Customer Risk and Corporate Financial Policy:

Evidence from Receivables Securitization

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ABSTRACT

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Key words: capital structure, asset backed securitization, customer-supplier relationship, special purpose entity

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The risk of customers affects corporate financial policy by limiting the ability of firms to securitize customer receivables. We find that firms with riskier receivables, based on the credit risk and diversification of the firms' principal customers, have lower financing capacity and lower leverage in their asset-backed securitizations. Because securitizations are designed to create a very safe claim by separating the risk of the securitized assets from the risk of the originating firms, increases in the risk of the receivables directly inhibit originating firms' ability to securitize assets and indirectly inhibit the originating firms' access to external finance. The study highlights a novel link between the financing of supplier firms and the financial health of their customers and shows how an increase in risk can limit the ability to create low risk sources of finance that otherwise increase access to external finance.

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Asset-backed securitization (ABS), in the form of accounts receivables securitization, provides a unique setting where we can identify a specific channel how economically related stakeholders affect corporate financial policy. Because securitizations are designed to separate the risk of the securitized assets from the risk of the originating firm, the risk of the securitized assets is an important determinant of the structure of most securitizations. Moreover, because the goal of many securitizations is to create very low risk securities, increases in the risk of the securitized assets limit the amount of financing available. In the case of receivables securitizations, the originating firms retain a subordinated interest in the securitized assets and obtain external financing in the commercial paper market, which demands very little credit risk. We use the risk of firms' customers as a proxy for the risk of the underlying receivables and show that higher credit risk leads to less access to external financing through ABS.

Theories explaining the value created by securitization rely on the risk of the securitized assets being separate from that of the originating firm, which can help alleviate financing frictions. By financing the securitized assets separately from the originating firm, Gorton and Souleles (2007) propose that securitization can reduce the expected costs of bankruptcy by allowing the originating firm can to file for bankruptcy protection without affecting the securitized assets.[1] Lemmon et al. (2014) argue that securitization can provide access to high-grade credit markets, since the ABS can be structured to have very little risk, perhaps much different than the originating firm, which offers access to the investment-grade bond and commercial paper markets. [2]

In this study, we show direct evidence that securitizations accomplish this goal. The credit risk of customer firms has a statistically significant and economically important effect on

[1] The originating firm is also referred to as the sponsor or the originator in a securitization.
[2] Covitz, Liang, and Suarez (2013) show that the vast majority of ABCP programs carry the highest short-term ratings.

the amount of financing available through securitization, but the risk of the originating firm has quite limited impact on securitization financing. Our result stands in contrast to some existing studies that find that the originator's financial status has important effect on the securitization, typically by examining prices of securities related to the originator or ABS. We complement these studies by examining the structure of the securitization and how it relates to the risk of the securitized assets and the risk of the originating firm.

Securitization by nonfinancial firms typically involves transferring accounts receivables to a special purpose entity (SPE) that finances the purchase by issuing asset backed securities to investors. The amount of ABS debt is less than the amount of receivables transferred to the SPE, and the difference represents the originator's equity-like claim on the SPE, typically referred to as overcollateralization or retained interest. The level of overcollateralization can be adjusted to fine tune the riskiness of the ABS debt, and the evidence suggests that firms minimize the overcollateralization subject to maintaining the highest credit rating, since smaller overcollateralization yields more borrowing capacity. We use two measures to capture the risk of the securitized receivables, the concentration of the originating firm's primary customers and the credit risk of the originating firm's primary customers, and find that the risk of customer firms has a significant effect on the amount of financing available through securitization. Firms with riskier receivables have smaller securitization programs and larger overcollateralization. In contrast, conditioning on a firm having a securitization program in place, we do not find any negative association of the credit risk of the originating firm with either SPE leverage or ABS capacity.

Our empirical analysis starts with the full set of nonfinancial firms identified as ABS users from their SEC filings during the period from 1997 to 2013. ABS has become a significant

source of funding for U.S. nonfinancial firms; in 2009, for example, roughly 10% of large nonfinancial firms used ABS, and the typical ABS user obtained 20% of their total debt through securitization financing (Lemmon, Liu, Mao, and Nini, 2014). We then collect detailed information on the securitization programs, including the maximum borrowing amount allowed, the actual amount of ABS debt issued, and the total amount of receivables that serve as ABS assets. In total we identify 539 unique ABS firms. We match these ABS firms with their principal customers using Compustat segments files, which name all customers providing more than 10% of sales to the originating firm. We then match the customers with their Compustat records to create credit risk measures related to the customer firms, which serve as proxies for the risk of the securitized assets. This process leads to a first observation that helps explain the securitization process: there is a notable difference in the credit risk between originating firms and their principal customers. On average, an ABS originating firm has a rating of BBB-, while its principal customer has an average rating of A-. The receivables of an ABS firm have notably lower credit risk than the firm's balance sheet, which facilitates the creation of very safe debt through securitization.

We begin our main analysis by exploring the determinants of SPE leverage, defined as the ratio of the amount of ABS borrowed to the amount of receivables placed in the SPE. Higher SPE leverage means lower overcollateralization used to support the borrowing. We first show that SPE leverage is negatively associated with an indicator that the firm has a principal customer, which we interpret as a measure of customer concentration and a measure of the risk of the securitized receivables. We then show that the credit risk of customer firms, measured by the debt-to-market equity ratio of principal customers, is significantly negatively associated with

SPE leverage. Overall, we conclude that higher customer risk is significantly associated with lower SPE leverage.

Next we explore the determinants of ABS financing capacity, defined as the contractual limit of borrowing normalized by the originating firm's total assets. The results show that our measures of customer risk are negatively associated with ABS financing capacity. In addition, we find that smaller firms and firms with more receivables have higher ABS financing capacity, which suggests that the demand and the eligibility for ABS financing also affect ABS capacity.

In both sets of regressions, we find no evidence that the credit risk of the originating firm is negatively related to SPE leverage or ABS financing capacity. Instead, we find limited evidence that riskier firms have higher SPE leverage and larger financing capacity, although the relationship is fairly weak. We conclude that the securitization structure indeed provides little to no recourse to the originating firm and successfully separates the risk of the securitized assets. The credit risk of the originating firm plays less significant role as to determine the capacity of securitization financing than the choice of ABS initiation.

In a set of robustness checks, we show that that the conclusions are unchanged if we use alternative measures of customer risk. Most importantly, we find similar results if we measure customer risk using the risk profile of the typical customers for firms in the same industry as the originating firm, rather than the risk of the specific customer firms. This suggests that the relationships we identify are not due to omitted factors that affect firms' choice of customer risk but rather due to the underlying nature of the originating firms' customers. We conclude that the ABS is structured in anticipation of the potential risk of the receivables.

Overall, our study makes a contribution to several strands of the literature. First, we contribute to the studies which highlight the effect of economically-related firms on corporate

policies. For example, studies on customer-supplier relationships suggest that firm financial and investment policies are affected by firms with a dependent relationship (Titman, and Wessels, 1988; Kale, and Shahrur, 2007; Banerjee, Dasgupta, and Kim, 2008; Hertzel, Li, Officer, and Rogers, 2008; Johnson, Kang, Masulis, and Yi, 2014; Files and Gurun, 2015; Cen, Dasgupta, Elkamhi, and Pungaliya, 2016; Li and Tang, 2016).[3] Our study differs in that rather than exploring the effect of customer risk on the supplier firm's overall leverage, we focus on the financing capacity and leverage within a securitization vehicle. Because the factors affecting the choice of leverage inside the SPE are relatively limited, the setting permits more precise estimates of the underlying relationship between customer risk and financing.[4] Our results provide direct evidence that customer specific risk influences corporate financing capacity, and we conjecture that other sources of financing might be affected similarly. To the extent that receivables are widely used as collateral to support financing such as bank revolving credit lines and other secured debt, we expect customer specific risk to be one key factor that affects the lending decision by creditors.

