Asset-backed securitization in industrial firms—
an empirical investigation[*]

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We investigate the determinants and consequences of the use of asset-backed securitizations (ABS) by industrial firms. ABS users are larger, more highly levered, have lower R&D intensity, and have more securitizable assets compared to other firms in the industry. Upon initiating an ABS program, firms experience an increase in asst return volatility, a decrease in bond rating, and increase in their total leverage (including the leverage associated with ABS). Firms with higher marginal tax rates borrow more using ABS. ABS users also experience an increase in their bond and loan spreads post ABS initiation, while the ABS spreads are much lower than bond spreads. Overall, our results are consistent with Leland's (2007) model where firms use ABS financing to exploit financial synergies. Finally, we find that firms use less ABS when the securitization has to be consolidated and that ABS usage has declined following changes in the accounting treatment of these transactions that have made it more difficult to treat ABS as off balance-sheet financing. This finding suggests that firms also care about accounting reporting in determining whether to use ABS.

Key words: Asset-backed securitization, ABS, capital structure, off-balance sheet, SPE, VIE, financing

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Abstract

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Introduction

Asset backed securitization (ABS) has become a significant source of financing for many firms. In a typical securitization transaction the firm removes some assets (e.g. receivables) from its balance sheet by selling these assets to a bankruptcy remote Special Purpose Entity (SPE). The SPE then securitizes these assets by selling securities to investors. The funds from the sale of securities in the SPE are paid to the firm in return for the assets transferred to the SPE. Prior work has primarily focused on the accounting treatment of securitizations, including whether securitizations are used to manage earnings (Feng, Gramlich, and Gupta (2009)), to window dress financial statements (Dechow and Shakespeare (2009)), or to reduce leverage and improve the firm's credit rating (Mills and Newberry (2005)). In contrast, relatively little is known about the underlying economic benefits of asset backed securitization. For example, as noted by Dechow and Shakespeare (2009), "Our paper takes as given that there are economic benefits to securitizations. Undoubtedly such transactions would occur regardless of the accounting treatment".

In this paper we attempt to fill this gap in the literature by focusing on the determinants and consequences of ABS usage by industrial firms. The starting point of our analysis is the model by Leland (2007), which focuses on the financial synergies that can potentially be obtained by securitization of some of the firm's assets. Specifically, Leland's model is based on the tradeoff theory of capital structure and makes a number of predictions regarding the conditions under which asset securitization can lower the firm's overall cost of financing---One of the main benefits of securitization cited by practitioners (Roever

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and Fabozzi (2003), Gangwani (1998)). We test a number of these predictions using a large database of asset based securitizations by non-financial firms collected from firm's 10k disclosures. Our paper makes several contributions. First, we provide new descriptive evidence on the usage of ABS by industrial firms and document the effects ABS on the firm's balance sheet. Second, we provide new evidence on the underlying determinants of capital structure and on the underlying economic rationale for the use of ABS as a form of financing. Finally, we also provide some evidence on how recent changes in accounting rules that have made it more difficult to keep securitizations off-balance sheet have affected the use of ABS, which allows us to comment on the potential accounting benefits of these transactions.

Over the period 1994 through 2008 we identify 428 industrial firms that engage in ABS financing.[1] The usage and reporting of ABS has increased over time as has the fraction of ABS programs that are consolidated on firms' balance sheets. The firms in our sample span a variety of industries, with ABS usage being most prevalent in wholesale, retail, and business services. No firms report ABS usage in agriculture, beer and liquor, tobacco, shipbuilding, defense and mining. In an average securitization the firm securitizes about 22% of its total debt, which constitutes approximately 9% of its total assets. The leverage ratios of the SPE's in our sample are 61%, and the typical ABS program has a duration of 4 years.

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[1] Note that we focus on ABS usage by industrial firms and exclude financial firms. This results in a much smaller sample of ABS users compared to some other papers, but allows us to focus directly on issues of capital structure in an environment less affected by regulatory capital requirements and other issues unique to financial firms.

