CREDIT CARD SECURITIZATION, RECOURSE, AND REGULATORY ARBITRAGE

by

Charles W. Calomiris, Eric J. Higgins, and Joseph R. Mason*

Commercial banks have a strong incentive to sell assets in order to increase liquidity, reduce interest rate risk, and avoid burdensome regulations. However, most bank assets are high asymmetric information financial instruments and, as a result, are fundamentally illiquid. Hence, commercial banks have become increasingly reliant upon securitization as a means of selling assets in diversified pools.

Business strategies that revolve around securitization are accompanied by a host of incentive conflicts. At various times during the 1990s, securitization has been associated with financial difficulties arising from fictitious financial ratios (gain-on-sale provisions), understated leverage (Enron), and hidden risks (Enron, PNC, and other commercial banks). The present paper concerns itself with the last of these, that is, the propensity for securitizations to mask risks to the sponsor,[1] whether the sponsor is a bank originating loans or a nonbank firm posting other collateral for securitization (see also Jones 2000).

Risks often remain with the sponsor despite the fact that securitization – and the removal of assets from the sponsor's balance sheet – in theory results in a "true sale" to a legally remote third party. If the assets are not truly sold or the sale is not to a legally defined third party, the assets must be reported on the sponsor's balance sheet. One important condition that determines whether a true sale has taken place is whether the sale agreement provides recourse, or performance guarantees, to the buyer. If recourse terms are present, the assets pose a contingent risk to the seller which, under FASB140, prohibits the removal of the assets from the seller's balance sheet.

While few loan sales contracts contain explicit terms that provide recourse, many loan sales (particularly those involving

---

*Calomiris: Columbia University, NBER, and American Enterprise Institute. Higgins: Kansas State University. Mason: Drexel University, Federal Reserve Bank of Philadelphia Payment Cards Center, and Wharton Financial Institutions Center. Portions of this work are excerpted from Calomiris and Mason (2003) and Higgins and Mason (2003). The views expressed in this paper are those of the authors and do not necessarily represent the views of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

revolving collateral like credit card loans) hinge upon an implicit understanding that recourse may be provided by the sponsor. Such understandings exist because sponsors wish to maintain their reputations for consistent credit quality over repeated sales (while still taking advantage of the ability, under a true sale, to remove the assets from the balance sheet). Losing a good reputation (and the ability to sell loans economically) may expose the sponsor to decreased liquidity, increased interest rate risk, and burdensome regulatory supervision.

By providing recourse in cases where none is explicitly required, the sponsor demonstrates the presence of de facto recourse and therefore previously unreported contingent liabilities. The present paper reviews results that establish the effects of offering such recourse on the sponsoring bank and the potential for regulatory capital arbitrage in doing so.

On the face of it, one might expect that suddenly revealing previously unreported contingent liabilities could heighten asymmetric information about firm conditions, resulting in poor short- and long-term stock price performance, poor long-term financial performance, and reduced proceeds from subsequent loan sales. However, conditional on being in a position where honoring implicit recourse has become necessary and conditional on actually providing that recourse, sponsors, on average, exhibit improved short- and long-term stock price performance, improved long-term financial performance, and similar proceeds from subsequent loan sales. Furthermore, (and counter to some widely-held expectations) it appears that sponsors routinely carry additional capital associated with concentrations of securitized assets. While this capital cannot be explicitly earmarked against the possibility of recourse without sacrificing the “true sale” and hence keeping the assets on balance-sheet, regression results suggest that the amount of capital held is directly proportional to not only the amount of assets off balance-sheet, but also their risk and their importance to the bank as a whole.

While such results may seem counterintuitive, three elements may be combined that can explain the potential efficiency of this arrangement: (1) bank capital regulation, (2) adverse selection costs, and (3) other regulations that force banks to make recourse implicit and that prevent non-bank intermediaries from offering an alternative to bank securitization with implicit recourse. The efficiency argument begins with the efficiency gain from economizing on scarce equity capital by avoiding the high minimum regulatory requirements set for banks. Because of adverse-selection costs, securitizing banks must retain much of the risk associated with securitized assets. Given current accounting and capital regulations, they can do so only by making recourse implicit (otherwise they would run afoul of FASB and the bank regulators). Of course, if other intermediaries (e.g., finance companies) could offer credit cards on equal terms with banks, they might be able to offer a superior contracting alternative. But an institutional constraint (the VISA-Mastercard duopoly) effectively limits credit card issuers to commercial banks. Otherwise, non-bank intermediaries would be able to securitize with explicit recourse or simply maintain lower (unregulated)

capital ratios for their on-balance-sheet intermediation. In the presence of these various constraints, it may be that the most efficient means of intermediating credit card receivables is bank securitization with implicit recourse.

It is conceivable that implicit recourse might even be more desirable than explicit recourse in the absence of legal impediments to explicit recourse. Implicit recourse allows assistance by originating banks to be made voluntarily ex post, and in some states of the world (when market access for the pool is not worth preserving) assistance would not be offered. The signaling gains from voluntary assistance may favor a reliance on implicit, rather than explicit, recourse. Nevertheless, implicit recourse may be socially costly, since it can be a means of imposing costs on the deposit insurer. Thus, permitting implicit recourse may not be desirable, despite its advantages.

The rest of the paper proceeds by describing the recourse events that have taken place in the history of credit card securitization and the recourse and credit card bank samples analyzed throughout the paper. Section I describes the sample of recourse events and compares short-term stock price effects around recourse announcements for recourse announcing firms and non-recourse announcing firms, long-term stock price and financial performance around recourse announcements, and subsequent loan sale proceeds and provisions around recourse announcements. Section II analyzes whether securitization is associated with safety net abuse by modeling securitization and capitalization decisions of credit card banks. Section III summarizes and concludes.

I. Effects of Implicit Recourse Events at Credit Card Banks

A search of Lexis-Nexis for the period 1987 (the year of the first credit card securitization) to 2001 turns up 17 discrete recourse events involving 10 credit card banks. We identify recourse events through news filings that report “ratings affirmations” following a period of weak collateral pool performance. The news reports usually give some description of the reason for the affirmations. During the period 1987 to 2001, only two credit card securitizations entered early amortization without recourse. The associated sponsors, Republic Bank (DE) and Southeast Bank, both failed, although the securitizations repaid investors full principal in the early amortization process. Table 1 lists our set of recourse events, the bank names, the dates, the recourse actions taken, and the specific securities and/or pools involved. The set of banks in Table 1 makes up our recourse credit card bank sample. The data sets we use to analyze these events combine call report data on banks and bank holding companies with Faulkner & Gray data on the quantity of managed credit card receivables and securitizations, CRSP stock price data, Compustat financial data, and Securities Data Corp. data on the structure and frequency of securitizations.

