

Impact of FAS 166/167 on the Securitization of Credit Card Loans

Xiaoli (Shaolee) Tian
Fisher College of Business
The Ohio State University
Columbus, OH 43210
(614) 292-2698
tian.241@osu.edu

Haiwen Zhang *
Fisher College of Business
The Ohio State University
Columbus, OH 43210
(614) 292-6547
zhang.614@osu.edu

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* Corresponding author.

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ABSTRACT

Over 80 percent of securitized loans consolidated back onto banks' balance sheets as a result of FAS 166/167 are revolving consumer loans, primarily credit card loans. In this paper, we examine the impact of FAS 166/167 on the credit card loan securitization. First, we document that the affected U.S. banks sponsor significantly less amount of credit card-backed securities after FAS 166/167. In addition, compared with both non-securitized credit card loans from the same securitization banks and credit card loans from non-securitization banks, the balance of securitized credit card loans falls significantly after the adoption of FAS 166/167 for affected banks. We consider two alternative explanations for this reduction: increased financial reporting transparency and reduced regulatory capital arbitrage. Consistent with the latter explanation, we find that banks securitized higher quality credit card loans before the adoption of the new accounting rules and that the differential loan quality between securitized and non-securitized loans from the same securitization banks decreases after FAS 166/167. Overall, our findings suggest that banks reduce credit card securitizations due to decreased regulatory capital arbitrage opportunities after the adoption of FAS 166/167.

1. Introduction

The off-balance-sheet accounting treatment for securitizations was widely criticized during the 2008–2009 financial crisis, as it exacerbates the opacity of these sophisticated financial arrangements, likely preventing investors from properly assessing their risk (Barth and Landsman, 2010; Cheng et al. 2011). In June 2009, FASB issued FAS 166 and 167, which took effect in November 2009, tightening the consolidation requirements for securitizations. As a result, U.S. banks consolidated \$399.9 billion assets (before considering allowances for loan losses) that were previously reported off balance sheet as of March 31, 2010.¹ Of these newly consolidated assets, \$322 billion were securitized credit card loans. Thus, although mortgage loans are generally blamed for the financial crisis, the main impact of the accounting rules was on revolving consumer loans, primarily credit card loans.² After FAS 166/167, essentially all securitized credit card loans sponsored by bank holding companies are consolidated on these banks' balance sheets.³

We evaluate the economic consequences of FAS 166/167 by focusing on credit card loan securitizations. Our objective is twofold. First, we examine whether the change from off- to on-balance-sheet accounting treatment affects the quantity of credit card loan securitizations. Both the popular press and the academic literature suggest that banks prefer to report lower leverage to investors and regulators (Bens and Monahan 2008; Owen and Wu 2015). If the adoption of FAS

¹ http://www.federalreserve.gov/releases/h8/h8notes.htm#notes_20110429

“The major asset items affected were other securities, mortgage-backed securities, -\$6.4; other securities, non-MBS, -\$23.5; commercial and industrial loans, \$19.1; real estate loans, revolving home equity loans, \$5.5; real estate loans, closed-end residential loans, \$20.9; real estate loans, commercial real estate loans, \$1.2; consumer loans, credit cards and other revolving plans, \$321.9; consumer loans, other consumer loans, \$24.6; other loans and leases, all other loans and leases, \$46.1; allowance for loan and lease losses, \$36.4; cash assets, \$4.1; trading assets, other trading assets, -\$1.7; and other asset items, -\$11.9.”

² According to the Federal Reserve, “Credit card loans comprise most of revolving consumer credit measured in the G.19, but other types, such as prearranged overdraft plans, are also included.”

³ One exception is Citigroup Inc., which consolidated all its \$111 billion off-balance-sheet securitized credit card loans onto the balance sheet upon the adoption of FAS 166/167 but started to report small off-balance-sheet securitized credit card loans from 2011, ranging from \$134 to \$481 million.

166/167 reduces the “benefits” of off-balance-sheet accounting treatment for credit card securitization, we expect to find banks securitizing less amount of credit card loans. However, securitization as a funding source generates important economic benefits, such as risk sharing, improving liquidity, and reducing cost of capital (Pavel and Phillis 1987, Pennacchi 1988, DeMarzo 2005). Although banks cannot restructure credit card loan securitizations to avoid consolidation, they may make other business-line adjustments or restructure other types of securitizations to minimize the impact of the new accounting rules on their reported leverage (Bens and Monahan 2008, Bonsall et al. 2015, Dou et al. 2016). Thus, it is not clear whether the adoption of FAS 166/167 indeed affects the magnitude of credit card securitizations.

If FAS 166/167 does reduce the quantity of credit card securitizations, the next question is why. Our second research objective is to differentiate between two explanations for such reduction: increased financial reporting transparency versus reduced regulatory capital arbitrage (RCA) opportunity. While both are consistent with the quantity effect, the implications of the two explanations on the wealth transfer effect are quite different. The increased financial reporting transparency argument mainly focuses on mitigating the information asymmetry between corporate insiders and external investors (particularly equity investors) and contends that FAS 166/167 allows investors to better assess risk. Following this argument, decreased securitizations resulting from more transparent financial reporting represent less “excessive” risk taking and maximize shareholder value. We would expect to find that banks securitized *riskier* credit card loans and hid these loans via off-balance-sheet special purpose vehicles before FAS 166/167. On the other hand, the reduced RCA opportunity argument focuses on the conflicts of interest between shareholders and regulators and presumes that the optimal leverage ratio and level of risk-maximizing shareholder value is often higher than that preferred by regulators since

their mission is to promote the safety and soundness of the banking industry and to reduce systemic risk (Stulz 2014). This argument predicts that banks transfers *safer* loans to off-balance-sheet vehicles to increase reported regulatory capital ratio, such as the Tier 1 ratio. This approach allows banks to retain riskier loans, maximizing the expected future payoffs for shareholders for a given amount of capital (Pavel and Phillis 1987; Jones 2000; Ambrose et al. 2005).

To examine our research questions, we identify bank holding companies that sponsored credit card loan securitizations before the adoption of the new accounting rules. We test for changes in the quantity and quality of their securitized credit card loans from before FAS 166/167 (2006–2009) to afterward (2010–2014). To mitigate the impact of confounding events, such as the financial crisis or the Dodd-Frank Act, we adopt a difference-in-difference research design and identify multiple control groups. First, following Bens and Monahan (2008), we compare the time-series changes in the aggregate amount of credit card ABS issuance sponsored by our sample banks with that sponsored by non-U.S. banks and U.S. nonbank institutions. As non-U.S. banks are not subject to FAS 166/167, their issuance helps control for changes in the global securitization market. U.S. nonbanks serve as another helpful control group, as they face not only the same securitization market conditions but also the same consumer-lending regulations (such as the Truth-In-Lending Act 1968 and the Credit Card Act 2009) as the treatment banks. We find that the U.S. banks dominate the credit card ABS market before the adoption of FAS 166/167, as evidenced by the 85% of market share before 2010. As expected, we also find that the overall ABS issuance fell dramatically in 2009, due to the financial crisis. However, the most striking change we document is that U.S. banks reduced their credit card ABS issuance from \$40 billion in 2009 to \$3.3 billion in 2010 after the adoption of FAS 166/167—a reduction of 92%, suggesting that the adoption of the accounting rules induced an

immediate significant change in the issuance of ABS issuance. Although U.S bank-sponsored credit card ABS issuance increases after 2010, as the market recovers, the decrease from pre to post FAS 166/167 is economically and statistically significant, relative to ABS issuance by both U.S. nonbanks and non-U.S. banks.

The above results suggest that the reduction in credit card ABS issuance sponsored by the treatment banks following FAS 166/167 are unlikely driven by general changes in the securitization market conditions. However, treatment banks may have changed their overall loan management behavior after 2010 differently than sponsors in the control groups for reasons unrelated to FAS 166/167. Thus, our next test compares the balance of *securitized* credit card loans (i.e., loans transferred to the master trust) with that of *non-securitized* credit card loans within the same treatment bank. This within-bank comparison controls for time-varying credit supply and loan management behavior at the bank-quarter level. We find that the balance of securitized credit card loans (i.e., loans transferred to the master trusts) for the sample banks fell by 40% from before to after FAS 166/167. In contrast, the balance of non-securitized credit card loans from the same securitization banks remained at the same level.⁴

Overall, we document that the affected banks securitize less amount of credit card loans following the adoption of FAS 166/167 and that this result is robust to multiple control groups. One explanation is increased transparency. Prior research provides evidence that banks tend to securitize riskier mortgages and industrial loans (Keys et al. 2010; Bord and Santos 2015) and that managers engage in insider trading and earnings management to exploit the complexities of securitizations (Dechow et al 2010; Ryan et al. 2016). Evidence also shows that FAS 166 and 167 better reflect the underlying economic risks and improve banks' financial reporting (Oz

⁴ We also compare the changes in balance of securitized credit card loans with changes in balance of credit card loans from banks that do not engage in credit card securitization. Inference is the same.