Second, we add to the literature that studies whether securitization leads to the separation of credit risk between the securitized assets and the originator (Ayotte and Gaon, 2011; Chen, Liu, and Ryan, 2008; Gorton and Souleles, 2007; Landsman, Peasnell, and Shakespeare, 2008). The consistently significant role of customer risk in explaining ABS outcomes suggests that ABS creditors make lending decisions by separating the credit risk of the securitized assets from the remaining assets of the originating firm. The limited explanatory power of originating firm characteristics for SPE leverage demonstrates that once an ABS program by a nonfinancial firm

[3] Hertzel, Li, Officer, and Rogers (2008) document a spillover effect of financial distress and bankruptcy along the supply chain. Cen, Dasgupta, Elkamhi and Pungaliya (2016) show that long-term relationships with principal customers matter for bank loan spreads and covenants.

[4] As we discuss below, the capital structure of the SPE is primarily determined by a simple trade-off strategy: leverage is as high as possible without jeopardizing the highest rating on the ABS debt.

is in place, ABS financing is treated more as a true asset sale that separates the risk of the securitized assets from the originator.

Finally, our results highlight how increases in risk can limit the creation of very safe assets. The literature on security design (e.g. DeMarzo, 2005; Dang, Gorton, and Holmström, 2012) has shown that creating a very safe asset can increase access to capital by reducing financial frictions arising from information costs, costs of financial distress, or access to segmented markets. Our results show that an increase in the underlying risk of assets inhibits the ability of financial engineering to create a very safe asset, which can reduce access to external finance. In our setting, firms with riskier receivables have lower financing capacity, as the firms restructure the securitization in order to maintain very safe ABS debt.

The remainder of the paper is structured as follows. Section I describes the sample construction and provides some summary statistics on users of securitization and their customers. Section II provides a literature review and develops the main predictions. Empirical results on the determinants of ABS leverage and financing capacity are discussed in Section III and IV. We present robustness checks in Section V and conclude in Section VI.

I. Data and Summary Statistics

A. Information on Asset Backed Securitization

A typical corporate asset-backed securitization (ABS) involves the creation of a bankruptcy-remote special purpose entity (SPE), which will purchase assets from the originating firm and borrow funds from investors. The originator sells assets to the SPE in exchange for cash and a retained interest in the SPE. The SPE obtains financing by issuing ABS and uses the obtained funds plus the retained interest to finance the purchase of the securitized assets. The

ABS has a priority claim on the securitized assets and expects repayment from the cash flows generated by the securitized assets. Since the securitized assets are larger than the ABS financing, due to the retained interest, the ABS is overcollateralized and can be made to be very safe. For nonfinancial firms, the securitization typically involves transferring accounts receivables, and the deal is structured on a revolving basis so that the originating firm can continually finance new receivables as they are created. Due to their short maturity, receivables-based securitizations are often funded by ABCP, and the SPE is structured to carry very little credit risk. In our analysis below, we examine the relationship between the risk of the receivables and the level of overcollateralization.

We obtain information on firms' ABS programs from their annual reports filed with the SEC. We collect the maximum borrowing permitted under the ABS program (which we label '*Limit*'), the outstanding borrowing through the SPE ('*SPED*') and the value of the assets held in the SPE ('*SPEA*').[5] Whether the *SPED* is treated as part of the originating firm's on-balance-sheet debt depends on the accounting treatment of the SPE.[6] In order to standardize values across firms, we account for whether the firm consolidates the SPE and create firm level values for total assets and debt (termed '*TotalA*' and '*TotalD*') that include the SPE. We also create values that exclude the SPE (termed '*FirmA*' and '*FirmD*').[7]

As an example of the data we collect, consider the disclosure in the 2007 annual report of Hanesbrands Inc., an American clothing company:

On November 27, 2007, we entered into the Receivables Facility, which provides for up to $250 million in funding accounted for as a secured borrowing, limited to the availability of eligible

[5] The retained interest in a SPE is given by the difference between SPEA and SPED. In the cases where a firm discloses retained interest and SPED, we use this identity to determine SPEA.
[6] The Financial Accounting Standards Board issued FAS125 in 1996 and FIN46 in 2003 to provide guidance on the consolidation treatment of a securitization entity.
[7] In unreported results, we confirm that all of our conclusions do not depend on whether a firm reports consolidated results or not.

receivables, and is secured by certain domestic trade receivables. The Receivables Facility will terminate on November 27, 2010. Under the terms of the Receivables Facility, the company sells, on a revolving basis, certain domestic trade receivables to HBI Receivables LLC ("Receivables LLC"), a wholly-owned bankruptcy-remote subsidiary that in turn uses the trade receivables to secure the borrowings, which are funded through conduits that issue commercial paper in the short-term market and are not affiliated with us or through committed bank purchasers if the conduits fail to fund. The assets and liabilities of Receivables LLC are fully reflected on our Consolidated Balance Sheet, and the securitization is treated as a secured borrowing for accounting purposes. … As of December 29, 2007, we had $250 million outstanding under the Receivables Facility. … The total amount of receivables used as collateral for the credit facility was $495,245 at December 29, 2007 and is reported on the Company's Consolidated Balance Sheet in trade accounts receivables less allowances.

In this case, we collect *Limit* of 250, *SPED* of 250 and *SPEA* of 495.245 for the fiscal year of 2007 for Hanesbrands. The retained interest is 245.245, and the leverage of the SPE is .505 (250/495.245).

B. Sample Construction

Table I reports the distribution of firms using securitization by year. The number of firms varies by year from a low of 96 to a high of 213 in 2002. Even after the financial crisis in 2008, 132 firms still used securitization in 2009. We are able to find customer sales data for about 20 percent of firms, which we term the "matched sample." Within the matched sample, we find, on average, between one and two customer firms.

[Table I here]

We construct the sample by first identifying the full set of nonfinancial firms that used ABS during the period from 1997 through 2013.[8] In total we identify 539 unique firms. 361 of these firms report the borrowing limit, and 241 firms report enough information for us to

[8] See the appendix of Lemmon, Liu, Mao and Nini (2014) for a detailed description on how the information on securitization is collected from firms' SEC filings.

compute the leverage of the SPE.[9] We label this sample as the full sample, but the exact number of firms used in the analysis will depend on the availability of information. We next collect data on the principal customer firms associated with these ABS firms. Regulation SFAS 131 requires firms to report in their interim financial reports the identity of and the amount of sales to customers that represent more than 10% of their total sales.[10] We follow Banerjee, Dasgupta and Kim (2008), Hertzel, Li, Officer and Rogers (2008), and Cohen and Frazzini (2008) by matching firms with their customers using the Compustat segments files. We use only customers that are covered in Compustat so that we can collect accounting and financial data to measure the risk of firms' customers. We use various name fields and manual matching to merge the customer records in the Compustat segments files with the customers' records in the Compustat annual files. Using this process, we are able to find at least one customer for 173 of the 539 ABS firms. This set of firms comprises the matched sample, since it contains all ABS firms for which we can find a customer firm matched to a Compustat record. Within the matched sample, we have data on the SPE borrowing limit for 122 firms and SPE leverage for 57 firms. Table AI in the appendix summarizes the sample construction process.

Information on principal customers is derived from disclosures made in firm annual reports. For example, Hanesbrands Inc. disclosed the following customer information in its 2007 annual report:

In the year ended December 29, 2007, approximately 90% of our net sales were to customers in the United States and approximately 10% were to customers outside the United States. Domestically, almost 85% of our net sales were wholesale sales to retailers, 7% were wholesale sales to third-party embellishers and 8% were direct to consumers. We have well-established relationships with some of the largest apparel retailers in the world. Our largest customers are Wal-Mart Stores, Inc., or "Wal-Mart," Target Corporation, or "Target" and Kohl's Corporation,

[9] If a firm reports several SPEs, we use the largest SPE for which relevant information (SPE debt, SPE limit, etc.) is available.
[10] SFAS 131 superseded SFAS 14 as of December 15, 1997.

or "Kohl's," accounting for 27%, 14% and 6%, respectively, of our total sales in the year ended December 29, 2007.