The 10 banks identified as providing recourse are invariably large credit card banks. The minimum securitization size among these banks in 1996 is that of Tandy National Bank with $350

million outstanding, and the maximum is that of Citicorp, with $25.9 billion outstanding. The dollar amount of securitizations at recourse credit card banks averages $6.1 billion, with a median of $3.5 billion. The average percent of total credit card loans securitized among recourse credit card banks was 42%, with a median of 45%.

In the event of early amortization, the charters described above are those that would be affected by the sudden accelerated on-balance-sheet loan growth. The magnitude of securitizations relative to on-balance-sheet assets for banks in Table 1 suggests that banks relying on securitization should seek to avoid the possibility of prolonged on-balance-sheet funding. The firms and bank holding companies in Table 1 provide recourse to existing securitizations to avoid that fate.

Typical actions used to provide recourse in Table 1 are adding new, higher-quality accounts to a securitized pool (cherry picking) (Sears 9/11/91, Citicorp 3/15/93, Household 3/31/93, FCC 7/11/96, AT&T 9/9/96, First Union 6/10/96); selling new receivables to the pool at a discount below par (Household 11/13/95, Mercantile 2/12/96, First Union 5/19/97, Prudential 5/96); increasing the credit enhancement (Sears 5/18/98, Banc One 3/5/97, Prudential 10/21/96, Tandy 8/93); getting investors to waive early amortization triggers (Sears 10/14/91, Citicorp 5/13/91); and getting the servicer (usually the sponsor) to reduce its fees (First Union 2/24/97). All violate the true sale provision of GAAP and RAP, yet none of the events resulted in regulatory or accounting restatements that added loans back onto bank balance sheets. The recourse events in Table 1 propped up 89 domestic and three foreign securities issues with a combined value of about $35.5 billion, comprising almost 7.5% of the $475 billion total domestic public credit card asset-backed security issuance reported on the Securities Data Corp. New Issues Database through May 2002.

A. Stock Price Effects of Recourse

We analyze both the short- and long-term equity return effects associated with recourse on the recourse credit card bank sample (described previously) and a comparative benchmark non-recourse credit card bank sample.

1. Short-term returns for the recourse credit card bank sample

We analyze equity returns around 14 recourse events involving eight of the sponsors[2] by calculating announcement period abnormal returns for firms in the recourse credit card bank sample. Our tests use a standard market model, $R_{i,t} = \alpha_i + \beta_i R_{m,t} + e_{i,t}$, where $R_{i,t}$ is the return on day t for the recourse announcing firm and $R_{m,t}$ is the equally weighted CRSP index return on day t. The announcement day is defined as day 0. The market model parameters, α_i and β_i, are estimated over the 200-day window ending 10 days prior to the announcement (day -210 to day -10). Since our announcements generally come from newswire reports, it is possible that the news may have been released after the close of trading on

the announcement day. Hence, we define the announcement period as the two-day window including the announcement day and the day following the announcement (day 0 to day 1). We use the cross-sectional test statistic of Boehmer, Musumeci, and Poulsen (1991) to test the significance of the abnormal returns. This statistic controls for event-induced variance increases associated with significant firm events.

The event study conducted for the recourse credit card bank sample yields an average positive and statistically significant two-day (day 0, 1) abnormal return. It appears that the market reaction actually occurs on day 1, which has a positive, significant abnormal return of 1.36%. This abnormal return is quite large and indicates that the market did not anticipate the recourse announcement.

2. Short-term returns for the non-recourse credit card bank sample

In the presence of asymmetric information, it is not uncommon for shareholders to infer information about the value of their company from information that comes from similar companies. This is indicative of the transfer of information that exists between firms in similar industries. We hypothesize that a similar phenomenon may exist for recourse credit card bank sample firms. Specifically, we hypothesize that the announcement of the provision of implicit recourse eliminates uncertainty about the industry's willingness to provide recourse and about the value that recourse has for securitizing firms. We therefore analyze whether there exists an information transfer between the recourse announcing firm and other firms that are securitizing credit card debt.

To test this hypothesis, we calculate abnormal returns associated with recourse announcements for a non-recourse credit card bank sample (other securitizing banks that did not provide recourse). For each year represented in the recourse sample, we identify all securitizing credit card sponsors listed in Faulkner & Gray's Card Industry Directory that did not provide recourse at any time during the sample period. In the event that some of these banks did not report securitizations to Faulkner & Gray, their issuance was confirmed using Lexis-Nexis and the Securities Data Corp. New Issues Database and (far less detailed) call report data where available. Members of the non-recourse credit card bank sample for each year are identified in Higgins and Mason (2003) Table 3.

To calculate abnormal returns for the non-recourse credit card bank sample, we use the portfolio approach suggested by Szewczyk (1992). For each recourse announcement, we create an equally weighted portfolio of returns for all firms in the non-recourse credit card bank sample over the period from -210 days prior to the announcement to 10 days after the announcement. Using the portfolio returns, market model parameters (described above) are estimated over the period from -210 days to -10 days. Again, we define the announcement period as days 0 and 1 and use the cross-sectional t-statistic of Boehmer, Musumeci, and Poulsen (1991) to test for significance. Although we do not have returns

data on Prudential (a non-public company) itself, we have an exact announcement date for one of the Prudential recourse announcements. Including that event in the analysis raises the number of events analyzed to 15.

Results for the non-recourse credit card bank sample event study yield significant positive abnormal returns for the non-recourse banks around the recourse announcement (days 0 and 1). The two-day announcement period abnormal return is 0.66% and is significant at the 1% level. Such a large abnormal return for the industry is rather surprising, suggesting that the market places a great deal of importance on the recourse announcements of other banks.

B. Long-Run Stock Price and Operating Performance Effects of Recourse

Results in the previous section suggest that the announcement of recourse by credit card banks has a substantial impact on both recourse credit card banks and non-recourse credit card banks. It is possible, however, that the market does not fully anticipate or properly value the information contained in important event announcements. In such cases, the effects associated with the announcement would be mitigated over time. Thus, the events may also have an impact on the long-run stock price and operating performance of the announcing firms. We are interested in determining if such post-announcement effects exist for our recourse credit card bank sample firms.

We are also interested in determining why some banks provide recourse and others do not. An obvious reason for providing recourse is simple necessity. It may be that the banks in our sample are simply performing very poorly relative to other banks and must provide recourse as a means to keep their issues afloat. Thus, we examine long-run pre- and post-announcement stock price and operating performance of recourse credit card bank sample firms.

1. Matching samples for long-term comparisons

We use matching samples to determine if long-run performance among the recourse credit card bank sample firms is substantially different from that of other firms. Similar to other studies, our study creates matching samples by identifying matching firms comparable to each announcing firm. We identify matching firms using two methodologies. First, we match recourse credit card bank sample firms with others using a procedure similar to that of Loughran and Ritter (1997). According to this procedure, each firm in the recourse credit card bank sample is paired with another firm listed on the Compustat database based on SIC code, asset size, and book-to-market equity ratio.[3] Potential matching firms have the same four-digit SIC code as the announcing firm and have an asset size between 25 percent and 200 percent of the announcing firm at the time of the recourse announcement. From these potential firms, we choose as matching firms those that have the closest book-to-market equity ratio to each recourse credit card

bank sample firm. We call the resulting sample the size and book-to-market equity matched sample (SBEM sample).