2013; Ahn 2014; Bonsall et al. 2015). If decreased credit card securitization following FAS 166/167 results from less risk taking, we expect to find that banks securitized riskier loans beforehand and that the asset quality of securitized assets improves afterward. We conduct the same within-bank comparison as in the quantity test and use the percentage of 30-day or 90-day past-due loans as the ex-post measures of asset riskiness. Inconsistent with the transparency explanation, we find that the percentage of the 90-day (30-day) and above past-due loans is 2.1% (4.4%), on average, for securitized credit card loans, significantly lower than the 3.6% (6.9%) for non-securitized credit card loans from the same securitization banks before FAS 166/167. This finding suggests that banks securitize safer assets to engage in regulatory capital arbitrage before the adoption of FAS 166/167. We also find that the differential asset quality between securitized and non-securitized loans dropped after FAS 166/167, suggesting that regulatory capital arbitrage becomes less important in explaining credit card securitization structures. Collectively, our evidence suggests that FAS 166/167 reduces banks' regulatory capital arbitrage opportunities via credit card securitizations and thus banks reduced their securitization activities accordingly.⁵

Our study makes three contributions. First, understanding how mandatory accounting rule changes affect firm's future cash flow distributions and related wealth transfer effects has long been an important research topic (Holthausen and Leftwich 1983). Understanding the real effect of the accounting rules on bank financing and investment is even more important, as banks serve as financial intermediaries and provide capital for both industrial firms and consumers. Bens and Monahan (2008) provide evidence that banks restructure ABCP to avoid consolidation of the ABCP conduit following FIN 46. Building on their research, we examine how *actual*

⁵ Note that we do not claim that the adoption of FAS 166/167 reduces banks' overall regulatory arbitrage activities. Our research objective is to examine the real effects of the accounting rules on the mostly affected line of business. How banks adjust mortgage or industrial loan management activities in response to FAS 166/167 is out of the scope of this paper.

consolidation affects banks' securitizations. Since banks do not have the option of restructuring the transaction to avoid consolidation, the cost-benefit trade off as well as the timing of real transaction adjustment maybe different. In addition, we also examine securitized versus non-securitized loan quality to differentiate between increased financial reporting transparency and reduced regulatory capital arbitrage. Although FASB and bank regulators both contend that the new rules better reflect bank risk, they have different objectives and serve different stakeholders. Differentiation between the two channels contributes to understanding of the wealth transfer effect among managers, shareholders, and stakeholders represented by bank regulators.

Second, due to several special features of credit card securitizations, discussed in Section 2, virtually all securitized credit card loans are consolidated onto banks' balance sheets, providing a clean research setting to examine the impact of consolidation resulting from FAS 166/167. Two concurrent papers, by Dou (2016) and Dou et al. (2016), examine the impact of FAS 166/167 on banks' small business lending and mortgage lending, respectively. Unlike their work, this paper focuses on how the new accounting rules affect bank financing activities (versus investing activities). We believe our paper complements their studies by providing direct evidence that FAS 166/167 reduces banks' opportunity for regulatory capital arbitrage via credit card securitization, leading to less securitization.

Finally, the Federal Reserve reports that the total outstanding consumer revolver loans (mostly credit card loans) were \$916 billion at the end of 2009, of which \$442 billion were securitized off balance sheet. The economic significance of credit card loans is even higher if one considers the revolving nature of the loans. In terms of the instrument performance, credit card backed ABS instruments have one of the lowest default rates compared with ABS instruments

backed with other types of assets (Griffin et al. 2014).⁶ While existing research focuses on MBS, CLOs, or ABCPs when examining the implication of securitization structures, we believe it is important to better understand the impact of the accounting rules on this market segment.

One caveat of this paper is that our sample is small due to the market structure, constraining cross-sectional analysis. We employ multiple empirical strategies, including time-series analysis and within-bank comparisons, to alleviate the data constraints. Our results are also robust when the standard errors are estimated based on nonparametric bootstrapping.

The remainder of the paper is organized as below. Section 2 describes background information and related literature. Section 3 develops our main hypotheses. Section 4 describes the data and research design. Section 5 presents our empirical results. And Section 6 concludes.

2. Background and Literature Review

2.1 Securitization of credit card loans and related accounting issues

Credit card securitization started in 1987. Securitization has been the largest funding source for credit cards since 1990s, representing about 50% of the industry funding. According to the FDIC, *“Because investors look to the securitization structure of underlying assets and credit enhancements rather than to the credit card issuer (selling bank) as a source of repayment, unrated or low-rated credit card issuers may be able to obtain triple-A ratings on the securitized credit card receivables”* (FDIC credit card securitization manual 2007). Similar to other types of securitizations, credit card securitizations allow sponsors to share risk, increase liquidity and fee income, and reduce cost of capital.

Different from other ABS instruments, credit card ABS are backed with revolving loans with flexible contracting terms. Thus, the stream of future cash flows generated by these assets is

⁶ Griffin et al. (2014) document that the percentage of ABS deals in default as of December 2010 is 0.8%, 1.4%, 43.7%, 5.6% and 27.7% for instruments backed with auto loans, credit card, home equity, student loans, and mortgage respectively.

not well defined. Credit card balances can be paid down or added to, depending on the end customers' desire, as long as those customers make a minimum monthly payment and stay below their assigned credit limit. In addition, servicers of credit cards usually can change the contract terms, such as interest rates or fees, without the customers' consent after an introductory period. Thus, the norm is that sponsoring banks retain the servicing role for securitized credit card loans to avoid servicer-sponsor conflicts. Since the revolving nature of the credit card loans suggests that the collateral assets can completely turn over every few months, most credit card companies use one or two master trusts to issue debt securities. According to the FDIC, "*A master-trust is set up to allow for receivables to be added to the trust over time and to issue multiple series of certificates identified by specific issue dates all backed by a single pool of credit card receivables in the master trust*" (FDIC Credit Card Securitization Manual).

Before 2010, a master trust was usually set up to satisfy the four broad conditions to qualify as a special purpose entity (QSPE).⁷ Credit card loans transferred to the QSPE thus qualified for off-balance-sheet accounting treatment, except for the portion that constituted "seller's interests" and certain "credit enhancements."⁸ However, both investment professionals and prior literature (Chen et al. 2008; Higgins and Mason 2004) document that banks have incentives to provide implicit recourse, to avoid early amortizations to continue the ABS financing, and that the structure of the master trust allows banks to provide implicit recourse through the ordinary course of business. If banks do not truly transfer credit risks to the SPE

⁷ The four conditions are a) demonstrably distinct from the transferor, b) restricted as to its permitted activities, c) limited as to the types of assets it can hold, and d) limited as to its ability to sell or otherwise dispose noncash financial assets.

⁸ Levitin (2013) explains: "The seller's interest is a "vertical" slice, or participation, of the securitization trust owned by the card issuer. The seller's interest ranks pari passu with the investors' interest. ... Most credit card ABS deals mandate a minimum 7% seller's interest." He also points out that the Dodd Frank minimum 5% risk retention rule, enacted in October 2014, should not affect credit card securitization because of the minimum 7% seller's interest requirement. In addition, the seller's interest does not serve as a credit enhancement, as its main purpose is to "ensure that there will be sufficient collateral available to support the investor certificates, particularly since cardholder seasonal spending patterns cause balances to fluctuate" (FDIC credit card securitization manual 2007).

investors, the off-balance-sheet accounting treatment does not properly reflect the banks' underlying economic risks.

Effective on November 15, 2009, FAS 166 eliminates the concept of qualifying special purpose entity, and thus all securitization transactions are subject to the consolidation assessment. FAS 167 specifies that an entity is the primary beneficiary of a variable interest entity if *a) it has the power to direct the activities of a variable interest entity that most significantly impact the entity's economic performance and b) the obligation to absorb losses of the entity that could potentially be significant to the variable interest entity*. Because a credit card securitization sponsor/servicer can 1) change the composition of the credit card loans transferred to a master trust and 2) adjust the credit card contracting terms, such as interest rate or late fee policies, virtually all securitized credit card loans are consolidated onto sponsoring banks' balance sheets. This accounting change increases banks' reported leverage ratio, which potentially improves their reporting transparency.⁹

2.2 Literature review

Economic theories explain that banks benefit from asset securitization by risk sharing, enhancing competitive advantage and circumventing regulatory constraints (Pennacchi 1988; DeMarzo 2005). Earlier empirical research provides evidence of these economic benefits. Pavel and Phillis (1987) examine commercial bank characteristics and find that avoiding "regulatory tax" matters, but diversification and operating competitiveness are the primary factors for loan sales. Minton et al. (2004) document that risky and highly levered nonbank institutions are more likely to securitize, whereas highly levered banks are less likely to do so, suggesting the main

⁹ Given the potential significant economic impact on banks' regulatory capital, regulators collectively issued a final rule at the beginning of 2010 that allows an optional phase-in period up to four quarters for adopting FAS 166/167 for the purpose of calculating risk-based regulatory capital ratio. <http://www.federalreserve.gov/newsevents/press/bcreg/20100121a.htm>.

motivation for securitization is to diversify risk and reduce distress costs rather than engage in regulatory arbitrage. For a sample of 14,285 conventional mortgage loans originated between 1995 and 1997 by one single lender, Ambrose et al. (2005) differentiate the adverse selection from regulatory capital arbitrage explanations and find that banks securitize relatively higher quality mortgage loans, consistent with the latter explanation.