In this case, we collect from the Compustat segments files the customer names and corresponding sales percentages for 'Wal-Mart stores', 'Target corp' and 'Kohl's corp'. We then match these customer firms with their accounting and financial information using Compustat fundamental annuals files. Our analysis sample is an unbalanced panel of firm-year observations for the full sample and matched sample of firms.

We do not have information on the exact source of the receivables sold in the securitization. Hanesbrand Inc, for instance, may securitize all its receivables including those from Wal-Mart, Target, and Kohl's. Moreover, we can only measure the concentration and risk for customers that we can match to Compustat. This means that our measure of customer risk is a noisy of the actual risk of the receivables financed through the securitization. We believe this process provides a reasonably accurate measure of the risk of securitized receivables. First, since principal customers contribute the most to a firm's total sales, it is likely that these customers are contributing the most of the securitized receivables, so our measure of principal customer risk captures a large portion of the receivables actually securitized. Second, other undisclosed customers are likely to be in the same industry as the principal customers and likely have credit risk profiles similar to the principal customers.[11] Moreover, we conduct a robustness check by measuring the risk of a firm's receivables using the risk profile of the customer industries.

C. Summary Statistics

Table II provides summary statistics on securitization usage and a variety of firm characteristics. Variable definitions are described in detail in the appendix. Lemmon, Liu, Mao

[11] Frank and Goyal (2009) show that industry is an important determinant of firms' capital structure choices.

and Nini (2014) discuss the differences between firms that use securitization and the broader sample of public firms in Compustat.

Securitization vehicles are highly leveraged, due to their assets being relatively safe. On average, the SPEs used to support securitization have leverage (the ratio of debt to assets) of 56%, which is much higher than the on-balance sheet leverage for ABS firms. As we show subsequently, this difference can be explained by the low risk of the assets being funded through the securitization. For firms that use securitization, ABS programs provide significant access to credit. The median program provides a borrowing limit that is about 5% of the firm's total assets or 18% of the firm's total debt, including securitized debt. The remaining firm characteristics reflect the conclusions drawn in Lemmon, Liu, Mao and Nini (2014). Securitization users are relatively large firms that usually have a credit rating close to the investment-grade / speculative-grade border, which also implies that the credit risk of the originating firm is a first order determinant for initiating an ABS program.

The last two columns in Panel A compare the means between firms that report a principal customer (*With_CST* = 1) and those that do not (*With_CST* = 0). The two groups are similar in most firm characteristics, although firms with a principal customer have a lower ratio of fixed assets to total assets and slightly higher research and development expenses. Within the securitization, however, firms with matched customers have, on average, notably lower SPE leverage and lower borrowing capacity. The increased concentration of customers makes the receivables riskier, which as we show below, leads to lower SPE leverage. Though firms in our sample are ABS firms which are very large firms to begin with, note that the second group does have slightly lower size[12].

[12] In the literature, most studies document that firms that report customers are generally much smaller than those that do not.

Panel B presents characteristics of customer firms. Since the reporting requirement is based on a sales threshold, the customer firms are large and represent a significant fraction of the sales to the ABS firms. On average, the customer firms account for 16% of the ABS firm's total sales. Although the debt-to-market equity ratio (1.26) of customer firms is slightly higher than that of ABS firms (96%), customer firms have a higher average credit rating than ABS firms. The average rating of customer firms is A-, with nearly 80% of the customers having a rating of BBB- or better. For ABS firms, only about 46% have an investment-grade rating. Customer firms also tend to have a very high market-to-book ratio; the mean and median values are each about 1 point larger for customer firms as compared to ABS firms. In total, the summary statistics provide evidence that securitized assets are of lower risk than that of the remaining assets on the originating firms' balance sheets. This result sheds some light on the motivation for ABS financing: separately financing low risk assets can help firms lower their cost of financing.

[Table II here]

II. Literature Review and Hypotheses

In this section, we discuss related studies that help guide our empirical investigation. We focus on two streams of the literature. First, we review extant knowledge on securitization financing as it applies to receivables securitization by nonfinancial firms. Second, we consider research related to the economic links along the supply chain to develop predictions about the effect of customer risk on the capital structure and financing capacity in ABS programs.

A. Asset-backed-securitization

As originally stressed by Gorton and Souleles (2007), the key feature of securitization is the separation of risk between the securitized assets and the originating firm. The SPE structure permits the creditors of the securitization to assess, finance, and potentially restructure the SPE separately from the balance sheet of the originating firm. To the extent that this separation can reduce some of the frictional costs of external finance, the securitization can reduce the originating firm's cost of capital.

Gorton and Souleles (2007) suggest that securitization can create value by minimizing the expected costs of distress, since the SPE is structured to avoid bankruptcy and continue operating in the event of the originator's financial distress. Leland (2007) shows that the additional degree of freedom to set two different capital structures can allow firms to minimize distortions from taxes and financial distress.[13] Lemmon, Liu, Mao, and Nini (2014) propose that segmented credit markets, perhaps induced through regulatory restrictions on asset mangers' investment choices, create an incentive to securitize assets. The securitization structure generates access to certain capital markets – such as the ABCP market – that firms otherwise could not use. Finally, to the extent that securitizations by nonfinancial firms involve the separate financing of receivables from large, well-known, low risk customers, we suggest that securitization can minimize aggregate information costs, similar to the logic put forth in DeMarzo (2005).

According to all of the explanations for how securitization can create value, the critical feature is that the risk of the SPE be separate from the risk of the originating firm. However, there is mixed empirical evidence about the degree of separation between the SPE and the originating firm. Gorton and Souleles (2007) show that the pricing of credit card ABS debt reflects the strength of the sponsoring bank, suggesting that the investors in the securitized debt

[13] SPEs are structured as pass-through entities that are not separately taxed, so the tax benefits of leverage are unlikely the motivation for receivables securitization. Nevertheless, the Leland (2007) logic applies to any friction that generates an optimal amount of leverage.

retain some exposure to the originator. Chen, Liu, and Ryan (2008), Niu and Richardson (2006), and Landsman, Peasnell, and Shakespeare (2008) all explore the correlation between measures of originators' risk and the characteristics of their off-balance sheet debt.[14] The combined evidence suggests that firms provide limited recourse to their securitization financing, suggesting that the separation of risk is not complete. We complement these studies by examining the choice of leverage in the SPE and examining the relative importance of the risk of the securitized assets and the originating firm's risk.

For receivables securitizations, it appears that the underlying motivation is to satisfy investor demand for very safe assets. Since the originating firm retains the residual interest in the SPE, the only external financing is provided by investors who buy the very low risk ABCP. Whether this is due to regulation that forces investors to buy safe assets or due to demand for information insensitive assets (as in Dang, Gorton, and Holmström 2012), it means that the risk of the underlying receivables has a direct impact on the financing capacity of the SPE; riskier receivables provide less financing capacity.

Based on this logic, we hypothesize that there is a strong negative correlation between asset risk and SPE leverage. Importantly, however, we can assess the relative importance of asset risk from the originator's customers and the originator's remaining balance sheet. If the securitization creates a true separation of risk, we expect that the characteristics of the originating firm to have limited explanatory power to explain ABS leverage, but customer risk should be strongly correlated with SPE leverage. Under the hypothesis that the ABS debt is completely separate from the originator's balance sheet, we expect that ABS financing capacity will be related only to customer risk and unrelated to the originator's balance sheet risk.

[14] Landsman, Peasnell, and Shakespeare (2008) also find that the equity valuations of securitization sponsors imply that market treats the assets and liabilities of SPEs as belonging to their sponsors.