We next examine the types of firms that engage in ABS transactions. Leland's model predicts that firms with a high volatility of operating assets compared to the volatility of the assets to be securitized will benefit more from asset securitization. In addition, firms with higher marginal tax rates and those with low credit ratings should be most likely to use ABS. Our results are generally consistent with these predictions. We do find however, that securitization activity is concentrated in large firms, suggesting that there are significant fixed costs associated with setting up an ABS program.

With respect to the amount of debt used in the ABS special purpose vehicle, we find that the amount of ABS debt is negatively related to firm size, market-to-book, the amount of dividends paid, and whether the ABS program is consolidated on the balance sheet. The amount of leverage used in the ABS special purpose vehicle is positively related to the amount of accounts receivables (the asset generally securitized), the firm's total debt ratio, and the underlying risk of the firm's assets. We find little evidence that whether or not the ABS program is consolidated on the firm's balance-sheet is systematically related to firm characteristics, except that there is some evidence that larger firms are more likely to keep their ABS programs off of the balance-sheet.

Upon ABS initiation, we find that the remaining assets of the firm become riskier and a decrease in credit rating of the remaining assets. These findings are consistent with Leland's model that shows that securitization is most valuable for firms in which the credit quality of the securitized assets is significantly higher than that of the firm's remaining assets. Also consistent with Leland's model, the usage of ABS appears to

increase the overall debt capacity of the firm and to lower the firm's overall tax bill. Also consistent with the view that ABS can lower overall financing costs we find that bond and loan spreads increase after the initiation of an ABS program, but that the funding costs of the ABS program are significantly lower than spreads on debt issued against the remaining assets.

Overall, this paper is among the first to examine the economic benefits of asset-backed securitizations by non-financial firms. Our evidence paints a consistent picture that firms realize substantial economic benefits in the form of lower overall financing costs through the use of securitizations. The results provide support for the types of financial synergies described by Leland (2007). This work is particularly relevant as policy makers currently debate the merits of securutization and the role that off-balance sheet financing may have played in exacerbating the current financial crisis.

II Overview of Asset Backed Securitization

Asset-backed securitization (ABS) is a form of financing when assets with predictable cash flows are sold to a specially created entity that finances the purchase by issuing securities guaranteed by these assets. ABS deals are often arranged through a legal entity called a special purpose entity (SPE) or special purpose vehicle (SPV) or variable interest entity (VIE). The firm, called the originator in ABS deals, will first set up a bankruptcy remote SPE and then sell part of its assets to the SPE in return for a cash payment. To pay the originator, the SPE raises funds through the issuance of bonds or commercial paper guaranteed by the underlying assets. For non-financial firms, common types of securitized assets are accounts receivable or installment loan contracts.

An important issue related to an ABS deal is whether the SPE needs to be consolidated into the originator's financial statements or is left off-balance sheet. If the SPE is unconsolidated, the ABS deal results in the removal of the underlying asset from the originator's balance sheet. The borrowing by the SPE does not increase the balance sheet debt of the originator. On the other hand, if a SPE is consolidated, the underlying asset remains on the balance sheet and the borrowing by the SPE is reflected on the balance sheet of the originator as debt.

The accounting consolidation treatments of SPE have evolved through several stages. Prior to 1990, the consolidation principle is based on ownership of majority voting interests. If a firm owns more than 50% of voting equity shares of an entity, the entity needs to be consolidated. In 1990, the Emerging Issues Task Force (EITF) of the Financial Accounting Standards Board (FASB) issued EITF Issue No. 90-15, which indicated that a third party's equity holding in a SPE should exceed 3% of the SPE's total asset in order for the SPE to be kept off-balance sheet. Since then the "3% rule" has became a consolidation standard. In 2003, the FASB released Interpretation No. 46 (FIN46). FIN46 raised the 3% threshold to 10%, and renamed the legal entities as VIE (instead of SPE). More importantly, FIN46 set forth a new measure of control, independent of voting interests. Based on FIN46, the VIE needs to be consolidated if the originator, even without any equity share holdings, holds the majority of the residual risk or obtains the majority of the benefits.