An emerging empirical literature, prompted by the recent financial crisis, examines the consequences of incentive misalignment resulting from the origination-to-distribution business model. Keys et al. (2010) find that mortgage loans that are more likely to be securitized ex ante (FICO score right above 620) have higher default rates after loan originations, relative to mortgage loans with borrower FICO score right below 620. Bord and Santos (2015) find that loans sold to collateralized loan obligations (CLOs) underperform matched unsecuritized loans originated by the same bank. Both papers argue that securitization reduces originating banks' screening and monitoring incentives. The above discussions assume that risks of the securitized assets are transferred to the ABS investors. However, Acharya et al. (2012) find evidence that investors of asset-backed commercial paper do not suffer losses during the crisis and that, instead of risk sharing, ABCPs are primarily used for regulatory arbitrage.

Schipper and Yohn (2007) summarize the accounting research related to accounting for financial asset transfers. In addition to regulatory capital arbitrage incentives, the accounting literature mainly examines earnings management and insider trading related to securitization (Karaoglu 2005; Dechow et al. 2010; Dechow and Shakespear 2009; Ryan et al. 2016) and whether the off-balance-sheet accounting treatment of securitization properly reflects bank risk. For example, Dechow et al. (2010) provide evidence that firms use sales accounting to manage earnings and CEOs are rewarded for these gains. Ryan et al. (2016) find bank insiders trade on

private information related to complex securitizations. Prior literature also documents that the off-balance-sheet accounting treatment under the previous accounting regime does not properly reflect bank risk (Niu and Richardson, 2006; Chen et al. 2008; Barth et al. 2012) and that reporting becomes more transparent after FAS 166/167 became effective (Oz 2013; Ahn 2014; Bonsall et al. 2015).

There are several papers directly related to our paper that examine how accounting rule changes for securitizations affect banks' investing and financing activities. Bens and Monahan (2008) find that North American banks temporarily sponsored less asset backed commercial paper (ABCP) conduits after the first proposal of FIN 46 and restructured their transactions to avoid ABCP consolidation. Bonsall et al. (2015) also find that banks are less likely to serve as sponsors and servicers simultaneously for mortgage loans after the adoption of FAS 166/167, suggesting banks change securitization structures to avoid consolidation. Our research setting differs in that virtually *all* securitized credit card loans are consolidated onto banks' balance sheets, offering a clean research setting to examine impact of actual consolidation. Our research setting also allows us to rely on loan quality information to differentiate between alternative explanations. Dou (2016) examines the spillover effect of FAS 166/167 on banks' small business lending and documents that banks consolidating securitized assets reduce small business lending. Dou et al. (2016) find consolidation of off-balance-sheet securitizations leads to lower approval rate of mortgage applications for affected banks. Both papers conclude that banks reduce their loan supply after FAS 166/167. Our paper complements these two papers by directly showing how FAS 166 and 167 affect banks' financing through credit card securitizations.

3. Hypothesis Development

Our first hypothesis tests the impact of FAS 166/167 on the quantity of the credit card loan securitizations. Off-balance-sheet accounting treatment for securitizations allows banks to reduce reported leverage ratios. From the perspective of financial reporting transparency, bank managers may prefer less transparency, which allows them to exploit private benefits from securitizations. On the other hand, bank shareholders may prefer lower reported leverage ratios to alleviate regulatory capital constraints. Since banks are required to consolidate all previously off-balance-sheet securitized credit card loans after the adoption of FAS 166/167, we expect reduced credit card securitizations as the “benefits” of off-balance-sheet treatment decrease. However, securitization also provides many economic benefits to sponsoring banks. In addition, although the opportunity of restructuring credit card securitization to achieve off-balance-sheet treatment is limited, there are other ways for banks to manage reported regulatory capital and balance sheet presentations. Thus, ex ante, it is not clear whether the adoption of FAS 166/167 has a significant impact on banks’ credit card securitizations.

H1 (null): The quantity of credit card loan securitization does not change after the adoption of FAS 166/167.

If the adoption of the new accounting rules indeed affects the quantity of credit card securitizations, we further differentiate between two competing explanations: reduced regulatory capital arbitrage (RCA) versus increased financial reporting transparency. Both FASB and bank regulators argue that previous accounting rules (FAS 140, FIN 46R) do not properly reflect the underlying risks of securitization and that off-balance-sheet accounting treatment masks the true level of economic risks. However, different regulators represent different stakeholders. As pointed out by Stulz (2014), the optimal risk level preferred by shareholders is often higher than

that favored by regulators. It is important to differentiate the RCA versus transparency explanations to evaluate the effect of FAS 166/167 on different stakeholders.

Following the regulatory arbitrage argument, banks structure securitizations in a way that results in higher *effective* leverage than *nominal* leverage and take risks to maximize shareholder benefits. In addition, Jones (2000) explains that the most common practice to achieve regulatory capital arbitrage is to re-package and cherry-pick so that low risk instruments are shared with third-party investors. This approach maximizes the expected future payoffs from non-securitized loans for a given level of effective leverage. Thus, the RCA explanation predicts that securitized credit card loans are less risky than that of non-securitized credit card loans from the same bank and that the reduced RCA opportunity resulting from FAS 166/167 will reduce this difference in asset riskiness.

On the other hand, FASB's aim is to improve faithful representation and reporting transparency so that investors can make better decisions. If bank managers engage in off-balance-sheet securitization to hide excessive risk taking, we would expect that banks would securitize riskier credit card loans and that more transparent reporting after FAS 166/167 would reduce the riskiness of securitized loans.

The discussion above leads to our H2a and H2b.

H2a (null): The riskiness of securitized credit card loans is not different from that of non-securitized credit card loans from the same banks before the adoption of FAS 166/167.

H2b (null): The difference in riskiness between securitized and non-securitized credit card loans from the same securitization banks does not change after the adoption of FAS 166/167.

4. Data and Research Design

4.1 *Data and sample*

Bank holding companies report the balances and quality of credit card loans that are consolidated on the balance sheet in Y-9C reports schedule HC-C (Loans and Lease Financing Receivables) and HC-N (Past Due and Nonaccrual Loans, Leases, and Other Assets). Information about off-balance-sheet securitizations is reported in HC-S (Servicing, Securitization, and Asset Sale Activities). Before the adoption of FAS 166/167 in 2010, credit card securitizations (except for sellers' interest and credit enhancements) are reported off balance sheet and disclosed in schedule HC-S. However, since banks essentially consolidated all credit card securitization after 2010, information about the on-balance-sheet credit card loans include both securitized credit card loans that are going through the master trusts and non-securitized credit card loans, precluding reliance solely on Y-9C information to examine the impact of accounting rules on changes in securitized versus non-securitized credit card loans.

We obtain information about the quantity and quality of the securitized credit card loans transferred to the credit card master trusts from the master trusts' periodic 10-D filings. On January 7, 2005, the Securities and Exchange Commission issued final rule 33-8518 – Asset Back Securities, to address comprehensively the registration, disclosure, and reporting requirements for asset-backed securities issued by SEC-registered ABS trusts.^{10,11} An integral part of the final rule is Regulation AB, which requires ABS-issuing entities to disclose information, such as transactional parties, performance of the asset pool, and allocation of cash flows and distribution of payments. The above information is required to be disclosed monthly

¹⁰ <https://www.sec.gov/rules/final/33-8518fr.pdf>

¹¹ Based on the information provided by Asset-Backed Alert, 86% of total amount of the credit card ABS issuance is registered with the SEC from 2006 to 2014. Since a credit card ABS issuance is backed with all the trust assets, a trust is required to file form 10-D if at least one of its issuances is registered with the SEC. Of all the domestic bank holding companies that engage in credit card securitization, only American Express has one trust that does not issue any SEC-registered ABS in 2011 and 2012 with the total issuance amount less \$200 millions, compared to \$7.2 billion ABS issued by the AE master trust that filed with the SEC in 2012. Thus, we are able to identify nearly all securitized credit card loans using form 10-D information.

after ABS issuance in form 10-Ds.

Combining information reported in banks' Y-9C reports and master trusts' form 10-Ds, we obtain credit card loans information, such as loan balances and past-due status for securitized loans and non-securitized loans separately. We obtain ABS issuance information, such as issuance amount and issuance sponsors, from Asset-Backed Alert. Macro-level information, such as aggregate consumer lending and interest rates, is obtained from the Federal Reserve. Finally, we collect information about the impact of FAS 166/167 on banks' financial statements and regulatory capital ratios from sponsoring banks' SEC filings.