B. Buyer-supplier relationships

Previous research has documented that supply chain considerations can influence capital structure through costs of financial distress borne by firms' customers. The pioneering paper by Titman (1984) demonstrates that firms can choose lower leverage to minimize the expected costs of liquidation on firm customers, which permits the firm to raise product prices. Hertzel, Li, Officer, and Rodgers (2008) provide empirical support for the spillover of financial distress by documenting that a bankruptcy filing can have adverse valuation consequences on the bankrupt firm's suppliers. Other research has provided empirical support for ex-ante effects of customer relationships on capital structure. For example, Titman and Wessels (1988) show that firms with unique or specialized products maintain lower leverage; Kale and Shahrur (2007) show that leverage is decreasing in the intensity of relation-specific investments as proxied by R&D; Banerjee, Dasgupta and Kim (2008) show that firms in durable goods industries maintain low leverage both when they have dependent suppliers and when they depend on relatively few customers;[15] and Kale, Meneghetti and Shahrur (2013) document a negative relation between leverage and the use of product warranties. Overall, these studies show that firms choose their capital structures with consideration of their economically-related stakeholders, including customers and suppliers that have a stake in each other's performance.

We propose that the credit risk of customers can affect the financing of suppliers since trade credit represents an asset that is effective collateral for supplier firms. For firms using securitization, the link is straightforward; the credit risk of a customer directly affects the value and risk of any receivables from the customer which serve as the assets of the SPE. We hypothesize that more risky receivables are associated with lower SPE leverage. Indeed,

[15] See also Li and Tang (2016) who find that CDS trading on customer firms affects corporate financial policies.

anecdotes provided in corporate disclosures suggest that the availability of ABS financing depends on certain characteristics of the originating firm's accounts receivables. For example, Huntsman Corporation, a U.S.-based global manufacturer of chemical products, disclosed the following in its 2009 annual report about its accounts receivables securitization program:

> The maximum funding availability under the U.S. A/R Program is $250 million, … The amount of actual availability under the U.S. A/R Program is subject to change based on the level of eligible receivables sold. Availability is further subject to changes in the credit ratings of Huntsman International's customers, customer concentration levels, and certain characteristics of the accounts receivable being transferred.

Our analysis provides large sample evidence on the relationship between customer risk and the borrowing capacity and usage of securitization programs.

To summarize, we focus on the determinants of ABS leverage and ABS financing capacity to identify the relative effects of the securitized assets and the originating firm's balance sheet risk. We aim to weigh the relative importance of the two and draw inferences on firm financial policy and its dependence on economically-linked stakeholders.

III. ABS Capital Structure

In this section, we examine the determinants of ABS capital structure. To restate our underlying hypotheses, we conjecture that firms borrow as much as possible through the SPE while maintaining relatively low credit risk, usually as measured by a high credit rating. As a result, we expect the limit on borrowing and the leverage of the SPE to be negatively related to the risk of the securitized assets, which we measure based on the average credit risk and diversification of the originator's customers. Second, we hypothesize the securitization capacity and usage is more sensitive to customer risk than it is to the risk of the originating firm, as would

be expected if the securitization successfully isolated the SPE from the risk of the originating firm.

In Panel A of Table III, we investigate the relation between the SPE leverage ratio and the concentration risk embedded in the originator's receivables. We create an indicator, *With_CST*, that a firm reports at least one principal customer. The reporting threshold stipulated in Regulation SFAS 131 requires firms to disclose all its customers that contribute more than 10% of its total sales. Any firm not reporting a customer above this threshold has sales diversified across at least 10 customers, with no single customer having more than 10%. Among those firms that have at least one principal customer, we create an additional measure of receivables concentration by aggregating the sales to all principal customers, which we term $Sum\_Sale_{CST}/Sale$. To the extent that the credit risk associated with accounts receivables is not perfectly correlated across customers, those firms without a principal customer or having relatively less sales to principal customers will have less risky receivables. We refer to this risk as "concentration risk" and assume that such risk would add to the risk borne by investors in the securitization and therefore may limit the amount of SPE leverage and financing capacity.

Columns (1)-(3) show the specifications with *With_CST* as the relevant independent variable, and columns (4)-(6) use $Sum\_Sale_{CST}/Sale$ as the measure of concentration. In the robustness tests section, we replicate these specifications using the entire sample of firms by estimating the concentration of receivables using an industry-level input-output table. In all specifications in Panel A, the coefficient estimates on *With_CST* and $Sum\_Sale_{CST}/Sale$ are negative and highly significant. Firms with riskier receivables have significantly lower SPE leverage, and the effect is quite large. For example, the estimates imply that firms with a principal customer have SPE leverage that is about 14% lower, which is roughly one-half of the

cross-sectional standard deviation of SPE leverage. The evidence confirms the hypothesis that concentration risk limits the amount of SPE leverage.

In Panel B of Table III, we relate the SPE leverage ratio to the characteristics of the corresponding ABS firm and the credit risk of ABS customer firms.[16] We aggregate the characteristics of customers for each ABS firm in each year by computing the weighted average of customer firm characteristics. We use the sales to each customer as the weight, under the assumption that sales should measure the customer's relative contribution to the accounts receivables being securitized. We compute the weighted average debt-to-market equity ratio (market leverage) of customer firms, which we label *Avg. $(D/E)_{CST}$*. We control for year fixed effects to absorb common factors that affect SPE leverage at the macro level. Since firms appear multiple times in the unbalanced panel, we report robust standard errors that are clustered at the firm level.

Columns (1)-(3) show the specifications with *Avg. $(D/E)_{CST}$* as the relevant independent variable. The estimated coefficient on *Avg. $(D/E)_{CST}$* is negative and significant in all specifications and does not change as we add more controls for the originator's credit risk. The estimates suggest a strong negative relation between SPE leverage and the credit risk of customers. For example, a one standard deviation increase in the average customer firm's leverage corresponds to a decrease in SPE leverage by approximately 10%, which is about one-third of a standard deviation of SPE leverage. Overall, the evidence shows that the risk of originator's customers is strongly negatively related to the leverage of the SPE, suggesting that securitization financing capacity is related to the risk of the securitized assets.[17]

[16] See Frank and Goyal (2009) for determinants of firms' capital structures.
[17] The results remain similar if we control for other customer characteristics such as customer firm profitability.

The remaining variables in the regression show the relationship between SPE leverage and characteristics of the originating firm. Most interesting is that SPE leverage is insignificantly related to the leverage or the rating of the originating firm, which proxies for the balance sheet risk of the originator. This evidence suggests that once an ABS program is in place, the SPE is less constrained by the risk of the originator than the risk of the securitized assets. This strongly supports the notion that the SPE is truly separate from the originating firm. To the extent that more credit constrained originators tend to benefit more from ABS initiation and utilize more the funding from an SPE, the conditional association between SPE leverage and originator credit risk can be positive.[18] For those who have access to the ABS market, more highly leveraged originators may face more need for financing through their SPEs.

[Table III here]

Overall, Panel B of Table III shows consistent evidence that the credit risk of the securitized assets dominates originating firm characteristics in accounting for the level of SPE leverage. In particular, firms with more concentrated customers with higher leverage have lower SPE leverage, but there is no evidence that higher originator risk lowers SPE leverage. We conclude that the securitization structure results in a true separation of the risk related to the securitized assets and that of the remaining firm assets. Moreover, the evidence suggests a clear link between the risk of customers and their suppliers; riskier customers reduce the financing capacity of suppliers through receivables securitization programs.

IV. ABS financing capacity

[18] Lemmon, Liu, Mao and Nini (2014) show that firms with higher leverage are more likely to initiate a securitization program.