The second matching sample is constructed by pairing each firm in the recourse credit card bank sample with its closest counterpart in the non-recourse credit card bank sample (described in section I.A.2) on the basis of outstanding securitization volume and portfolio size at the time of the recourse announcement. We call this the credit card issue size matched sample (CCISM sample).

One problem that we encounter in examining long-run operating performance is the presence of multiple events occurring within a short period of time. Following the methodology of Loughran and Ritter (1997), we exclude subsequent recourse announcements occurring during the two years following a recourse announcement in the sample.[4] Thus, the sample used for the examination of long-run performance contains 10 recourse-announcing firm observations. Higgins and Mason (2003) Table 5 lists the recourse credit card bank sample firms and the selected matching companies based on the two selection criteria.

2. Long-term returns for the recourse credit card bank sample

To examine the long-run stock price performance of recourse announcing banks, we compute buy and hold returns for one year before the recourse announcement and for two years after the recourse announcement. We calculate abnormal long-run returns for the recourse announcing firms using both the SBEM sample and CCISM sample as benchmark portfolios. The significance of the abnormal returns is tested using a nonparametric sign test.

Table 2 illustrates that returns for recourse credit card bank sample firms one year prior to the announcement of recourse are significantly lower than those for CCISM sample firms. Two years post-announcement, returns for recourse credit card bank sample firms are significantly higher than those for SBEM sample firms. Thus, it appears that the recourse credit card bank sample firms are under-performing matching firms prior to the recourse announcement, perhaps leading to the recourse announcement. After the recourse announcement, performance improves, suggesting that the provision of recourse does not result in a long-term cost to the recourse credit card bank sample firms in terms of stock price performance.

3. Long-run operating performance

Table 3 presents changes to five operating performance ratios: EBITDA to assets, profit margin, return on assets, EBITDA to sales,[5] and return on equity. All operating performance data come from the Compustat database. We define year 0 as the fiscal year in which the recourse announcement occurs, and we examine operating performance over a two-year window before and after the recourse announcement (fiscal years –2 through +2). To determine if significant differences are present in the operating performance recourse credit card bank sample firms and the matching firms, the Wilcoxon signed-rank test is used. We examine

the change from fiscal year –2 to +1 and from +1 to +2 for the differences between the recourse credit card bank sample firm and matching firm ratios. Again, we use the Wilcoxon signed-rank test to determine if there are significant differences between recourse credit card bank sample firm ratios and the matching firm ratios.

In general, the results in Table 3 again suggest that the operating performance of the recourse credit card bank sample firms deteriorates prior to the support announcement and improves after the support announcement. Comparison of operating performance of recourse credit card bank sample firms to the SBEM firms shows that announcing firms have a statistically significant increase in operating performance after the recourse announcement, whether measured by EBITDA/assets, profit margin, return on assets, EBITDA/sales, or return on equity. Comparison of recourse credit card bank sample firms relative to the CCISM matched sample shows that the profit margin and EBITDA/sales for recourse credit card bank sample firms decreased by statistically significant amounts over the years prior to the announcement. Furthermore, EBITDA/assets, profit margin, return on assets, and return on equity for the recourse credit card bank sample firms increased by statistically significant amounts, relative to the CCISM sample, in the years following the announcement. These results are again similar to those found for long-run stock returns. Performance of the recourse credit card bank sample firms was poor prior to the announcement but improved post-announcement.

C. Subsequent Loan Sale Terms and Conditions

Recourse is an indication that some aspect of the securitization was unanticipated, whether that be lower than expected credit quality, legal terms regarding the mechanics of disbursements, or regulatory action. Hence, while the bank or parent firm may not have suffered, subsequent deals may be structured in ways that help ensure that investors avoid the default and reinvestment risks that accompany early amortization. Hence, we compare the dimensions of pool size, support, and coupons for both A and B tranches, the underlying (tertiary) credit support, the average issue frequency prior to support, and the time between issues before and after the support event for both our recourse credit card bank sample and a matched sample (the CCISM sample firms) to determine if any observed changes in the recourse sample are firm specific or are associated with overall changes in the credit card securitization market.

Higgins and Mason (2003) compare attributes for recourse credit card bank sample deals brought to market before and after 10 of the support events. The events relating to Mercantile, Prudential, and Tandy did not have any other comparison issues either before or after the recourse event. First Union’s only issues were its 1996-1 and 1996-2, both of which required recourse. We hypothesize that, following recourse, ABS investors might expect increased enhancement for the pool to receive a desired rating, an increased coupon to compensate for higher unexpected risk, or higher levels of tertiary (C-class) credit enhancement for the entire deal.

Few of the comparisons in Higgins and Mason's (2003) Table 9 illustrate evidence consistent with this hypothesis. A-class and B-class enhancements rise in only one of the deal comparisons – that associated with the Sears Roebuck May 18, 1998, support event. In this case, the A-class enhancement level rose from 11.5% before support to over 15% after, and the B-class support rose from 7% to 9%. Following the Household International November 13, 1995, support event the amount of enhancement rose, but the sponsor switched to a different type of enhancement, from a 12% collateral invested amount (CIA) to a 15.61% overcollateralization (OC). The other events exhibit unchanged or sometimes decreased support levels after the event.

Coupons are also typically the same or lower after the support event. The only increase is that for B-class coupons before and after the AT&T Corp September 9, 1996, event.

All in all, it appears that few recourse events are associated with pool enhancement, tertiary enhancement, or coupon changes that could be associated with investor concern.

Market access, however, may pose an additional means by which investors react. Higgins and Mason (2003) compare the average time between issues before and after recourse for our group of sponsors. Excepting the Sears Roebuck September 11, 1991, support event, which was followed closely by another support event for that sponsor, the time lapse between issues around the support event averaged over four times the interval between issues prior to the event. In two cases, Sears Roebuck May 18, 1998, and AT&T Corp. September 9, 1996, sponsors took deals to market the day after support. In both cases, however, these sponsors waited a substantial period – 411 days in the case of Sears (308% of the average issuance interval) and 317 days in the case of AT&T (310% of the average issuance interval) – before taking their next deals to market. Hence, although it appears sponsors eventually return to the market at terms similar to those prior to support, they often do not do so on the same schedule as prior to providing support.