To obtain the sample banks, we identify banks that securitize credit card loans from 2006 to 2014. Before FAS 166/167, credit card loan securitization is recorded as an off-balance-sheet item. Thus we first identify banks that have off-balance-sheet credit card securitizations (i.e., item BHCKB707 from Y9C report) greater than \$100,000 before 2010. We then check the characteristics of each bank and delete Barclays Group U.S. Inc., which is a U.S. branch of a foreign bank. We further search for the name of the credit card master trusts for each bank by reading these banks' websites and SEC filings. Through this process, we identify eight domestic banks that set up master trusts and engage in credit card securitization from 2006 to 2014. We list each bank in Table 1.

4.2 *Research Design*

To test our research questions, ideally, we would like to have a randomly selected sample of control banks identical to our treatment banks but are not affected by FAS 166/167. However, finding such banks is infeasible. Thus we rely on both ABS issuance and the balance of securitized credit card loan information and construct multiple control samples to identify the causal effect. We use model (1a) and (1b) to test H1.

$$\begin{aligned}
LOG_ISS_{it} = & \alpha_1 US_BANK_i + \alpha_2 POST_t + \alpha_3 US_BANK_i * POST_t + \alpha_4 REVOLVE_t + \\
& \alpha_5 NON_REVOLVE_t + \alpha_6 MORTGAGE_t + \alpha_7 RATE_t + \alpha_8 CREDIT_SPREAD_t + \\
& \alpha_9 FFR_t + \alpha_{10} SP_RET_t + \varepsilon_{it} \qquad (1a)
\end{aligned}$$

Following Bens and Monahan (2008), Model (1a) tests whether the time-series change of total credit card-backed securities issuance sponsored by the sample U.S. banks differs from that sponsored by the control groups after FAS 166/167. We identify two control groups of ABS sponsors: non-U.S. banks and U.S. nonbank institutions. Since our sample period includes the financial crisis, it is important to control for general changes in market conditions. The control group of U.S. nonbanks is especially helpful because these institutions face the same ABS market conditions and are subject to the same consumer lending regulations, such as the Credit Card Act of 2009, but have fewer incentives to manage reported leverage ratios for transparency or regulatory arbitrage reasons.¹² LOG_ISS is the natural log of aggregate quarterly credit card-backed securities issuance, measured for treatment bank sponsors and control institutions separately. US_BANK is an indicator variable equal to 1 for our sample bank sponsors and 0 for control institutions. POST is an indicator variable equal to 1 for quarters after 2010, which is the adoption year of FAS 166/167. If the sample banks reduce ABS issuance after adopting FAS 166/167, we expect to find α_3 to be significantly negative. We control for changes in the aggregate consumer loans to account for the supply of ABS collateral and the interest rate environment to account for demand for ABS instruments by institutional investors. REVOLVE is quarterly changes in the natural log of aggregate revolving consumer loans outstanding in the U.S. NON_REVOLVE is quarterly changes in the natural log of aggregate non-revolving

¹² The list of U.S. nonbanks that sponsored credit card ABS issuance during our sample period includes Advanta, Alliance Data Systems, Cabela's, Charming Shoppes, Compucredit, Conn's, General Electric, Nordstrom, and Synchrony Financial.

consumer loans outstanding in the U.S. MORTGAGE is quarterly changes in the natural log of aggregate U.S. one-to-four family mortgage loans outstanding. RATE is the average annual percentage rate for all credit card accounts subject to finance charges, measured for each quarter. CREDIT_SPREAD captures the risk premium and is constructed as the difference in yields between BAA and AAA rated long-term corporate bond, measured for each quarter. FFR is federal funds rate, measured for each quarter. SP_RET is the quarterly return on the S&P 500 Index.

Model 1(a) examines whether U.S. banks sponsored less amount of credit card-backed ABS after FAS 166/167, controlling for changes in market conditions using the two separate control groups. However, it is still possible that our sample banks changed their overall loan management after 2010 for reasons unrelated to FAS 166/167. To alleviate this concern, we estimate model 1(b) and examine changes in the balance of securitized credit card loans (i.e., loans transferred to master trusts).

$$\begin{aligned}
 LOG_CRLOAN_{i,s,t} = & \beta_1 SECURITIZE_{i,s} + \beta_2 POST_t + \beta_3 SECURITIZE_{i,s} * POST_t \\
 & + \beta_4 SIZE_{i,t} + \beta_5 CILOAN_{i,t} + \beta_6 RELOAN_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 SIZE_{i,t} * POST_t \\
 & + \beta_9 CILOAN_{i,t} * POST_t + \beta_{10} RELOAN_{i,t} * POST_t + \beta_{11} LIQ_{i,t} * POST_t + \varepsilon_{i,s,t} \quad (1b)
 \end{aligned}$$

We identify two control samples of credit card loans to examine whether FAS 166 and 167 lead to less amount of securitized credit card loans after 2010. The first control sample consists of non-securitized credit card loans from the same securitization bank. This within-bank comparison allows us to control for the time-varying consumer loan management behavior within a given treatment bank. We also identify a second control sample of non-securitized credit card loans from nine banks that do not securitize credit card loans to further control for general

time trend in revolving consumer loans.¹³ $LOG_CRLOAN_{i,s,t}$ is the natural log of the balance of credit card loans for bank i quarter t , either securitized or non-securitized. SECURITIZE is an indicator variable equal to 1 for securitized loans and 0 for non-securitized loans. POST is an indicator variable equal to one for all quarters after 2010 and zero otherwise. Our variable of interest is the interaction of SECURITIZE and POST. If balance of securitized loans decreases more than non-securitized loans, we expect the coefficient for the interaction term β_3 to be significantly negative. We include the following control variables in model (1b). SIZE is log of total assets. CILOAN is the natural log of commercial and industrial loans. RELOAN is log of real estate loans. LIQ is the natural log of a bank's liquid assets, which is the sum of cash plus federal funds sold plus government securities (U.S. Treasuries and government agency debt). Following Purnanandam (2010), we use CILOAN and RELOAN to control for the broad business mix of the banks. All specifications include bank and year fixed effects. Including bank fixed effects should not change the empirical results when the control sample is non-securitized credit card loans from the same securitization banks, but it could affect the results when the control sample is non-securitized credit card loans from non-securitization banks.

To differentiate between improved financial reporting transparency explanation and reduced regulatory capital arbitrage explanation, we use model (2) to test H2(a) and H2(b).

$$\begin{aligned}
 PASTDUE_CRLOAN_{i,s,t} = & \gamma_1 SECURITIZE_{i,s} + \gamma_2 POST + \gamma_3 SECURITIZE_{i,s} * POST \\
 & + \gamma_4 SIZE_{i,t} + \gamma_5 CILOAN_{i,t} + \gamma_6 RELOAN_{i,t} + \gamma_7 LIQ_{i,t} + \gamma_8 SIZE_{i,t} * POST_t \\
 & + \gamma_9 CILOAN_{i,t} * POST_t + \gamma_{10} RELOAN_{i,t} * POST_t + \gamma_{11} LIQ_{i,t} * POST_t + \varepsilon_{i,s,t} \quad (2)
 \end{aligned}$$

¹³ We recognize that banks not securitizing are much smaller. Since the aim is to control for the general time trend affecting credit card loans outstanding, we look for non-securitization banks with relatively large credit card loan portfolios. Specifically, we identify banks with total credit card loans (BHCKB538) greater than the lower quartile of treatment banks in the pre-period (\$1,800 million) or that have total credit card loans scaled by assets that are greater than the lower quartile of treatment banks in the pre-period (4.56%). The nine banks not securitizing include Amalgamated Investment Company, Commerce Bancshares, Capitol Bancorporation, Citizens Financial Group, Fifth Third Bancorp, U.S. Bancorp, Wells Fargo & Company, United National Corporation, and Simmons First National Corp.

We use two measures of the ex post quality of credit card loans to capture their riskiness. $PASTDUE_CRLOAN_{i,s,t}$ is the percentage of loans that are past due for more than 30 days or 90 days, measured for each bank i quarter t for securitized and non-securitized loans separately. We follow the same within-bank research design as in model 1(b) to examine whether banks securitize riskier loans and whether FAS 166 and 167 affect differential loan quality. Similar to model (1b), SECURITIZE is an indicator variable equal to 1 if the credit card loans are securitized and 0 if the loans are non-securitized and from the same treatment bank. POST is an indicator equal to one for quarters after 2010 and zero otherwise. If banks hide risky loans through securitization before adopting FAS 166/167, we expect γ_l to be significantly positive. On the other hand, if the aim of securitization is regulatory capital arbitrage, we expect banks to keep riskier loans and securitize safer loans to maximize expected future payoff ($\gamma_l < 0$). We expect to observe reduced difference in asset quality between securitized and non-securitized loans after FAS 166/167 if the adoption of the new accounting rules changes banks' opportunistic reporting. SIZE is log of total assets. CILOAN is commercial and industrial loans scaled by total assets. RELOAN is real estate loans scaled by total assets. LIQ is bank's liquid assets, which is the sum of cash plus federal funds sold plus government securities (U.S. Treasuries and government agency debt) scaled by total assets.