Now we explore the determinants of the ABS financing limit. The maximum borrowing limit through an ABS program is set contractually in agreement between the originating firm and the underwriter of the securitization. The contract will state the upper limit of the amount of debt the ABS firm can borrow through its SPE. Since the limit reflects the total availability of external funding, it constitutes part of the originating firm's existing financing capacity. The limit also creates protection for creditors who contractually limit their exposure to a single borrower and, as such, reflects creditors' assessment of the risk involved in lending to the securitization. We measure the ABS limit using the stated limit as a fraction of the ABS firm's total assets *Limit/TotalA*, where total assets includes ABS debt. A higher ratio means the firm has more access to ABS. Since the ABS limit can be revised over time due to reassessments by creditors, we examine the whole panel of firm-years.

In Table IV, we relate the SPE borrowing limit to the same set of characteristics as in Table III, including the originating firm characteristics, the measures of concentration risk (Panel A), and the measures of credit risk of customer firms (Panel B). The first three columns in Panel A show that firms with a principal customer have a significantly lower SPE borrowing limit than those that do not, with a difference of approximately 1.4% of total assets, which is fairly large compared to the average *Limit/TotalA* of 8% and the standard deviation of 9%. The next three columns show that among those with a principal customer, more sales to principal customers is associated with less SPE borrowing limit. The evidence provides support for the hypothesis that receivables concentration risk limits ABS financing capacity.

Panel B shows that the leverage of customer firms, $Avg.\ (D/E)_{CST,}$ is negatively associated with the SPE borrowing limit. A one standard deviation increase in $Avg.\ (D/E)_{CST}$ is associated with approximately a 0.6% drop in *Limit/TotalA*. It suggests that customer credit risk has some

power to explain ABS financing capacity; originators with higher customer credit quality have larger securitization programs.

The remaining variables show that originating firm characteristics are strongly related to the borrowing limit. The SPE borrowing limit is significantly negatively associated with the originating firm size and positively associated with firm's accounts receivables. Larger firms likely have access to alternative sources of financing and rely less on the securitization. The coefficient estimates should be interpreted in a conditional sense given that we only use firms having ABS programs in place. Since originating firm characteristics matter for both the need and the ability of funding, an unconditional coefficient estimate may be subject to potentially endogeneity concern.

[Table IV here]

V. Robustness Tests

We first show that our conclusions are robust to using the leverage and rating of the just the largest principal customer, assuming that receivables risk can be represented by the risk of the most important customer firm. The results in Table V confirm that customer firm risk measured by the leverage of the largest customer is negatively related to SPE leverage and the ABS borrowing limit. The coefficient estimates on the variables of interest as well as the control variables are similar to those when we use weighted average customer firm characteristics.

[Table V here]

Through this point, our measures of customers' concentration risk and credit risk are based on firms' disclosure of sales to their principal customers as collected in Compustat

segments files. Our next robustness check is to create measures of customer risk based on characteristics of the typical customers of an ABS firm's industry.

There are two advantages of using the industry-level measures of customer risk. First, since firms have some discretion over the structure of their customers and certainly have flexibility in how to structure their ABS borrowing, it is possible that some omitted factor is affecting observed customer risk and ABS outcomes, which could render misleading interpretations. By using the customers of an ABS firm's industry, we avoid using the choices of the ABS firm to measure the relationships. Second, the sample size has been constrained by the requirement that firms in the ABS sample have principal customers with available data in Compustat. By creating such an alternative measure of customers' risk that is available for every ABS firm in the sample, we can expand the sample and confirm the validity of our inferences,

We use the input-output data published by the Bureau of Economic Analysis (BEA) to measure, for each industry, the average concentration risk and credit risk of the customers of that industry. Based on periodic surveys of firms, the BEA publishes industry-level input-output accounts, which track an industries' production and relationship with industries. We use the benchmark *Make* data to identify customer industries and compute customer risk measures for each industry in our ABS sample. We measure concentration risk with the Herfindahl index (HI) for customer industries, defined as the sum of the squared share of sales to each output industry (as in Dass, Kale, and Nanda, 2015 and Gaspar, and Massa, 2006). We measure customer industry credit risk by computing the sales-weighted average leverage ratio, using the average leverage ratio of firms in Compustat. We construct these measures using the benchmark data that is produced every five years, so use the 1997 I-O table for ABS firms over the period 1997-2001 and use the 2002 I-O table for ABS firms over the period 2002-2013.

The downside of the industry-level measure is that it is likely a noisy proxy for the true risk of ABS firms' customers. The additional noise might make it more difficult to identify the underlying relationships.

Table VI replicates the analysis of Tables III and IV using the industry-level measures of customer risk. In the left panel, we examine the relationship between SPE leverage and customer risk, and the right panel shows the relation between the ABS limit and customer risk. The alternative measure of customer concentration, *HI_CST*, is significantly negatively related to SPE leverage and is significantly negatively related to SPE borrowing limit. The alternative measure of customer industry leverage, $Avg.\ (D/E)_{CST\_ind}$, however, is not significantly related to either SPE leverage or the borrowing limit. We conjecture that credit risk variations within each industry might make the industry-level measure of leverage not a good representation of the true credit risk of each ABS firms' customers. Overall, the combined evidence confirms the significant link between customer firm risk and ABS financing outcomes.

[Table VI here]

In the setting of ABS, the accounting treatment of a SPE can be either on-balance-sheet or off-balance-sheet depending on whether the originator is the major bearer of the residual risk. Under certain conditions such as in a VIE structure, an originator is allowed to treat ABS funding as off-balance-sheet. However, over time the accounting regulations have been tightened such that it is quite common that lots of originators have to consolidate their originally off-balance-sheet SPE debt on their balance sheet.[19] However, from the legal and economic sense, both off-balance-sheet treatment and on-balance-sheet treatment do not change the role of securitization in pure asset and risk separation. Table VII examines whether the effect of

[19] ASC 860-40 Transfers to Qualifying Special Purpose Entities was superseded by ASU 2009-16, Transfers and Servicing (Topic 860): Accounting for Transfers of Financial Assets (originally as FASB No. 166), which removed the concept of a qualifying special-purpose entity.

customer firm risk on SPE leverage and financing capacity differs for the subsamples of on- and off-balance sheet securitizations. Interestingly, the results suggest that the negative association between customer credit risk and SPE leverage and that between customer risk and SPE capacity are significant only for the off-balance-sheet ABS subsample. The evidence could imply that ABS investors weigh more the risk of the securitized assets than that of the originator firm assets especially for off-balance sheet ABS deals. We leave the rationality of such risk perception by ABS investors for future research.

[Table VII here]

VI. Conclusion

We examine the unique setting of asset backed securitizations to investigate the effect of related-firm risk on corporate financial policies. Securitizations by nonfinancial firms typically involve the financing of accounts receivables, so we examine how the credit risk of firms' principal customers affects the securitizations. Since securitizations are structured to create very low risk financing, we hypothesize and confirm that customer credit risk is negatively related to the borrowing capacity in the securitization and the leverage in the SPE. Additionally, we show that the explanatory power of originating firm characteristics is quite limited in explaining the leverage of the SPE, suggesting that the securitization successfully creates a bankruptcy remote SPE and limits any implicit recourse to the originating firm. Although credit risk matters for whether a firm initiates an ABS program, as shown in Lemmon, Liu, Mao, and Nini (2014), the evidence here suggests that following the creation of a securitization program, ABS creditors mainly bear the credit risk of the securitized assets. Firms appear constrained to borrow only as much as can be supported by the collateral while maintaining highly rated ABS debt. Overall, the

evidence shows that receivables securitizations achieve a separation of credit risk of the securitized assets from that of the originating firms, and the level of available ABS financing is determined by the riskiness of the securitized assets.

We conclude by highlighting two important consequences of this result. First, the relationship between customer risk and securitization financing creates a link between firms along the supply chain. An increase in the riskiness of customer firms reduces the value of their receivables as collateral and limits supplier firms' access to credit. We conjecture that this link extends beyond receivables securitization to other forms of collateralized financing, such as bank loans. Second, the relationship between asset risk and financing capacity suggests a mechanism through which risk exacerbates financial constraints. Increases in risk inhibit the ability to relax financial constraints through the creation of very low risk securities, such as ABS. We again conjecture that this mechanism extends beyond receivables securitization.