In contrast, loan sale terms for 13 credit card issue size matching (CCISM) sample firms around each recourse credit card sample firm's related recourse announcement do not yield evidence of change in A- or B-tranche composition or pricing changes associated with recourse events. Furthermore, Higgins and Mason (2003)suggest that average issuance intervals around recourse increase only about 2.3 times over the pre-recourse interval for the CCISM firms, on average, compared to over four times the pre-recourse interval for recourse credit card bank sample firms. A lot of this increase is driven by one outlier, Chase, around Citigroup's March 1993 recourse announcement. In that case, Chase's issue interval increases over 10 times its pre-recourse interval. Excluding that outlier from the sample reduces the average increase for CCISM sample firms to 1.46 times the pre-recourse interval. Hence, the time between issuance does not seem to increase around recourse events for CCISM sample firms as much as for recourse credit card bank sample firms. Thus, the increased time to issuance observed for the recourse bank sample does not appear to be associated with a marketwide effect, and it appears

that, as with the commercial paper market, the penalty for underperformance is market access.

II. Costs of Recourse to the Safety Net

Given the positive incentive for banks to provide recourse, it is important to investigate whether a "safety net abuse" or "efficient contracting" view of securitization with implicit recourse offers a better characterization of how banks approach securitization and possible recourse.

The two alternative theoretical views of regulatory capital arbitrage and implicit recourse have differing implications for the ex ante behavior of credit card banks. According to the efficient contracting view, healthy banks with scarce capital (faster growing banks) will see the greatest advantage to off-balance-sheet finance. Furthermore, if banks are establishing contracts to satisfy the marketplace, they will be setting their capital adequately to absorb risk, as measured by the market. Thus, banks may choose to maintain levels of capital in excess of their minimum regulatory requirements as a means of satisfying market requirements. Bank capital should vary with market perceptions of bank asset risk (including both on-balance-sheet and off-balance-sheet asset risks).

According to the safety net abuse view (following James 1987), if off-balance-sheet finance is motivated by the maximization of the deposit insurance subsidy, then banks that stand to gain the most from increasing the put option value of deposit insurance will be more likely to securitize and will securitize to a greater extent. Furthermore, if securitizing banks are seeking to maximize the put option value of the safety net, then they would tend to maintain capital levels close to their minimum regulatory requirements.

To distinguish between the safety net abuse and efficient contracting views, we analyze the characteristics and capital structure choices of securitizing credit card banks. The data set we use for this exercise combines bank call report data, bank holding company Y-9 reports, and off-balance-sheet data on the quantity and quality of managed credit card receivables of credit card banks from Faulkner and Gray's Card Industry Directory. Our sample is confined to the chartered, non-CEBA, commercial banks listed as among the top 300 credit card issuers listed in Faulkner & Gray for 1996 and 2000. We chose these dates so that we could investigate the extent to which changes in the regulation of implicit recourse over time might affect our conclusions.[6]

Because of consolidation within the credit card industry during the late 1990s and the rising importance of securitization as a means of finance, the composition and size of our sample of commercial bank credit card issuers changed dramatically from 1996 to 2000. In 1996, our sample consisted of 96 banks, 47 of which did not engage in securitizations. By 2000, our sample consisted of only 7 banks, all of whom were securitizers. Our sample is small in 2000 for various reasons. First, the consolidation of the credit card industry substantially reduced the number of credit card banks between 1996 and 2000. Second, consolidation and other

factors limited our ability to construct consistent time series data for surviving credit card banks over that period.

A. Univariate Capital Ratio Comparison

Table 4 reports mean and median capital ratios for the pooled sample of 103 credit card bank observations for 1996 and 2000, which are separated into subgroups in two ways. First, we divide observations according to whether the issuer is involved in securitization or not (56 with and 47 without off-balance-sheet activity). Second, we construct a sub-sample of 77 observations for banks and bank holding companies that are relatively specialized in credit card banking. We constructed that sample of 77 banks by removing the quartile of banks with the lowest proportion of managed credit card receivables relative to total consolidated assets.[7] Note, however, that "relatively specialized" does not mean that the bank or holding company is primarily a credit card bank; on average, the ratio of credit card receivables relative to total assets for bank holding company "specialists" is still only 8.7 percent.

The reason to divide the sample according to the degree of credit card specialization is that, to some extent, holding companies may target capital relative to the risk of the holding company as a whole (although, from a regulatory standpoint, both the bank and the holding company are subject to minimum capital requirements). Our unit of observation is the chartered "credit card" bank, not its holding company (which includes other banks and non-bank subsidiaries of the holding company). Dividing the sample according to the importance of credit card banking within the holding company allows us to investigate whether focusing attention on credit card banks within relatively "specialized" bank holding companies improves our understanding of credit card banks' target capital ratios (which it does). Of the 77 credit card banks in 1996 and 2000 that are housed in relatively specialized bank holding companies, 47 securitize.

The average capital ratios reported in Table 4 are expressed in several ways: tier 1 plus tier 2 capital as a fraction of total on-balance-sheet assets, which we call cap1n2ta, and tier 1 plus tier 2 capital as a fraction of "managed assets" (the sum of on-balance-sheet assets and off-balance-sheet credit card receivables), which we call cap1n2ma. It is possible that banks in our sample also maintain other off-balance-sheet assets, which are not included in our definition of managed assets.

Minimum capital requirements for banks involve a combination of minimum requirements. "Well-capitalized" banks must satisfy both a maximum leverage requirement as a fraction of total assets and a risk-based capital requirement, which has two parts: tier 1 capital / risk-weighted assets > 0.04, and tier 1 plus tier 2 capital / risk-weighted assets > 0.08. Since risk-weighted assets are less than total (on-balance-sheet) assets, a capital ratio of 0.08 for cap1n2ta implies that a bank is maintaining capital above all of its minimum required capital ratios. As a general rule (given the absence of explicit recourse in securitizations of

credit card receivables), only on-balance-sheet assets are relevant for computing the minimum required ratios.

As Table 4 shows, credit card banks that securitize actually maintain higher average ratios of capital to total on-balance-sheet assets (0.102) than credit card banks that do not securitize (0.092). Median capital ratios are also higher for securitizers. This is an important fact. Securitizers maintain far more than the minimum amount of capital required by regulation and tend to maintain a greater amount of "excess" capital (relative to regulatory requirements) than do non-securitizing banks. In fact, no matter which definition of capital one focuses on relative to on-balance-sheet assets (equity, tier 1, or tier 1 plus tier 2), securitizing credit card banks have higher average capital ratios (relative to on-balance-sheet assets) than either non-securitizing credit card banks or U.S. chartered banks as a whole.

These facts are not consistent with the "safety net abuse" view of securitization. If securitizers were trying to maximize the put option value of the safety net, they would maintain regulatory capital at or near the required minimum.

When one examines the ratio of capital to "managed assets" (on-balance-sheet assets plus off-balance-sheet credit card receivables), one sees that credit card securitizers do maintain capital ratios relative to the sum of on- and off-balance-sheet assets that are lower than those of non-securitizing credit card banks or of all banks. This is an indication of "regulatory capital arbitrage" – by securitizing, banks are able to reduce their capital relative to assets below what they would have to maintain if assets were retained on the balance sheet. The average and median capital ratio relative to managed assets for securitizers is 0.08, and many of these banks have capital ratios of less than 7%.