5. Results Discussions

5.1 Descriptive Statistics

Figure 1 is constructed based on the Federal Reserve Statistical Release historical G-19 series, describing the impact of FAS 166/167 on the consolidation of revolving consumer loans. Areas in black, green, yellow, and red represent balances of revolving consumer credit (in billions) held by depository institutions, other financial companies, nonfinancial companies, and

pools of securitized assets.¹⁴ The total outstanding consumer revolving loans was about \$1.0 trillion at the end of 2007, of which \$398 billion were held by depository institutions as on-balance-sheet assets and \$465 billion were reported as off-balance sheet securitizations. Note that the above two balances change drastically on March 31, 2010, one quarter after the adoption of FAS 166/167. Due to the rule change, depository institutions reported \$670 billions of on-balance-sheet revolving loans, compared to \$374 billion on December 31, 2009, whereas the off-balance-sheet balance drops from a 2009 year-end balance of \$442 billion to \$35 billion within one quarter.¹⁵ Another interesting observation from Figure 1 is that the market share of other nonregulated financial institutions (area in green) increased by over \$50 billion from December 2009 to March 2010, representing a transfer of total managed credit card loans from depository institutions to nonregulated financial institutions. This observation is confirmed by our sample banks. We find seven of the eight sample banks reduced their total managed loans (sum of securitized and non-securitized) during the first quarter of 2010 by an aggregate amount of \$56 billions.

Appendix I provides an example of the impact of FAS 166/167 on Citigroup's balance sheet as of January 1, 2010. The total assets consolidated upon the adoption of FAS 166/167 is \$137.3 billion, representing over 7% of the pre-consolidation total assets. Total liability increases by \$145.7 billion, most of which consists of short-term and long-term debt. Retained earnings fall by \$8.4 billion, due to loan loss allowances. As a result, the Tier 1 capital ratio drops by 141 basis points, a reduction from 11.67% to 10.25%. The most affected loan types are credit cards

¹⁴ The Federal Reserve specifies that pools of securitized assets “include off-balance-sheet securitized loans originated by depository institutions, finance companies, and nonfinancial businesses. Note that if any reporting entity holds securitized loans on its balance sheet, these loans do not contribute to the securitized pools sector but to the sector on whose balance sheet they are consolidated.”

¹⁵ Figure 1 contains no information about the amount of total securitized revolving consumer credit because the Federal Reserve does not provide separate information for on-balance-sheet securitized loans.

(\$86.3 billion) followed by asset-backed commercial paper (\$28.3 billion) and student loans (\$13.6 billions). In contrast, only \$4.4 billion of mortgages and \$2.4 billion of commercial and industrial loans are consolidated onto Citi's balance sheet.

Table 2 presents the descriptive statistics for variables used in our tests. Panel A presents the mean and median values for bank-level variables. The sample banks securitize \$51.69 billion credit card loans on average, 38% higher than the balance of non-securitized credit card loans. The size of the banks is rather large and skewed to the right. Total credit card loans represent 14% of total assets on average. The sample banks carry \$167 billion of real estate loans and \$75 billion of commercial and industrial loans on their balance sheet. Based on banks' 10-K filings, we document that the adoption of FAS 166/167 on January 1, 2010 increased banks total assets and total liabilities by \$59 billion and \$63 billion, respectively. As a result, the average Tier1 capital ratio dropped by 249 basis points. These statistics suggest that FAS 166 and 167 have a significant economic impact on bank balance sheets.¹⁶

Panel B presents the aggregate annual issuance of credit card ABS instruments by different types of sponsors. Before the financial crisis, over 80% of ABS are sponsored by U.S. banks. For example, U.S. banks sponsored \$87 billion of ABS issuance during 2007, whereas U.S. nonbank and non-U.S. institutions sponsored \$7.0 billion and \$3.1 billion, respectively. As expected, both the total ABS issuance and market share of U.S. bank sponsors dropped during the financial crisis. However, the most striking reduction happens in 2010, upon the adoption of FAS 166/167, when U.S. bank-sponsored ABS issuance shrank from \$40 billion in 2009 to \$3.3 billion in 2010, a reduction of 93%, consistent with the explanation that FAS 166/167 had an immediate significant impact on the ABS issuance.

¹⁶ The impact of the accounting rules is not available for First National of Nebraska, as it is a private bank without disclosures in SEC 10-K filings

Panel C presents the mean and median values of the quantity and quality measures for securitized and non-securitized credit card loans of the eight sample banks and non-securitized credit card loans of the nine control banks in both before and after FAS 166/167. The *Securitized* column describes credit card loans transferred to the securitization trusts by treatment banks. The *Nonsecuritized* column describes credit card loans not transferred to the securitization trusts by treatment banks. The *Nonsecuritization Banks* column describes credit card loans for control banks that do not engage in securitization. We find that, from before to after FAS 166/167, the average balance of securitized credit card loans by treatment banks falls from \$68 billion to \$41 billion. In addition, this 41% of reduction is not offset by the balance of non-securitized credit card loans held by securitization banks. In fact, the balance of non-securitized credit card loans of the securitization banks does not change significantly. The total balance of credit card loans for control banks not engaging in securitization increases slightly from \$3.97 billion to \$5.12 billion during the same period. Thus, the balance of securitized credit card loans shrank more significantly than non-securitized loans from the same securitization banks and credit card loans from the control banks. As to the quality of securitized credit card loans, the average 30- (90-) day past-due ratio for securitized credit card loans is 4.4% (2.1%). Both ratios are significantly lower than that of non-securitized loans from the same securitization bank. Overall, the descriptive evidence suggests that banks securitize safer (ex post higher quality) credit card loans before the adoption of FAS 166/167.

5.2 Test Results for H1 – Changes in the quantity of credit card loan securitization

Table 3 presents the test results for H1 based on model (1a)— the impact of FAS 166/167 on the quarterly aggregate credit card ABS issuance sponsored by U.S. banks. Column (1) and (2) report regression results using U.S. nonbank sponsors as the control group, and column (3)

and (4) report results using non-U.S. sponsors as the control group. We first document that the estimated coefficient on US_BANK is significantly positive for all specifications, suggesting U.S. banks issued more ABS before FAS 166/167. The coefficient on US_BANK suggests that the ABS issuance of U.S. banks is 17 to 33 times higher than that of non-U.S. and U.S. nonbank institutions before FAS 166/167. The estimated coefficients for the POST variable in the first two columns are not significant and are positively significant in columns (3) and (4), suggesting non-U.S. institutions sponsored more credit card ABS during the post period relative to the pre-166/167 period. Most importantly, we find that the coefficient for US_BANK * POST is significantly negative in all specifications, rejecting H1. Based on the estimated coefficients of US_BANK * POST in columns (2) and (4), the average ABS issuance sponsored by U.S. banks after adopting FAS 166/167 dropped to about one-fourth of the pre-2010 level. These results are both statistically and economically significant.

Table 4 presents test results of H1 based on model (1b)— the impact of FAS 166/167 on the balance of credit card loans securitized by U.S. banks. Panel A reports results using the non-securitized credit card loans from the same securitization bank as the control group. Since the primary business of American Express and Discover Financial Services relate to credit cards and these two companies only became bank holding companies during the past financial crisis, we separately report results excluding them in column (3) to ensure our results are not driven by the monoline credit card banks. We find that the estimated coefficients for SECURITIZE are positively significant in all specifications. The estimated coefficients suggest the sample banks securitize about 70% of total managed credit card loans before the adoption of FAS 166/167. The estimated coefficient for POST in column (1) is insignificant, providing no evidence that non-securitized loans change significantly from the pre to post period. We also find that the

interaction term SECURITIZE * POST to be significantly negative. The estimated coefficient on SECURITIZE * POST is -0.614 (p-value = 0.002), suggesting the balance of securitized credit card loans decreases by 46% from before to after FAS 166/167. The coefficient on SECURITIZE * POST is -0.772 (p-value = 0.001) in column (3), after excluding American Express and Discover, confirming that the results reported in column (2) are not driven by the two banks. Panel B reports results using non-securitized credit card loans from non-securitization U.S. banks as a control group. Similar to Panel A, we find significantly negative coefficient on SECURITIZE * POST, and the results are not driven by American Express and Discover in Panel B. As for control variables, we find significantly positive coefficients on SIZE in all specifications and significantly negative coefficients on CILOAN in four specifications, suggesting credit card securitization is affected by banks size and loan types. Overall, the main takeaway from Table 3 and Table 4 is that credit card securitizations drop significantly after the FAS 166/167 and this result is not driven by changes in market conditions and banks' overall loan management.