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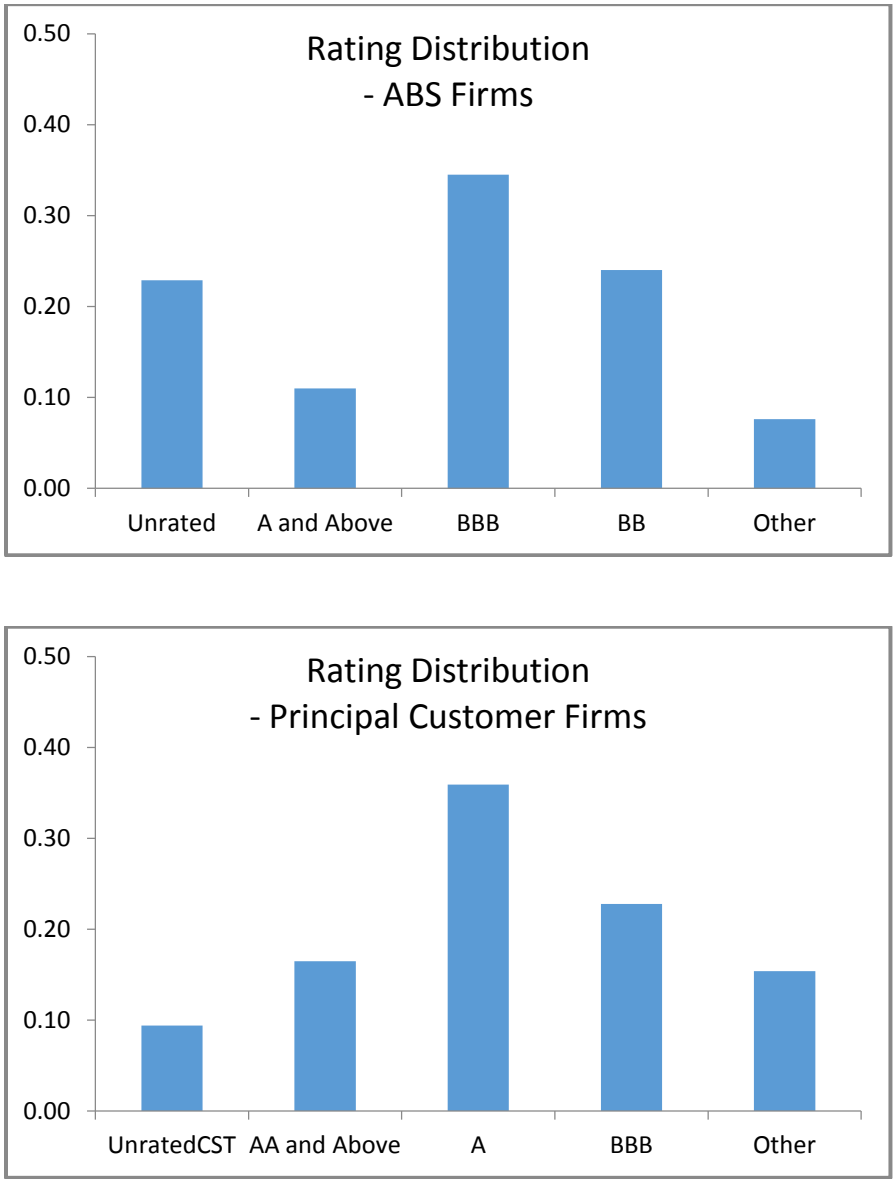
Figure I
Credit Rating Distribution



This figure presents S&P long term credit rating distributions for ABS firms (top panel) and those for their principal customer firms (bottom panel).

Table I
Firm Distribution over Time

	Full Sample	Matched Sample	
	ABS Firms	ABS Firms	Customer Firms
1997	113	25	43
1998	124	29	47
1999	133	25	42
2000	158	17	30
2001	203	31	52
2002	213	36	61
2003	202	42	75
2004	196	47	89
2005	173	45	78
2006	164	45	76
2007	159	49	86
2008	158	50	77
2009	132	40	67
2010	125	39	65
2011	104	29	49
2012	110	30	56
2013	96	25	47

This table presents firm distributions over time in the full sample and the match sample. Full sample refers to all ABS firms that report using securitization. Matched sample refers to all ABS firms that report using securitization and also report sales to Compustat-covered customers. Customer sales data are from Compustat segments files. The table shows the number of unique ABS firms and the number of corresponding customer firms in each year among all ABS firms that report using securitization borrowing. The sample period is from 1997 to 2013.

Table II
Summary Statistics

Panel A:	All ABS Firms					With_CST=0	With_CST=1	
Variable	Mean	Std. Dev.	p25	Median	p75	Mean	Mean	t-test
SPED_SPEA	0.56	0.31	0.35	0.62	0.81	0.58	0.43	***
Limit/TotalA	0.08	0.09	0.03	0.05	0.09	0.09	0.07	***
Limit/TotalD	0.36	0.59	0.10	0.18	0.37	0.36	0.35	
Ln(A)	8.19	1.37	7.26	8.15	9.08	8.23	8.05	**
AR/A	0.18	0.14	0.09	0.15	0.23	0.19	0.18	
PPE/A	0.30	0.21	0.13	0.25	0.42	0.31	0.26	***
EBIT/A	0.08	0.06	0.05	0.08	0.11	0.08	0.08	
XRD/A	0.01	0.03	0.00	0.00	0.02	0.01	0.02	***
Market-to-Book	2.73	4.37	1.14	1.75	2.89	2.73	2.75	
D/E	0.96	1.92	0.22	0.45	0.96	1.02	0.69	
Unrated	0.23	0.42	0.00	0.00	0.00	0.23	0.22	
A and Above	0.11	0.31	0.00	0.00	0.00	0.12	0.09	
BBB	0.35	0.48	0.00	0.00	1.00	0.35	0.32	
BB	0.24	0.43	0.00	0.00	0.00	0.22	0.30	***

Panel B: Customer Firms					
Variable	Mean	Std. Dev.	p25	Median	p75
$Ln(A)_{CST}$	10.21	1.40	9.56	10.50	11.52
$(D/E)_{CST}$	1.26	3.20	0.10	0.25	0.92
$Unrated_{CST}$	0.09	0.29	0.00	0.00	0.00
AA and Above	0.17	0.37	0.00	0.00	0.00
A	0.36	0.48	0.00	0.00	1.00
BBB	0.23	0.42	0.00	0.00	0.00
$Market\text{-}to\text{-}Book_{CST}$	4.03	4.86	1.52	2.68	4.84
$Sale_{CST}/Sale$	0.16	0.10	0.10	0.13	0.20

This table presents summary statistics of characteristics for ABS firms and their customer firms. Panel A presents characteristics of ABS firms. With_CST=0 refers to the group of ABS firms without principal customers and With_CST=1 refers to the group with principal customers. Panel B presents characteristics of customer firms. A and Above, AA and Above, A, BBB, BB are indicator variables for a credit rating belonging to a corresponding group. Detailed variable definitions are in Table AII. All ratios have been winsorized at the 1st and 99th percentiles. Customer sales data are from Compustat segments files. The sample period is from 1997 to 2013.