As noted before, there are two views of the motivations for regulatory capital arbitrage. According to the "safety net abuse" view, banks with low ratios of capital to managed assets are trying to maximize the put option value of the safety net. According to the "efficient contracting" view, banks are on a "market margin" that determines their risk-based capital (which explains why their capital relative to on-balance-sheet assets is higher than that of other banks, since implicit recourse for off-balance-sheet assets requires that they hold higher capital to compensate for that risk).

The relatively low ratios of capital to managed assets for securitizers, according to this view, is the result of market perceptions that lower capital relative to managed assets is adequate for these banks. That market determination reflects a combination of two factors. First, securitizers with relatively low ratios of capital to managed assets may be originating lower-risk credit card receivables. Second, although implicit recourse involves the retaining of some risk on securitized receivables, securitizers are not retaining all the risk for securitized receivables, since there are states of the world in which other investors in securitized assets would not be fully protected by issuers. That implies that the amount of capital needed to stand behind securitized receivables should be less than the amount

needed to stand behind receivables held on the balance sheet; hence, ceteris paribus, capital ratios relative to managed assets should be declining in the proportion of assets that are securitized.

B. OLS analysis of securitizing bank capital ratios

To further investigate the determinants of credit card banks' capital ratios, in Table 5 we report OLS regression results for two sets of regressions in which capital ratios are the dependent variables: one set uses capital relative to on-balance-sheet assets to measure the capital ratio, while the other uses capital relative to managed assets. For each of the two categories of regressions, the first three columns include the entire sample of credit card banks, while the fourth column excludes the quartile of credit card banks whose bank holding companies were least involved in credit card banking.

If the market determines the risk-based capital maintained by credit card banks, then we should find four things to be true: (1) capital relative to managed assets increases as the riskiness of the receivables rises, ceteris paribus, (2) capital relative to managed assets is an increasing function of the proportion of assets held as loans rather than government securities, ceteris paribus, (3) capital relative to managed assets decreases as the ratio of securitized assets relative to total managed assets rises, ceteris paribus (since the risk retained on securitized assets via implicit recourse is less than the risk retained for on-balance-sheet receivables), and (4) the regression fit should be better when using the "managed capital ratio" definition of capital relative to assets rather than the "regulatory capital ratio" (capital relative to on-balance-sheet assets). All four predictions are confirmed in Table 5. Interestingly, the standard deviation of past due credit card receivables seems to be a better indicator of credit card risk than the current level of past due receivables.[8] The fit for the model is better when we exclude the quartile of banks whose holding companies are least involved in credit card intermediation.

The adjusted R-squareds are much higher for the managed capital ratio regressions than for the regulatory capital ratio regressions. The model is much better at explaining the managed capital ratio than the regulatory capital ratio, and this is particularly true for securitizing banks.

We investigate two other questions in Table 5. According to the safety net abuse view, banks that raise more of their funds from insured deposits should face stronger motivations to keep capital small, since doing so would increase the put option value of deposit insurance. We include the ratio of insured deposits to total deposits, which according to the safety net abuse view, should enter negatively. The estimated coefficients are negative but are insignificantly different from zero. We also test to see if banks' capital ratios are significantly different in 2000 (in response to greater regulatory criticisms of implicit recourse). Our 2000 sample is small, but there is no evidence for a significant change in capital relative to risk from 1996 to 2000.

The significant negative coefficient on the 1996 dummy in the regulatory capital regression appears to be a spurious result, reflecting the fact that all banks present in the 2000 sample are securitizers (which maintain higher regulatory capital ratios). The managed capital ratio regression is able to capture differences in capital targeting for securitizers and non-securitizers, and once those differences are captured, there is no significant difference between behavior in 1996 and in 2000.

C. 3SLS model of securitization and capital ratio choice

One potential concern about the regressions reported in Table 5 is the endogeneity of the choice of whether to be a securitizer. To deal with this potential problem, in Tables 6 and 7 we construct a two-step procedure that corrects for selectivity bias (in the first-stage regressions, reported in Table 6) before estimating the determinants of the managed capital ratio (in Table 7). We employ two alternative first-stage models, a probit and a tobit. The probit model assumes that selection bias pertains to whether one securitizes or not; the tobit model also allows the extent of securitization (relative to managed assets) to be controlled for in the first-stage regression. We find the tobit model more informative, but we report both for purposes of comparison.

There are three “instruments” used in the first-stage regressions (variables that determine whether and how much one securitizes, which are assumed not to determine risk-based capital targets): the total amount of credit card receivables managed, the growth rate of managed receivables, and the growth rate of capital. The first two instruments we expected to be positively associated with securitizing, and the third we expected to be negatively associated with securitization. The first instrument reflects the importance of scale economies in securitization, owing to the high transaction costs of establishing conduits and marketing their securities. The last two instruments reflect the importance of economizing on capital, which should be particularly relevant for a bank that is experiencing rapid growth in receivables relative to available capital. Our estimates confirm those predictions.

We also found that the ratio of insured deposits to total deposits is a significant positive predictor of securitization. That fact is consistent with the safety net abuse view of securitization but may also reflect other factors (e.g., banks that securitize may simply not need to rely as much on wholesale sources of on-balance-sheet finance like large-denomination CDs for their financing). The fact that the ratio of insured deposits has no significant negative effect on managed capital ratios in Table 7 contradicts the safety net abuse view of securitization with implicit recourse. Results reported in Table 7 are quite similar in Table 5, indicating that selection bias has little effect on our estimates of risk-based capital targeting.

III. Conclusions

This paper began by observing that securitization is believed to pose risks to sponsors of the underlying collateral. These risks are believed to be especially acute with revolving collateral, like credit card loans, because of the propensity for recourse provided by the sponsor. The paper documents 17 discrete recourse events that occurred during the 1990s and examines the effects of recourse to the sponsor by examining short- and long-term stock returns, long-term operating performance, default probabilities, and follow-on terms of securitization.

The paper demonstrates that sponsor stock prices, on average, increase in both the short- and long-run following recourse. Long-run median operating performance also improves ex post. However, ex ante, the firms providing recourse are weaker than matched samples of their counterparts.

Nonetheless, despite improvements in stock returns and operating performance for the sponsor following recourse, it appears sponsors will face a penalty for unexpected performance shortfalls in their securitizations. Although terms of the securitizations (coupons, composition, credit enhancements) for the most part remain consistent when firms return to market after recourse, the paper documents that firms providing recourse may face long delays before returning to market. Hence, much as with commercial paper, firms face market exclusion if they demonstrate an inability to sell sound investment-grade paper.