5.3 Test Results for H2—Increased financial reporting transparency versus reduced regulatory capital arbitrage explanations

Table 5 reports test results for H2a and H2b. To differentiate between the increased financial reporting transparency and reduced regulatory capital arbitrage explanations, we compare the loan quality of securitized versus non-securitized loans within the same securitization bank. We find that, before FAS 166/167, banks securitized higher quality credit card loans, as evidenced by the significantly negative coefficient on SECURITIZE across all specifications. The percentage of 30-day (90-day) and above past-due loans for securitized loans is lower by 2.6% (1.4%) than non-securitized loans from the same bank. This result is

inconsistent with the explanation that banks hide riskier loans through off-balance-sheet activities. Instead, it is consistent with the regulatory arbitrage explanation, which suggest banks retain the risky assets to maximize future payoff. To provide further evidence, we also find the coefficient on SECURITIZE * POST to be significantly positive in three of the four specifications. Thus the asset quality between securitized and non-securitized loans becomes more similar after FAS 166/167, and the results become stronger after American Express and Discover are excluded. These results further confirm that FAS 166 and 167 affect bank securitizations via reduced regulatory capital arbitrage because, if banks securitize safer assets for other economic reasons, such as reputation, we would not expect FAS 166/167 to change these incentives.

5.4 Additional tests and considerations

One of the sample banks is not publicly traded (First National of Nebraska). The transparency issue may be less important in this situation. To make sure our results distinguishing increased transparency versus decreased regulatory capital arbitrage opportunity are not driven by First National of Nebraska, we re-run our loan quality test (Table 5 Panel A) excluding First National of Nebraska. Untabulated results show that our results are similar after excluding First National of Nebraska. Specifically, when PASTDUE_CRLOAN is for 30 (90) days or above, the coefficient for SECURITIZE is -0.019 (-0.010) with both P-values less than 0.001. Furthermore, we also check the robustness of our results by eliminating one bank at a time. Our main results are not driven by any one particular bank.

The total asset variable (AT) measures total assets that are on banks' balance sheet. Securitized credit card loans are excluded in the AT measure before FAS 166/167 but included in the AT measure after FAS 166/167 as they are consolidated back onto the balance sheets. This

inconsistency may bias our quality test since all of our control variables in the test are scaled by total assets. To check the robustness of our quality test results, we adjust the asset measure by excluding securitized credit card loans and find very similar results. Specifically, when PASTDUE_CRLOAN is for 30 (90) days or above, the coefficient for SECURITIZE is -0.026 (-0.014) with both P-values less than 0.001.

FAS 166/167 were issued in June 2009 and the related final exposure drafts were issued in September 2009. On one hand, the reported Tier 1 regulatory capital was not affected until March 31, 2010. Figure 1 also suggests that the sell-off of \$50 billion managed credit card loans happened during the first quarter of 2010. On the other hand, it may take some time for banks to make adjustment to its securitized credit card loan portfolios. To further explore when the change in securitization behavior takes place, we re-ran the quantity test reported in Table 4 Panel A and B Column (2) by redefining a pseudo POST period each quarter from quarter one of 2008 to quarter four of 2010. When comparing balances of securitized versus non-securitized credit card loans from the same securitization bank, the estimated coefficient for SECURITIZE*POST ranges from 0.034 (P-value=0.900) to -0.614 (P-value=0.002). When comparing balances of securitized versus non-securitized credit card from non-securitization banks, the estimated coefficient for SECURITIZE*POST ranges from -0.110 (P-value=0.040) to -0.296 (P-value=0.001). Thus, the results show that the biggest reduction in credit card securitization comes from the specifications when POST is defined as 1 for all quarters after 2010 immediately after FAS 166/167 became effective.

One issue related to the parametric linear specification for a small sample is the potential violation of the normality assumption. Bootstrapping helps alleviate this concern as it generates the sampling distribution based on the available information. Specifically, we use a wild

bootstrap cluster procedure, which is robust to heteroscedasticity in small samples (Davidson and Flachaire 2008).¹⁷ Our results based on wild bootstrapping with 1000 repetitions are weaker, but the inferences of our results are generally similar. For instance, untabulated results show that the two sided P-value for SECURITIZE*POST in Table 4 Panel A column (3) specification is 0.113. The two sided P-value for SECURITIZE*POST in Table 4 Panel B column (3) specification is 0.028. When PASTDUE_CRLOAN is for 30 days or above the two sided P-value for SECURITIZE in Table 5 Panel B specification is 0.081. When PASTDUE_CRLOAN is for 90 days or above, the two sided P-value for SECURITIZE in Table 5 Panel B specification is 0.095.

Our result suggests that decreased regulatory capital arbitrage opportunities with credit card securitization under FAS 166/167 leads to a reduction in securitizations. Although the power of the cross-sectional test maybe limited due to the limited degree of freedom, we explore whether banks with higher regulatory capital impact experience higher reduction than do banks with lower regulatory capital impact. Based on the adjusted Tier1 regulatory capital after considering the impact of FAS 166/167, we classify 3 banks (N=216) with the lowest adjusted capital ratio as high impact banks and the other 4 banks (N=194) as low impact banks.¹⁸ We then examine if high impact banks experience higher reduction in securitizations. For the specification in Table 4 Panel A column (2), the estimated coefficient for SECURITIZE*POST is -0.863 (P-value < 0.0001) for high impact banks and -0.543 (P-value=0.211) for low impact banks. For the specification in Table 4 Panel B column (2), the estimated coefficient for SECURITIZE*POST is -0.678 (P-value < 0.0001) for high impact banks and -0.309 (P-value < 0.0001) for low impact banks. These results are consistent with our expectation.

¹⁷ We do not use Wild cluster bootstrap results as our main results because there are numerous debates as how one should cluster standard error in a small sample.

¹⁸ We excluded First national bank of Nebraska for this test because it is a private bank and we cannot obtain its FAS 166/167 regulatory impact. The three banks that are in the high regulatory impact sample are: Capital One, JPMorgan Chase and Citigroup. The rest are low regulatory impact banks.

During the last financial crisis banks went through multiple mergers and acquisitions. To alleviate the concern that the reduction in credit card securitization maybe due to some specific M&A activities within our sample banks, we read though all M&A activities related to our sample banks. The M&A activities during our sample period are mostly related to mortgage loans. One M&A that might be of potential concern is that on December 31, 2008, PNC acquired National City through a merger in which PNC continued as the surviving entity. Credit card business became a major operation in PNC after this acquisition. As noted before, we re-ran our quantity test excluding PNC. For the specification in Table 4 Panel A, comparison within the treatment banks, the coefficient for SECURITIZE*POST is -0.403 (P-value < 0.0001). For the specification in Table 4 Panel B, comparison with the control banks, the coefficient for SECURITIZE*POST is -0.386 (P-value=0.009).

Finally, we consider one particular confounding event, the Credit Card Act of 2009. The U.S. congress passed the Credit Card Act on May 22, 2009 to enhance consumer protection. Its major provisions, such as limiting hidden fees, providing more transparent information in monthly statements to consumers, and eliminating excessive marketing to college students, became effective in February 2010. We believe our results are unlikely to be driven by the Card Act of 2009 for several reasons. First, the multiple control groups such as non-regulated U.S. sponsors and non-securitized credit card loans from both securitization banks and non-securitization banks are subject to the same regulation. Second, Agarwal et al. (2015) show that the Card Act reduced hidden fees for credit card loans of riskier borrowers (borrowers with FICO score below 660) whereas our results show that FAS 166/167 affected securitized credit card loans which are less risky than non-securitized loans. Third, Agarwal et al. (2015) find no

evidence of increase in credit card interest rate or reduction in total credit supply. Thus, our results of reduced credit card securitizations are unlikely due to the Card Act of 2009.

6. Conclusion

This paper examines the impact of accounting rules FAS 166 and 167 on credit card securitizations by U.S. banks. Securitization is an important funding vehicle for credit card loans. More than 50% of credit card loans managed by our U.S. sample banks are financed through securitization, and most of them are treated as off-balance-sheet financing before 2010. Due to the special features of credit card loans and related securitization structures, FAS 166 and 167 lead to consolidation of essentially all off-balance-sheet securitized credit card loans into banks' balance sheets. This accounting rule change provides us with a clean research setting to examine whether and why an off- to on-balance-sheet presentation change affects banks' financing activities. We find that banks are less likely to securitize credit card loans and issue credit card-backed financial instruments after the rule change, suggesting a financial reporting incentive helps explain the securitization, beyond traditional economic incentives such as liquidity management or risk sharing. We also find that banks securitized higher quality credit card loans before FAS 166/167, suggesting managers do not use securitization to hide risky assets off the balance sheet. Instead, this asset quality difference in securitized and non-securitized loans is more consistent with bank managers using securitization to improve reported regulatory capital. Finally, we document a reduced asset quality difference, suggesting regulatory capital arbitrage became less important in explaining credit card securitization after FAS 166/167. Although our sample is small, our results are robust to multiple control groups and have important policy implications. Collectively, our results provide evidence that an accounting rule change affects the structure of the securitization market and induces wealth transfers among its stakeholders.