Table III
Determinants of ABS Leverage

Panel A:	SPE Leverage (SPED/SPEA)					
	(1)	(2)	(3)	(4)	(5)	(6)
With_CST	-0.146***	-0.143***	-0.143***			
	(0.042)	(0.042)	(0.042)			
$Sum.Sale_{CST}/Sale$				-0.407***	-0.405***	-0.414***
				(0.122)	(0.122)	(0.124)
AR/A	-0.173	-0.187	-0.159	-0.167	-0.182	-0.148
	(0.195)	(0.193)	(0.195)	(0.194)	(0.193)	(0.195)
Ln(A)	0.018	0.018	0.032*	0.019	0.018	0.034*
	(0.015)	(0.015)	(0.018)	(0.015)	(0.015)	(0.018)
D/E		0.012*			0.013**	
		(0.006)			(0.006)	
Unrated			0.014			0.009
			(0.053)			(0.053)
High Rating			-0.063			-0.072*
			(0.044)			(0.044)
PPE/A	-0.188**	-0.188**	-0.184**	-0.182*	-0.182*	-0.179*
	(0.095)	(0.095)	(0.093)	(0.095)	(0.094)	(0.092)
EBIT/A	-0.012	0.123	0.116	-0.034	0.113	0.114
	(0.297)	(0.309)	(0.297)	(0.302)	(0.314)	(0.302)
XRD/A	0.833	0.896	0.755	0.772	0.844	0.705
	(0.717)	(0.713)	(0.718)	(0.753)	(0.744)	(0.751)
Market-to-Book	0.006*	0.005*	0.005*	0.005*	0.005*	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes	Yes	Yes	Yes
#obs	1,096	1,096	1,096	1,096	1,096	1,096
R-sqr	0.13	0.14	0.14	0.13	0.14	0.14

Panel B:	SPE Leverage (SPED/SPEA)		
	(1)	(2)	(3)
Avg. $(D/E)_{CST}$	-0.024**	-0.033**	-0.024**
	(0.010)	(0.015)	(0.009)
Avg. $Sale_{CST}/Sale$	-0.192	-0.191	-0.194
	(0.320)	(0.318)	(0.331)
AR/A	-0.414	-0.362	-0.420
	(0.444)	(0.454)	(0.438)
Ln(A)	0.052	0.059	0.046
	(0.037)	(0.037)	(0.049)
D/E		0.027	
		(0.025)	
Unrated			-0.016
			(0.134)
High Rating			0.008
			(0.085)
PPE/A	0.091	0.108	0.091
	(0.262)	(0.257)	(0.262)
EBIT/A	-0.714	-0.570	-0.715
	(0.614)	(0.613)	(0.730)
XRD/A	-1.334	-1.137	-1.287
	(0.960)	(0.989)	(1.125)
Market-to-Book	0.007	0.006	0.007
	(0.007)	(0.008)	(0.008)
Year Fixed Effects	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes
#obs	169	169	169
R-sqr	0.25	0.26	0.25

This table presents estimated coefficients from regressions that relate SPE leverage at year t to firm characteristics at year t-1. Panel A uses the sample that includes observations of all firms that report using securitization. *With_CST* is a dummy variable which equals one if an ABS firm reports at least one principal customer in the year. $Sum.Sale_{CST}/Sale$ is the sum of the sales to all principal customers scaled by total sales of the firm in the year. It takes the value of zero if a firm does not report any principal customer. Panel B uses the sample that includes observations of all firms that report using securitization and also report sales to Compustat-covered customers. Avg. $(D/E)_{CST}$ is the weighted average debt-to-market equity ratio of customers using $Sale_{CST}/Sale$ as the weight. Detailed variable definitions are in Table AII. Standard errors are robust, clustered at the firm-level and reported in parentheses. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Table IV
Determinants of ABS Financing Capacity

Panel A:	SPE Borrowing Limit (Limit/TotalA)					
	(1)	(2)	(3)	(4)	(5)	(6)
With_CST	-0.015***	-0.014**	-0.013**			
	(0.006)	(0.006)	(0.006)			
$Sum.Sale_{CST}/Sale$				-0.029*	-0.028*	-0.026*
				(0.016)	(0.016)	(0.015)
AR/A	0.157***	0.159***	0.143***	0.160***	0.162***	0.145***
	(0.053)	(0.053)	(0.054)	(0.053)	(0.053)	(0.054)
Ln(A)	-0.036***	-0.036***	-0.027***	-0.036***	-0.036***	-0.027***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
D/E		0.002*			0.002*	
		(0.001)			(0.001)	
Unrated			0.043***			0.044***
			(0.012)			(0.012)
High Rating			-0.010			-0.010
			(0.006)			(0.006)
PPE/A	-0.012	-0.012	-0.009	-0.011	-0.011	-0.008
	(0.019)	(0.019)	(0.018)	(0.019)	(0.019)	(0.018)
EBIT/A	-0.065	-0.049	-0.029	-0.062	-0.045	-0.026
	(0.053)	(0.053)	(0.054)	(0.053)	(0.053)	(0.054)
XRD/A	-0.359***	-0.345***	-0.357***	-0.376***	-0.360***	-0.372***
	(0.109)	(0.110)	(0.110)	(0.109)	(0.110)	(0.110)
Market-to-Book	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes	Yes	Yes	Yes
#obs	1,892	1,892	1,892	1,892	1,892	1,892
R-sqr	0.42	0.42	0.46	0.42	0.42	0.46

Panel B:	SPE Borrowing Limit (Limit/TotalA)		
	(1)	(2)	(3)
Avg. $(D/E)_{CST}$	-0.002*	-0.002	-0.002*
	(0.001)	(0.001)	(0.001)
Avg. $Sale_{CST}/Sale$	0.031	0.031	0.031
	(0.028)	(0.028)	(0.026)
AR/A	0.180***	0.180***	0.170***
	(0.045)	(0.047)	(0.050)
Ln(A)	-0.034***	-0.034***	-0.031***
	(0.006)	(0.006)	(0.006)
D/E		-0.000	
		(0.003)	
Unrated			0.017
			(0.013)
High Rating			-0.001
			(0.008)
PPE/A	-0.010	-0.010	-0.013
	(0.021)	(0.021)	(0.021)
EBIT/A	-0.113**	-0.113**	-0.100*
	(0.048)	(0.047)	(0.056)
XRD/A	-0.007	-0.007	-0.018
	(0.071)	(0.068)	(0.065)
Market-to-Book	-0.001	-0.001	-0.000
	(0.000)	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes
#obs	417	417	417
R-sqr	0.59	0.59	0.60

This table presents estimated coefficients from regressions that relate SPE borrowing limit at year t to firm characteristics at year t-1. Panel A uses the sample that includes observations of all firms that report using securitization. *With_CST* is a dummy variable which equals one if an ABS firm reports at least one principal customer in the year. $Sum.Sale_{CST}/Sale$ is the sum of the sales to all principal customers scaled by total sales of the firm in the year. It takes the value of zero if a firm does not report any principal customer. Panel B uses the sample that includes observations of all firms that report using securitization and also report sales to Compustat-covered customers. Avg. $(D/E)_{CST}$ is the weighted average debt-to-market equity ratio of customers using $Sale_{CST}/Sale$ as the weight. Detailed variable definitions are in Table AII. Standard errors are robust, clustered at the firm-level and reported in parentheses. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Table V
Largest Principal Customer

Panel A:	SPE Leverage (SPED/SPEA)		
	(1)	(2)	(3)
$(D/E)_{CST}$	-0.017**	-0.021*	-0.018**
	(0.007)	(0.011)	(0.007)
$Sale_{CST}$/Sale	-0.090	-0.088	-0.034
	(0.319)	(0.317)	(0.331)
AR_A	-0.419	-0.398	-0.415
	(0.431)	(0.438)	(0.441)
Ln(A)	0.056	0.059	0.062
	(0.037)	(0.037)	(0.048)
D_E		0.014	
		(0.020)	
Unrated			0.053
			(0.139)
High Rating			0.024
			(0.090)
PPE/A	0.049	0.057	0.062
	(0.241)	(0.240)	(0.241)
EBIT/A	-0.638	-0.562	-0.779
	(0.587)	(0.590)	(0.716)
XRD/A	-1.262	-1.174	-1.438
	(0.879)	(0.886)	(1.040)
Market-to-Book	0.006	0.006	0.007
	(0.007)	(0.007)	(0.007)
Year Fixed Effects	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes
#obs	162	162	162
R-sqr	0.28	0.28	0.28