Our analysis of the cross-sectional determinants of the decision to finance credit card receivables off-balance-sheet and the relationship between off-balance-sheet finance and on-balance-sheet capital suggests that securitization is motivated by legitimate capital saving and that capital is being maintained in a manner commensurate with market perceptions of risk. Contrary to the safety net abuse view, securitizers maintain capital ratios far above their regulatory minima. Cross-sectional differences in risk explain differences in capital structure, while cross-sectional differences in the value of deposit insurance protection do not explain differences in capital structure.

The results outlined above should not be construed as favoring current practices involving recourse. While positive results following recourse suggest that sponsors act rationally, recourse still violates FASB 140 and regulatory restrictions governing the true sale of assets. Furthermore, recourse represents an implicit contractual provision that is not disclosed to the sponsor’s investors. Rather, the results presented in this paper suggest that recourse can be valuable and can benefit the sponsor and that there may be a gray area between treating assets as “sold” and taking them off balance sheets and treating them as “retained” and keeping them on. Clarifying this distinction and measuring, analyzing, and parameterizing that gray area are therefore important topics for future research.

One additional caveat warrants emphasis. It would be inappropriate to use our evidence to argue that regulatory or supervisory concerns about abuse of the safety net are entirely unwarranted. It is possible that in the wake of substantial losses of capital and increases in credit card risk banks could abuse securitization in the manner regulators fear. The experience of

the U.S. in the 1980s and the experiences of many other countries' banking systems in the 1980s and 1990s have taught that insolvent banks protected by safety nets change their behavior to maximize risk as part of resurrection strategies. Abuse of the safety net has not been the story thus far in credit card securitization, but under different, adverse circumstances in the future, potential abuse remains a possibility.

Endnotes

[1] The sponsor originates the assets and sells them to a bankruptcy-remote third-party trust that funds the purchase by issuing asset-backed securities.

[2] Prudential was not publicly traded at the time of its recourse announcements, and we did not have an exact day for the Tandy recourse announcement. Hence, these events are excluded from the analysis.

[3] Barber and Lyon (1997) suggest including the book-to-market equity ratio as a matching variable.

[4] Given data limitations due to mergers, we examine only stock price and operating performance in the two years after a recourse announcement; thus, we screen only for events occurring within two years.

[5] Sales is Compustat item 12, Sales-Net, the same item number used by Loughran and Ritter (1997). For banks, this item includes total current operating revenue and net pretax profit or loss on securities sold or redeemed.

[6] Between 1996 and 2000 credit card ABS structures also changed in ways that could potentially affect capital structure and risk. Increasingly, credit card ABS were sold through master trusts (rather than discrete trusts), wherein the receivables sold this period may be intermingled with those sold in previous periods, adding time-series diversification to the master trust pool performance. Also, over time, master trusts came to use tiered structures, involving "secondary note trusts," which permit banks to transfer more of their residual tranches to other investors.

[7] We constructed our measure of securitized credit card receivables for our sample of credit card banks by computing the difference between managed credit card receivables from Faulkner and Gray's *Card Industry Directory* for 1996 and 2000 and on-balance-sheet credit card receivables from call reports. Faulkner and Gray sometimes reports data at the holding company level. Where there existed no primary source of credit card lending within the holding company, the managed assets were assigned to the consolidated holding company, but not to any one of its subsidiary banks. To measure managed assets, we subtracted on-balance-sheet credit card loans from bank assets, then added Faulkner and Gray's managed credit card receivables to that

measure of total balance-sheet assets less credit card loans held on the balance sheet.

[8] The standard deviation of the ratio of past due loans is derived from on-balance-sheet credit card receivables that are either past due by more than 90 days or in non-accrual, divided by total on-balance-sheet credit card receivables. We use all available annual data from December call reports, beginning in 1984 and ending in the sample year, to compute the standard deviation. We omit banks with fewer than three annual observations from our sample.

References

Barber, Brad and Lyon, J. "Detecting *Long*-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics," *Journal of Financial Economics* 43 (March 1997): 341-372.

Boehmer, Ekkehart, Musumeci, Jim, and Poulsen, Annette B. "Event Study Methodology Under Conditions of Event-Induced Variance." *Journal of Financial Economics* 30 (December 1991): 253-272.

Calomiris, Charles W., and Mason, Joseph R. "Credit Card Securitization and Regulatory Arbitrage." Federal Reserve Bank of Philadelphia Working Paper #03-7, April 2003.

Faulkner & Gray (various issues). *Credit Card Management: Card Industry Directory. The Blue Book of the Credit and Debit Card Industry in the United States*.

Higgins, Eric J. and Mason, Joseph R. "What Is the Value of Recourse to Asset Backed Securities? A Clinical Study of Credit Card Banks." Federal Reserve Bank of Philadelphia Working Paper #03-6, April 2003.

James, Christopher. "The Use of Loan Sales and Standby Letters of Credit by Commercial Banks." *Journal of Monetary Economics* 22 (November 1987): 399-422.

Jones, David. "Emerging Problems with the Basel Capital Accord: Regulatory Capital Arbitrage and Related Issues." *Journal of Banking and Finance* 24 (January 2000): 35-58.

Loughran, Tim, and Ritter, Jay R. "The New Issues Puzzle," *Journal of Finance* 50 (March 1995): 23-51.

Loughran, Tim, and Ritter, Jay.R. "The Operating Performance of Firms Conducting Seasoned Equity Offerings." *Journal of Finance* 52 (December 1997): 1823-1850.

Shadow Financial Regulatory Committee (2000). *Reforming Bank Capital Regulation: A Proposal by the U.S. Shadow Financial Regulatory Committee*. Washington, DC: AEI Press.

Szewczyk, Samuel H. "The Intra-Industry Transfer of Information Inferred from Announcements of Corporate Security Offerings." *Journal of Finance* 47 (December 1992): 1935-1945.