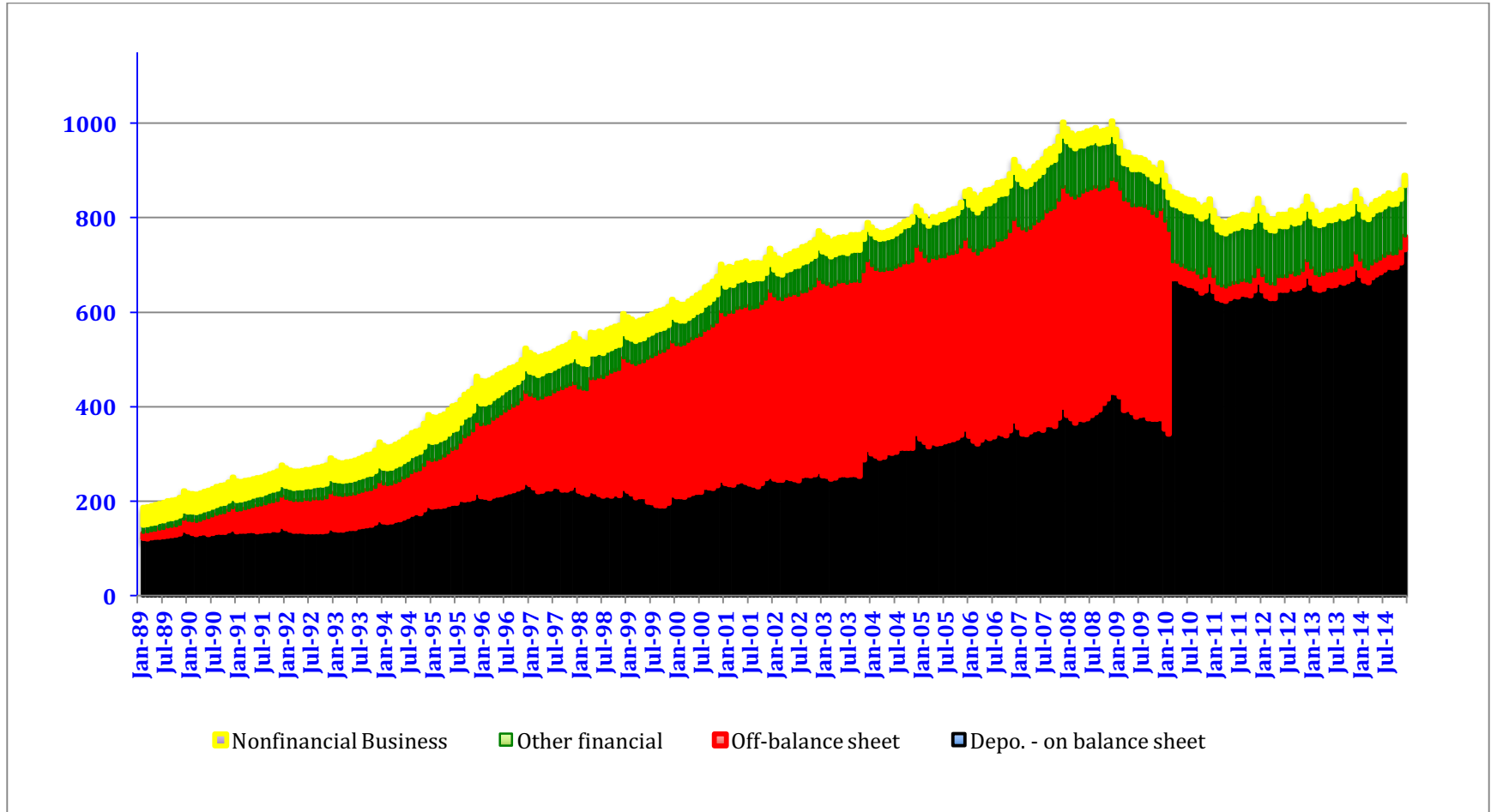
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Figure 1: Revolving Consumer Credit Outstanding (levels) in billions



Information source: Federal Reserve Consumer Credit Historical Data.
<http://www.federalreserve.gov/releases/g19/HIST/default.htm>

Appendix I: Impact of FAS 166/167 on Citigroup (Jan. 1, 2010)

	<i>Assets</i>	<i>\$ billion</i>	
	Trading account assets	-9.9	
	Investments	-0.6	
	Loans	159.4	
	Allowance for loan losses	-13.4	
	Other assets	1.8	
	<i>Total assets</i>	<i>137.3</i>	
	 <i>Liabilities</i>		
	Short-term borrowings	58.3	
	Long-term debt	86.1	
	Other liabilities	1.3	
	<i>Equity</i>		
	Retained earnings	-8.4	
	 <i>Tier 1 Capital</i>	 -141	 bps
	Credit cards	86.3	
	Commercial paper conduits	28.3	
	Student loans	13.6	
	Private label consumer mortgages	4.4	
	Municipal tender option bonds	0.6	
	Collateralized loan obligations	0.5	
	Mutual fund deferred sales commissions	0.5	
	Collateralized debt obligations	1.9	
	Equity-linked notes	1.2	
	 <i>Sum</i>	 137.3	

Table 1: Sample Bank Holding Companies

FIRST NATIONAL OF NEBRASKA, INC.

JPMORGAN CHASE & CO.

PNC FINANCIAL SERVICES GROUP, INC.

BANK OF AMERICA CORPORATION

AMERICAN EXPRESS COMPANY

CITIGROUP INC.

CAPITAL ONE FINANCIAL CORPORATION

DISCOVER FINANCIAL SERVICES

Table 2: Descriptive Statistics

Panel A: Descriptive statistics for the sample banks

Variable (\$ million)	N	Mean	Median
CRLOAN_SECURITIZE	231	51,690	42,820
CRLOAN_NONSECURITIZE	231	37,480	22,950
TOTAL ASSETS	231	1,005,799	296,698
CILOAN	231	75,484	41,582
RELOAN	231	167,200	82,791
LIQ	231	210,220	25,317
FAS166/167_TIER1 (basis points)	7	-249	-139
FAS166/167_ASSET	7	59,139	41,848
FAS166/167_LIAB	7	62,983	44,871

Panel B: Credit card loan-backed securities issuance

Year	Issuance sponsored by U.S. banks (\$ million)	Issuance sponsored by U.S. nonbank institutions (\$ million)	Issuance sponsored by non-U.S. institutions (\$ million)
2006	63,984	6,786	8,179
2007	86,543	6,988	3,082
2008	62,325	1,322	12,311
2009	39,945	6,636	0
2010	3,279	2,949	11,192
2011	8,939	3,645	14,923
2012	21,660	7,190	13,557
2013	29,657	2,671	18,230
2014	38,418	3,747	14,052

Panel C: Univariate analysis of changes in the quantity and quality of the securitized credit card loans

Before FAS 166/167									
	Securitized			Nonsecuritized			Nonsecuritization Banks		
Variable	N	Mean	Media	N	Mean	Median	N	Mean	Median
CR_LOAN	88	68428	53052	88	38984	23632	144	3972	718
PASTDUE_30	88	0.044	0.042	88	0.069	0.053	144	0.063	0.040
PASTDUE_90	88	0.021	0.020	88	0.036	0.027	144	0.024	0.019
After FAS 166/167									
	Securitized			Nonsecuritized			Nonsecuritization Banks		
Variable	N	Mean	Median	N	Mean	Median	N	Mean	Median
CR_LOAN	143	41392	38866	143	36534	22950	180	5120	777
PASTDUE_30	143	0.028	0.025	143	0.039	0.036	180	0.041	0.031
PASTDUE_90	143	0.014	0.013	143	0.023	0.019	180	0.018	0.015

Table 2 Panel A reports descriptive statistics of the credit card securitization sample banks. All dollar amounts are in millions. CRLOAN_SECURITIZE is the quantity of securitized credit card loans. CRLOAN_NONSECURITIZE is the quantity of nonsecuritized credit card loans. TOTAL ASSETS is total assets. CILOAN is commercial and industrial loans. RELOAN is real estate loans. LIQ is the amount of liquid assets. All the above six variables are measured for each bank-quarter. FAS166/167_TIER1 is the impact of the accounting rules on tier 1 regulatory capital. FAS166/167_ASSET is the impact of accounting rules on total assets. FAS166/167_LIAB is the impact of the accounting rules on banks' total liabilities. The impact of the accounting rules is not available for First National of Nebraska, as it is a private bank without disclosures in SEC 10-K filings.

Panel B reports annual aggregate credit card ABS issuance sponsored by U.S. banks, U.S. nonbank institutions, and non-U.S. institutions, respectively.

Panel C reports quality and quantity information for securitized credit card loans, nonsecuritized credit card loans of the securitization banks, and nonsecuritized credit cards loans of nonsecuritization banks for pre and post FAS 166/167 separately. PASTDUE_30 is the percentage of credit card loans that are PAST due for 30 days or more. PASTDUE_90 is the percentage of credit card loans that are PAST due for 90 days or more. Variables that are significantly different between pre and post FAS 166/167 periods at 5% or lower are bolded.

