: Bouwman's website
Lag_ROE (%)	The lagged annualized ROE with a lag of one quarter. ROE is calculated as within quarter net income divided by beginning equity. Source: WRDS Bank Regulatory Database
Lag_Wholesale Funding	The lagged Wholesale Funding with a lag of one quarter. Wholesale Funding is calculated as the sum of large time deposits, deposits booked in foreign offices, subordinated debt & debentures, gross federal funds purchased and repos, and other borrowed money. The sum is scaled by GTA.

Table A2
Liquidity classification of bank activities and construction of four liquidity creation measures (Berger and Bouwman 2009)

	Assets	
Illiquid assets (weight=1/2)	**Semiliquid assets (weight=0)**	**Liquid assets (weight=-1/2)**
Commercial real estate loans (CRE)	Residential real estate loans (RRE)	Cash and due from other institutions
Loans to finance agricultural production	Consumer loans	All securities (regardless of maturity)
Commercial and industrial institutions loans	Loans to depository institutions	Trading assets
Other real estate owned (OREO)	Loans to state and local governments	Fed funds sold
Customers' liability on bankers' acceptance	Loans to foreign governments	
Investment in unconsolidated subsidiaries		
Intangible assets		
Other assets		
	Liabilities plus equity	
Liquid liabilities (weight=1/2)	**Semiliquid liabilities (weight=0)**	**Illiquid liabilities (weight=-1/2)**
Transactions deposits	Time deposits	Banks' liability on bankers' acceptance
Savings deposits	Other borrowed money	Subordinated debt
Overnight federal funds purchased		Other liabilities
Trading liabilities		Equity
	Off-balance sheet guarantees (notional values)	
Illiquid gurantees (weight=1/2)	**Semiliquid guarantees (weight=0)**	**Liquid guarantees (weight=-1/2)**
Unused commitments	Net credit derivatives	Net participations acquired
Net standby letters of credit	Net securities lent	
Commercial and similar letters of credit		
All other off-balance sheet liabilities		
	Off-balance sheet derivatives (gross fair values)	
		Liquid derivatives (weight=-1/2)
		Interest rate derivatives
		Foreign exchange derivatives
		Equity and commodity derivatives

Note: CATFAT=LC_A+LC_L+LC_OBS, where LC_A denotes the asset-side liquidity creation and LC_A=1/2 Illiquid Assets-1/2 Liquid Assets, LC_L represents the liability-side liquidity creation and LC_L=1/2 Liquid Liabilities-1/2 Illiquid Liabilities plus Equity, and LC_OBS indicates off-balance sheet liability creation and LC_OBS=1/2 Illiquid Off-Balance Sheet Items-1/2 Liquid Off-Balance Sheet Items. CATFATLC30 is identical to CATFAT except for that it incorporates the frequency with which customers obtain liquid funds on off-balance sheet guarantees. CATNONFAT only includes on-balance sheet items. CATFATSECADJ is constructed using an alternative way of establishing which bank assets are securitizable.

All companies listed on Nasdaq or NYSE are 12(b). **OTC companies are generally 12(g).**

ITEM 5. MARKET FOR THE REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

The Corporation's stock is traded in the over-the-counter market under the symbol CHMG.OB.

Below are the quarterly market price ranges for the Corporation's stock for the past two years, based upon actual transactions as reported by securities brokerage firms which maintain a market or conduct trades in the Corporation's stock and other transactions known by the Corporation's management.

Market Prices During Past Two Years (dollars)

		2011		2010
1st Quarter	$	21.77 - $26.75	$	19.65 - $21.40
2nd Quarter	$	22.50 - $26.00	$	19.90 - $21.55
3rd Quarter	$	22.95 - $24.00	$	20.15 - $22.00
4th Quarter	$	22.50 - $23.75	$	20.50 - $24.00

Below are the dividends paid quarterly by the Corporation for each share of the Corporation's common stock over the last two years:

Dividends Paid Per Share During Past Two Years

	2011	2010
January	$ 0.25	$ 0.25
April	0.25	0.25
July	0.25	0.25
October	0.25	0.25
	$ 1.00	$ 1.00

The Bank is also subject to legal limitations on the amount of dividends that can be paid to the Corporation without prior regulatory approval. Dividends are limited to retained net profits, as defined by regulations, for the current year and the two preceding years. At December 31, 2011, approximately $4.6 million was available for the declaration of dividends from the Bank to the Corporation.

A registered holder of record is the name of the person who is the registered owner of a security and who has the rights, benefits and responsibilities of ownership, which means the same as a **shareholder of record (SoR)** in this paper.

As of February 29, 2012 there were 613 registered holders of record of the Corporation's stock.

Figure A1
Shareholders of Record (SoR) Information in a Form 10-K Filing
This figure shows an excerpt from Chemung Financial Corporation's 10-K filing. Usually, the shareholders of record (SoR) information can be found in Item 5—Market for the registrant's common equity, related stockholder matters and issuer purchase of equity securities. In this example, Chemung Financial Corporation reported that it was traded in the over-the-counter market, which corresponds to the fact that this BHC was registered under Section 12(g) of the Exchange Act. This BHC also reported that there was 613 SoR of the BHC's stock as of February 29, 2012, which is just a few weeks before the enactment of the JOBS Act.