Table 1: Sample Description

Company	Managed Credit Card Loans as Percent of Bank's On-balance Sheet Total Assets	Announcement Date	Trusts Supported	Support Provided
Sears Roebuck and Company	1,682%	9/11/91	Sears Credit Account Trust 1990-C	Added higher quality accounts
Sears Roebuck and Company	1,682%	10/14/91	Sears Credit Account Trust 1990–A,D,E and 1989-C,E	Removed early amortization trigger
Sears Roebuck and Company	1,682%	5/18/98	Sears Credit Account Master Trust II	Increased credit enhancement – Ratings affirmation followed
Citibank	184%	5/13/91	Standard Credit Card Trust 1989-2,3,4,5 and 1990-1	Lowered base rate by 2.3%
Citibank	184%	3/15/93	National Credit Card Trust 1989-2,4,5 Standard Credit Card Trust 1990-1,3,4 European Credit Card Trust 1989-1,2 and 1990-1	Added new accounts – Ratings affirmation followed
Household Finance	186%	3/31/93	Household Credit Trust 1991-2	Added new accounts – Ratings affirmation followed
Household Finance	186%	11/13/95	Household Private Label Master Credit Card Trust II	Added new accounts, increased discount on receivables – Ratings affirmation followed
Mercantile Bank	309%	2/12/96	Mercantile Credit Card Master Trust 1995-1	Added discounted receivables – Ratings affirmation followed
FCC National Bank	188%	7/11/96	First Chicago Master Trust II	Added new accounts – Ratings affirmation followed
AT&T	26,531%	9/9/96	AT&T Universal Card Master Trust	Added new accounts
Banc One Corporation	205%	3/5/97	Banc One Master Credit Card Trust	Increased credit enhancement – Ratings affirmation followed
First Union	52%	6/10/96	First Union Master Credit Card Trust	Removed lower quality accounts
First Union	52%	2/24/97	First Union Master Credit Card Trust 1996-1	Waived servicing fee
First Union	52%	5/19/97	First Union Master Credit Card Trust 1996-1,2	Added discounted receivables
Prudential Bank and Trust	101%	10/21/96	PB&T Master Credit Card Trust II 1994-A	Increased credit enhancement – Ratings affirmation followed
Prudential Bank and Trust	101%	5/96	PB&T Master Credit Card Trust II 1994-A	Added discounted receivables
Tandy Corporation	3,919%	8/93	Tandy Master Trust Series A	Increased credit enhancement

[a] Prudential Bank and Trust is owned by a non-public insurance company.

Table 2: Median Difference in Holding Period Returns for Recourse Announcing and Matching Firms

	Holding Period		
	One Year Pre-Announcement	One Year Post-Announcement	Two Years Post-Announcement
Announcing Returns Minus SBEM Matching Firm Returns	-0.1314	0.0112	0.1659*
Announcing Returns Minus CCISM Matching Firm Returns	-0.0931*	-0.2266	0.0026

Note: * (**) (***) statistically significant at the 10%, (5%) (1%) level.

Table 3: Median Operating Performance Measures for Recourse Announcing Firms and Differences in Medians between Announcing and Matching Firms

Panel A: Median change in the ratios of recourse credit card bank sample firms performance measures relative to the size and book-to-market equity matched (SBEM) sample

Time Period	EBITDA/ Assets	Profit margin	Return on assets	EBITDA/ Sales[a]	Return on Equity
-2 to +1	0.0002	-0.0326	-0.0039	-0.0254	-0.0324
+1 to +2	0.0093***	0.0212**	0.0061***	0.0255**	0.0312***

Panel B: Median change in the ratios of recourse credit card bank sample firms performance measures relative to the credit card issue size matched (CCISM) sample

Time Period	EBITDA/ Assets	Profit margin	Return on assets	EBITDA/ Sales[a]	Return on Equity
-2 to +1	-0.0081	-0.0398**	-0.0044	-0.04625*	0.0054
+1 to +2	0.0047**	0.0197*	0.0063**	0.0167	0.0413**

Note: * (**) (***) statistically significant at the 10%, (5%) (1%) level.

[a] Sales is Compustat item 12, Sales-Net, the same item number as used by Loughran and Ritter (1997). For banks, this item includes total current operating revenue and net pretax profit or loss on securities sold or redeemed.

Table 4: Managed and Regulatory Capital Ratio Comparisons

Variable Abbreviation	Variable Definition	All Banks	All CC Banks	CC Banks w/o OBS Activity	CC Banks w/ OBS Activity	CC Banks w/o Low BHC Importance Quartile
n	Number of observations	11,002	103	47	56	77
		Mean *Median* (Std Dev)	Mean *Median* (Std Dev)	Mean *Median* (Std Dev)	Mean *Median* (Std Dev)	Mean *Median* (Std Dev)
eqta	Equity capital / on-balance-sheet assets	0.084 *0.077* (0.032)	0.088 *0.081* (0.034)	0.085 *0.082* (0.030)	0.091 *0.081* (0.037)	0.087 *0.081* (0.032)
cap1ta	Tier 1 capital / on-balance-sheet assets	0.083 *0.076* (0.029)	0.083 *0.076* (0.030)	0.081 *0.076* (0.029)	0.084 *0.075* (0.031)	0.081 *0.075* (0.028)
cap1n2ta	Tier 1 and 2 capital / on-balance-sheet assets	0.097 *0.090* (0.034)	0.098 *0.092* (0.033)	0.092 *0.089* (0.030)	0.102 *0.094* (0.034)	0.098 *0.092* (0.032)
eqma	Equity capital / managed assets	0.076 *0.072* (0.028)	0.077 *0.075* (0.033)	0.085 *0.082* (0.030)	0.071 *0.070* (0.035)	0.072 *0.071* (0.030)
cap1ma	Tier 1 capital / managed assets	0.072 *0.068* (0.030)	0.073 *0.069* (0.032)	0.081 *0.076* (0.029)	0.066 *0.065* (0.033)	0.068 *0.067* (0.029)
cap1n2ma	Tier 1 and 2 capital / managed assets	0.084 *0.081* (0.028)	0.085 *0.083* (0.032)	0.092 *0.089* (0.030)	0.080 *0.080* (0.033)	0.082 *0.080* (0.031)

Table 5: OLS Models of Managed and Regulatory Capital Ratios

Dependent Variable		Regulatory Capital Ratio= Tier 1 and 2 capital / on-balance sheet assets				Managed Capital Ratio= Tier 1 and 2 capital / managed assets			
n		103	103	103	77	103	103	103	77
R2		0.058	0.146	0.065	0.071	0.281	0.283	0.283	0.341
Adjusted R2		0.020	0.102	0.016	0.020	0.251	0.246	0.246	0.305
Variable Abbreviation	Variable Name	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)
constant	Constant	0.102 ***	0.140 ***	0.110 ***	0.105 ***	0.099 ***	0.105 ***	0.104 ***	0.099 ***
		(0.007)	(0.014)	(0.012)	(0.009)	(0.006)	(0.012)	(0.010)	(0.007)
abs	Proportion of managed credit card portfolio securitized	0.000	-0.007	0.000	0.001	-0.041 ***	-0.042 ***	-0.041 ***	-0.042 ***
		(0.009)	(0.009)	(0.009)	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)
cngsta	Cash and government securities / on-balance-sheet assets	-0.114 **	-0.099 **	-0.112 **	-0.139 **	-0.085 **	-0.082 **	-0.083 **	-0.096 **
		(0.051)	(0.049)	(0.051)	(0.061)	(0.045)	(0.045)	(0.045)	(0.049)
cc90sd	Standard deviation of total loans greater than 90 days past due or in nonaccrual status / total loans	0.504 *	0.617 **	0.566 *	0.266	0.766 ***	0.785 ***	0.804 ***	0.595 **
		(0.373)	(0.359)	(0.382)	(0.385)	(0.324)	(0.327)	(0.332)	(0.312)
tl90ta	Total loans greater than 90 days past due or in nonaccrual status / total loans	-0.125	-0.202	-0.189	-0.080	-0.364	-0.377	-0.404	-0.316
		(0.377)	(0.362)	(0.387)	(0.424)	(0.328)	(0.330)	(0.337)	(0.343)
y1996	Dummy for year=1996		-0.040 ***				-0.007		
			(0.013)				(0.012)		
insdtd	Insured deposits / total deposits			-0.012				-0.007	
				(0.015)				(0.013)	

* (**) (***) statistically significant at the 10% (5%) (1%) level.