Table 3: Changes in the quarterly aggregate issuance of credit card loan backed securities

	LOG_ISS Column 1		LOG_ISS Column 2		LOG_ISS Column 3		LOG_ISS Column 4	
	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>
US_BANK	2.840***	(0.002)	2.840***	(0.000)	3.518***	(0.001)	3.518***	(0.000)
POST	0.525	(0.428)	-0.412	(0.695)	2.517***	(0.004)	5.387***	(0.003)
US_BANK * POST	-1.702*	(0.098)	-1.702**	(0.023)	-3.695***	(0.002)	-3.695***	(0.000)
REVOLVE			4.162	(0.565)			18.872**	(0.044)
NON_REVOLVE			-1.060	(0.758)			-4.126	(0.243)
MORTGAGE			-2.298	(0.731)			-11.425	(0.166)
RATE			-0.498	(0.240)			-1.113***	(0.008)
CREDIT_SPREAD			-2.516***	(0.002)			-1.291	(0.309)
FFR			-0.054	(0.706)			0.494**	(0.048)
SP_RET			10.112	(0.289)			-2.659	(0.820)
Constant	6.156***	(0.000)	14.103	(0.660)	5.478***	(0.000)	14.107	(0.691)
Observations	72		72		72		72	
R-squared	0.219		0.578		0.236		0.517	

Table 3 reports the test results of H1 based on model 1(a). Heteroscedasticity adjusted p-values are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Column (1) and (2) use U.S. nonbank sponsors as the control group. Column (3) and (4) use non-U.S. sponsors as the control group. Dependent variable LOG_ISS is the natural log of aggregate monthly credit card -backed securities issuance (\$ millions) measured for treatment sponsors (U.S. banks) and control groups, separately. US_BANK is an indicator variable equal to 1 for the sample U.S. bank sponsors. POST is an

indicator variable equal to 1 for months after 2010. REVOLVE is monthly changes in the natural log of aggregate revolving consumer loans outstanding in the U.S. NON_REVOLVE is monthly changes in the natural log of aggregate nonrevolving consumer loans outstanding in the U.S. MORTGAGE is monthly changes in the natural log of aggregate U.S. one-to-four family mortgage loans outstanding. RATE is the average annual percentage rate for all credit card accounts that are subject to finance charges. CREDIT_SPREAD is the difference in yields between the BAA and AAA long-term corporate bond. FFR is the federal funds rate. SP_RET is the monthly return on the S&P 500 Index.

Table 4: Changes in balance of securitized credit card loans

Panel A: Changes in balance of securitized credit card loans relative to nonsecuritized loans from the same securitization bank

	LOG_CRLOAN Column (1)		LOG_CRLOAN Column (2)		LOG_CRLOAN Column (3)	
	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>
Intercept	8.732***	(0.001)				
SECURITIZE	0.980***	(0.001)	0.980***	(0.001)	0.976***	(0.001)
POST	0.263	(0.893)				
SECURITIZE*POST	-0.614**	(0.015)	-0.614***	(0.002)	-0.772***	(0.001)
SIZE	0.636***	(0.009)	1.678**	(0.016)	4.733***	(0.006)
CILOAN	-0.298**	(0.046)	-0.341	(0.282)	-1.399*	(0.072)
RELOAN	0.056	(0.598)	0.010	(0.906)	0.081	(0.899)
LIQ	0.343*	(0.080)	0.574**	(0.047)	0.354	(0.393)
SIZE*POST	0.458	(0.133)	-0.218	(0.481)	-1.733**	(0.029)
CILOAN*POST	0.079	(0.619)	0.375	(0.238)	3.236***	(0.001)
RELOAN*POST	-0.100	(0.352)	-0.133	(0.403)	-1.749***	(0.007)
LIQ*POST	-0.489	(0.035)	-0.151	(0.481)	0.193	(0.515)
Year indicators	NO		YES		YES	
Bank indicators	NO		YES		YES	
N	462		462		368	
R Squared	47.59%		99.82%		99.79%	

Panel B: Changes in balance of securitized credit card loans relative to nonsecuritized loans from non-securitization control banks

	LOG_CRLOAN Column (1)		LOG_CRLOAN Column (2)		LOG_CRLOAN Column (3)	
	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>
Intercept	1.606***	(0.001)				
SECURITIZE	8.312***	(0.001)				
POST	-0.543	(0.303)				
SECURITIZE*POST	-0.371**	(0.044)	-0.296***	(0.001)	-0.307***	(0.001)
SIZE	0.970***	(0.001)	0.771***	(0.001)	1.198***	(0.001)
CILOAN	-0.122	(0.201)	-0.203***	(0.001)	-0.396***	(0.001)
RELOAN	-0.098	(0.144)	0.003	(0.863)	-0.199**	(0.025)
LIQ	-0.057	(0.469)	0.045	(0.247)	-0.003	(0.953)
SIZE*POST	0.284**	(0.012)	-0.050	(0.212)	-0.164**	(0.044)
CILOAN*POST	-0.158	(0.125)	0.206***	(0.001)	0.219***	(0.000)
RELOAN*POST	0.039	(0.569)	-0.104***	(0.001)	0.005	(0.926)
LIQ*POST	-0.178*	(0.060)	-0.096***	(0.000)	-0.094***	(0.003)
Year indicators	NO		YES		YES	
Bank indicators	NO		YES		YES	
N	555		555		508	
R Squared	98.47%		99.99%		99.99%	

Table 4 reports the test results of H1 based on model 1(b). Heteroscedasticity adjusted p-values are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Panel A uses nonsecuritized credit card loans from the same securitization bank as the control group. Panel B uses nonsecuritized credit card loans from control banks that do not engage in credit card securitization as the control group. In both panels, column (3) results exclude American Express and Discover Financial service. LOG_CRLOAN is the natural log of the balance of credit card loans, measured for securitized and nonsecuritized loans separately. SECURITIZE is an indicator variable equal to 1 for securitized loans and 0 for nonsecuritized loans. POST is an indicator variable equal to one for all quarters after 2010. SIZE is log of total assets. CILOAN is the natural log of commercial and industrial loans. RELOAN is log of real estate loans. LIQ is the natural log of a bank's liquid assets, which is the sum of cash plus federal funds sold plus government securities.

Table 5: Increased financial reporting transparency versus reduced regulatory capital arbitrage explanations

Panel A: Difference in asset quality between securitized and non-securitized loans within the same securitization banks

	PASTDUE_CRLOAN (30-day and above) Column (1)		PASTDUE_CRLOAN (90-day and above) Column (2)	
	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>
SECURITIZE	-0.026***	(0.001)	-0.014***	(0.001)
SECURITIZE*POST	0.014**	(0.027)	0.005	(0.136)
SIZE	-0.022	(0.245)	-0.012	(0.261)
CILOAN	-0.107	(0.627)	-0.088	(0.475)
RELOAN	0.261***	(0.004)	0.142***	(0.005)
LIQ	0.202**	(0.021)	0.133***	(0.007)
SIZE*POST	0.002	(0.465)	0.001	(0.459)
CILOAN*POST	-0.093	(0.682)	-0.058	(0.647)
RELOAN*POST	-0.084	(0.406)	-0.039	(0.491)
LIQ*POST	-0.236***	(0.002)	-0.136***	(0.001)
Year indicators	YES		YES	
Firm indicators	YES		YES	
N	462		462	
R-Squared	68.10%		66.30%	

Panel B: Difference in asset quality between securitized and nonsecuritized loans within the same securitization banks—excluding American Express and Discover

	PASTDUE_CRLOAN (30-day and above) Column (1)		PASTDUE_CRLOAN (90-day and above) Column (2)	
	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>
SECURITIZE	-0.027***	(0.001)	-0.014***	(0.001)
SECURITIZE*POST	0.017**	(0.030)	0.010**	(0.023)
SIZE	-0.033	(0.143)	-0.020*	(0.093)
CILOAN	-0.276	(0.341)	-0.152	(0.328)
RELOAN	0.269**	(0.011)	0.156***	(0.006)
LIQ	0.210*	(0.079)	0.110*	(0.086)
SIZE*POST	0.005	(0.205)	0.004	(0.110)
CILOAN*POST	-0.098	(0.718)	-0.040	(0.781)
RELOAN*POST	-0.032	(0.793)	0.002	(0.974)
LIQ*POST	-0.274***	(0.003)	-0.153***	(0.002)
Year indicators	YES		YES	
Firm indicators	YES		YES	
N	368		368	
R Squared	66.38%		63.47%	

Table 5 reports test results of H2 based on model (2). Heteroscedasticity adjusted p-values are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Panel B results exclude American Express and Discover Financial Services. PASTDUE_CRLOAN is the percentage of credit card loans that are past due for either above 30 days or 90 days. SECURITIZE is an indicator equal to one for credit card loans of treatment banks and zero for control banks. POST is an indicator equals one for 2010 and after and zero otherwise. SIZE is log of total assets. CILOAN is commercial and industrial loans scaled by total assets. RELOAN is real estate loans scaled by total assets. LIQ is bank's liquid assets, which is the sum of cash plus federal funds sold plus government securities scaled by total assets.