Panel B:	SPE Borrowing Limit (Limit/TotalA)		
	(1)	(2)	(3)
$(D/E)_{CST}$	-0.002**	-0.002*	-0.002**
	(0.001)	(0.001)	(0.001)
$Sale_{CST}$/Sale	0.027	0.027	0.029
	(0.031)	(0.031)	(0.031)
AR_A	0.171***	0.172***	0.162***
	(0.046)	(0.047)	(0.051)
Ln(A)	-0.036***	-0.035***	-0.032***
	(0.006)	(0.006)	(0.006)
D_E		0.000	
		(0.003)	
Unrated			0.016
			(0.014)
High Rating			-0.000
			(0.009)
PPE/A	-0.009	-0.009	-0.011
	(0.021)	(0.021)	(0.020)
EBIT/A	-0.121**	-0.118**	-0.112**
	(0.046)	(0.046)	(0.055)
XRD/A	0.012	0.014	0.001
	(0.069)	(0.066)	(0.061)
Market-to-Book	-0.001	-0.001	-0.000
	(0.000)	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes
#obs	391	391	391
R-sqr	0.60	0.60	0.61

This table presents estimated coefficients from regressions that relate SPE leverage (Panel A) and borrowing limit (Panel B) at year t to firm characteristics at year t-1. The regression specifications are the same as that in Panel B of Table III and Panel B of Table IV. $(D/E)_{CST}$ is the average debt-to-market equity ratio of the largest principal customer. Detailed variable definitions are in Table AII. Standard errors are robust, clustered at the firm-level and reported in parentheses. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Table VI
Customer Industry Risk

	Leverage (SPED/SPEA)			Borrowing Limit (Limit/TotalA)		
	(1)	(2)	(3)	(4)	(5)	(6)
HI_CST	-0.240*	-0.248**	-0.236*	-0.061**	-0.061**	-0.068**
	(0.123)	(0.124)	(0.124)	(0.029)	(0.029)	(0.028)
Avg. $(D/E)_{CST\_ind}$	0.007	0.004	0.007	0.004	0.003	0.004
	(0.012)	(0.013)	(0.013)	(0.003)	(0.003)	(0.003)
AR/A	-0.218	-0.223	-0.213	0.167***	0.170***	0.150***
	(0.227)	(0.225)	(0.228)	(0.053)	(0.053)	(0.054)
Ln(A)	0.003	0.003	0.018	-0.037***	-0.037***	-0.028***
	(0.018)	(0.018)	(0.022)	(0.004)	(0.004)	(0.004)
D/E		0.009			0.002	
		(0.009)			(0.001)	
Unrated			0.039			0.048***
			(0.054)			(0.012)
High Rating			-0.041			-0.009
			(0.044)			(0.006)
PPE/A	-0.118	-0.117	-0.114	-0.004	-0.004	-0.002
	(0.096)	(0.096)	(0.094)	(0.018)	(0.018)	(0.017)
EBIT/A	0.105	0.189	0.161	-0.052	-0.040	-0.020
	(0.322)	(0.323)	(0.314)	(0.053)	(0.054)	(0.053)
XRD/A	0.759	0.801	0.650	-0.428***	-0.422***	-0.429***
	(0.778)	(0.778)	(0.780)	(0.126)	(0.128)	(0.126)
Market-to-Book	0.005	0.004	0.004	-0.001**	-0.001**	-0.001**
	(0.003)	(0.003)	(0.003)	(0.000)	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering(Firm)	Yes	Yes	Yes	Yes	Yes	Yes
#obs	1,028	1,028	1,028	1,815	1,815	1,815
R-sqr	0.12	0.12	0.12	0.43	0.43	0.47

This table presents estimated coefficients from regressions that relate SPE leverage (left panel) and borrowing limit (right panel) at year t to firm characteristics at year t-1. *HI_CST* is the Herfindahl Index measuring the concentration risk of firms' customer industries, constructed based on the BEA 1997 and 2002 detailed input-output table. *Avg. $(D/E)_{CST\_ind}$* is the weighted average debt-to-market equity ratio of the customer industries using the sales from the firm's industry to each customer industry as the weight. Detailed variable definitions are in Table AII. Standard errors are robust, clustered at the firm-level and reported in parentheses. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Table VII
On/Off Balance Sheet Securitization

Panel A:	SPE Leverage (SPED/SPEA)					
	off-balance			on-balance		
Avg. $(D/E)_{CST}$	-0.030**	-0.034**	-0.026**	-0.005	-0.002	0.001
	(0.013)	(0.017)	(0.011)	(0.006)	(0.037)	(0.008)
Avg. $Sale_{CST}/Sale$	0.061	0.033	0.130	-0.215	-0.208	0.287
	(0.375)	(0.361)	(0.377)	(0.532)	(0.587)	(0.700)
Originator Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Originator Credit Risk		Yes	Yes		Yes	Yes

Panel B:	SPE Borrowing Limit (Limit/TotalA)					
	off-balance			on-balance		
Avg. $(D/E)_{CST}$	-0.003***	-0.003**	-0.003**	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Avg. $Sale_{CST}/Sale$	0.017	0.017	0.018	0.053	0.054	0.048
	(0.032)	(0.032)	(0.033)	(0.048)	(0.048)	(0.038)
Originator Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Originator Credit Risk		Yes	Yes		Yes	Yes

This table presents estimated coefficients from regressions that relate SPE leverage (Panel A) and borrowing limit (Panel B) at year t to firm characteristics at year t-1. The regression specifications are the same as that in Panel B of Table III and Panel B of Table IV. The left panel uses the sample of firms doing off-balance-sheet ABS and the right panel uses the sample of firms doing on-balance-sheet ABS. Detailed variable definitions are in Table AII. Standard errors are robust, clustered at the firm-level and reported in parentheses. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Table AI
Sample Construction

This table describes the sample construction process for the full sample and the matched sample. The sample period is from 1997 to 2013. Full sample refers to all firms during the sample period that report using securitization. Matched sample refers to all firms that report using securitization and also report sales to Compustat-covered customers.

	Full Sample	Matched Sample	
	ABS Firms	ABS Firms	Customer Firms
ABS firms identified from firm 10ks	539	539	
After matching with customers using Compustat segment files		173	
With SPE borrowing amount and sufficient accounting & financial data	442	143	114
With data on SPE Borrowing Limit (Limit/TotalD)	361	122	101
With data on SPE Leverage (SPED/SPEA)	241	57	51

Table AII
Variable List and Description

Variable	Definition	Compustat Item
SPED	Debt borrowed through SPEs	
SPEA	Assets in SPEs	
Limit	Upper limit of the amount of debt SPEs can borrow	
A	Total assets	at
D	Total debt	dltt+dlc
E	Market value of equity	prcc_f*csho
AR	Account receivable	rect
PPE	Net property, plant and equipment	ppent
EBIT	Operating income after depreciation	oiadp
XRD	Research and development expense (set to zero if missing)	xrd
Market-to-Book	Market value of equity divided by book value of equity	prcc_f*csho/(ceq+txdb)
Rating	S&P long-term domestic issuer credit rating: AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, CCC+, CCC, CCC-, and anything below CCC-, respectively	splticrm
Unrated	An indicator variable taking the value of one if a firm doesn't have a S&P long-term, rating, and zero otherwise	
High Rating	An indicator variable taking the value of one if a firm has a S&P long-term rating above BB+ and zero otherwise	
Sale	Total sales	sale
$Sale_{CST}$	Sales to the principal customer	salecs
HI_CST	The Herfindahl Index of sales in the industry, defined as the sum of squared share of sales to each customer industry	