Table 6: Selection Models of Managed Capital Ratios-First-round Probit and Tobit Model Results

Dependent Variable		abs= Dummy for whether bank securitizes				abs_prop=Proportion of managed credit card portfolio securitized			
Model Type		Probit	Probit	Probit	Probit	Tobit	Tobit	Tobit	Tobit
n		103	103	103	77	103	103	103	77
Log likelihood function		-53.600	-52.994	-51.572	-33.960	-60.279	-59.846	-57.587	-45.537
Restricted log likelihood		-71.001	-71.001	-71.001	-51.902	-84.738	-84.738	-84.738	-65.014
Chi squared		34.802	36.014	38.858	35.884	48.918	49.784	54.302	38.955
Variable Abbreviation	Variable Name	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)	Coefficient (Std Dev)
constant	Constant	-3.485 ***	3.018	-5.188 ***	-4.671 ***	-1.677 ***	-1.951 ***	-1.998 ***	-1.816 ***
		(0.854)	-1.78E+05	(1.281)	(1.231)	(0.284)	(0.413)	(0.346)	(0.366)
cngsta	Cash and government securities / on-balance-sheet assets	-1.868	-1.759	-2.221	-0.847	-0.160	-0.212	-0.189	0.215
		(2.323)	(2.317)	(2.380)	(2.853)	(0.823)	(0.823)	(0.798)	(0.936)
lmccln_1	Log of managed credit card portfolio, 1 period lag	0.310 ***	0.285 ***	0.361 ***	0.386 ***	0.152 ***	0.162 ***	0.157 ***	0.158 ***
		(0.072)	(0.076)	(0.080)	(0.096)	(0.021)	(0.024)	(0.021)	(0.026)
cc90sd	Standard deviation of total loans greater than 90 days past due or in nonaccrual status / total loans	-11.217	-11.238	-19.042	-16.063	2.540	2.396	0.362	2.606
		(16.254)	(16.464)	(17.023)	(18.787)	(5.778)	(5.740)	(5.736)	(6.176)
tl90ta	Total loans greater than 90 days past due or in nonaccrual status / total loans	12.179	12.911	18.540	23.685	-2.466	-2.864	-1.359	-0.821
		(18.264)	(18.233)	(19.431)	(24.290)	(5.661)	(5.641)	(5.553)	(6.417)
dlmr	Growth of managed credit card portfolio over past year (log difference)	0.441 *	0.431 *	0.466 *	1.289 **	0.071 **	0.071 **	0.073 **	0.079 **
		(0.319)	(0.315)	(0.333)	(0.566)	(0.037)	(0.036)	(0.035)	(0.037)
dlcap	Growth of tier 1 and 2 capital over past year (log difference)	0.028	0.069	0.320	-0.150	-0.219 **	-0.240 ***	-0.158 *	-0.210 **
		(0.418)	(0.418)	(0.490)	(0.412)	(0.097)	(0.099)	(0.098)	(0.098)
y1996	Dummy for year=1996		-6.265				0.181		
			-1.78E+05				(0.193)		
insdtd	Insured deposits / total deposits			1.688 **				0.410 **	
				(0.869)				(0.233)	
sigma	Disturbance standard deviation (Tobit Model)					0.423 ***	0.420 ***	0.409 ***	0.418 ***
						(0.044)	(0.044)	(0.042)	(0.048)

* (**) (***) statistically significant at the 10% (5%) (1%) level.

Table 7: Selection Models of Managed Capital Ratios-Second-round Heckman-adjusted OLS Models of Managed Capital Ratios

Dependent Variable		Using First-round Probit from Table 4 Managed Capital Ratio= Tier 1 and 2 capital / managed assets								Using First-round Tobit from Table 4 Managed Capital Ratio= Tier 1 and 2 capital / managed assets							
n		103		103		103		77		103		103		103		77	
R2		0.160		0.158		0.192		0.205		0.283		0.288		0.288		0.341	
Adjusted R2		0.117		0.106		0.142		0.149		0.246		0.243		0.243		0.295	
Variable Abbreviation	Variable Name	Coefficient (Std Dev)		Coefficient (Std Dev)		Coefficient (Std Dev)		Coefficient (Std Dev)		Coefficient (Std Dev)		Coefficient (Std Dev)		Coefficient (Std Dev)		Coefficient (Std Dev)	
constant	Constant	0.111 (0.011)	***	0.122 (0.020)	***	0.118 (0.015)	***	0.107 (0.010)	***	0.094 (0.010)	***	0.101 (0.014)	***	0.097 (0.013)	***	0.100 (0.011)	***
abs	Dummy for whether bank securitizes	-0.040 (0.014)	***	-0.043 (0.016)	***	-0.044 (0.013)	***	-0.034 (0.012)	***								
abs_prop	Proportion of managed credit card portfolio securitized									-0.038 (0.010)	***	-0.038 (0.010)	***	-0.036 (0.010)	***	-0.042 (0.010)	***
cngsta	Cash and government securities / on-balance-sheet assets	-0.116 (0.056)	**	-0.115 (0.057)	**	-0.118 (0.057)	**	-0.120 (0.056)	**	-0.088 (0.046)	**	-0.086 (0.047)	**	-0.088 (0.048)	**	-0.096 (0.050)	**
cc90sd	Standard deviation of total loans greater than 90 days past due or in nonaccrual status / total loans	0.596 (0.399)	*	0.608 (0.405)	*	0.615 (0.416)	*	0.462 (0.361)	*	0.762 (0.333)	**	0.784 (0.341)	**	0.796 (0.348)	**	0.596 (0.315)	**
tl90ta	Total loans greater than 90 days past due or in nonaccrual status / total loans	-0.140 (0.425)		-0.134 (0.434)		-0.139 (0.440)		-0.148 (0.418)		-0.329 (0.341)		-0.334 (0.347)		-0.362 (0.355)		-0.318 (0.357)	
y1996	Dummy for year=1996			-0.010 (0.015)								-0.009 (0.012)					
insdtd	Insured deposits / total deposits					-0.008 (0.016)								-0.008 (0.014)			
lambda	Inverse Mills ratio	0.023 (0.009)	***	0.025 (0.010)	***	0.027 (0.009)	***	0.012 (0.008)	*	0.005 (0.008)		0.006 (0.008)		0.007 (0.009)		0.000 (0.009)	

* (**) (***) statistically significant at the 10% (5%) (1%) level.