Besides the accounting rules regulating Special Purpose Entities, the FASB issued FAS 125 in 1996, defining a different type of entity, qualifying SPE (QSPE). An entity needs to meet certain standards in order to be treated as a QSPE and a QSPE is unconsolidated. In 2000, the FASB adopted FAS 140, tightening the conditions for an entity to become a QSPE. The use of QSPEs has been mainly limited to transactions by financial firms such as mortgaged-backed securitizations.

Loosely speaking, the evolution of the consolidation guidance by the FASB has made it more difficult for firm's to maintain their SPEs off-balance sheet. It is worth mentioning

that the legal status of an entity and its accounting treatment is not the same issue. For example, a SPE can remain bankruptcy remote from the originator even though it is consolidated.

ABS financing shares certain similarities with secured debt and factoring, but it differs in several important respects. If a SPE is consolidated, the accounting treatment of ABS deals resembles that of secured debt as the underlying assets and the debt borrowed are both on the balance sheet. A key concept to securitization is that the underlying assets can generate cash flows independent of the firm's operation. The securities issued through the SPE rely on the cash flow related to the underlying assets only rather than the payment promise of the originator. Secured debt, on the other hand, depends primarily on the company's ability to pay back. The debt holders of the SPE do not have claims to the firm's other assets while the holders of secured debt do. The legal feature of bankruptcy remoteness of the SPE allows a company to isolate specific assets from creditors of the company's other assets, an important goal that cannot be achieved through secured debt.

If a SPE is unconsolidated, ABS financing is essentially a true sale of assets from an accounting point of view. In this respect, ABS is sometimes compared to factoring. In factoring, a firm sells its accounting receivables to a factor company for a discounted amount of the face value of the invoices. Factoring usually involves transferring control from the seller to the factor. However, in ABS, the originator is commonly responsible for servicing the assets (e.g., collecting payments from the consumer). Factoring is mainly used by small firms, which obtain financing and services from a factor company by accepting a discounted price for the sale. In contrast, ABS involves setting up a separate legal entity, which requires substantial fixed costs, making ABS more attractive to larger firms.

III Description, Data and Summary Statistics
A. Sample collection

To create a sample of ABS users we use Edgar to search the 10-K SEC filings to identify firms with an ABS program. We begin with all Compustat firms from 1994 through 2007, excluding financial firms (SIC codes between 6000 and 6999) and regulated utilities (SIC codes between 4900 and 4999). We start from 1994 which is the first year when the electronic filings on Edgar are available. We next merge the Compustat firm year observations with the annual 10-K filings on Edgar. We search every merged firm-year filing for the word "securitization", "securitization", "securitized", or "securitised". As long as a firm has one filing with one of these four words, we mark it as an ABS candidate.

The ABS candidate sample is complemented by a sample of ABS users identified by Securities Data Corporation (SDC). The SDC New Issues database provides a sample of ABS entities issuing securities. Most of the issues identified by SDC are initiated by financial firms. Another difficulty in using the SDC sample is that the originator information is often missing. Nevertheless, where possible, we merge the data in SDC with the Compustat sample using the originator information.

From 1994 through 2007, the Compustat non-financial, non-utility sample has 126108 firm-year observations, representing 15952 unique firms. Linking Compustat to Edgar yields 100405 firm-year filings by 12126 unique firms. The word search yields 2026 firms as ABS candidates. The SDC database provides another 43 firms as additional candidates.

Next, we manually check the 10-K filings of each candidate filing to determine whether the filing firm has an ABS program or not. This screening procedure identifies 428 unique firms with an ABS program.[2]

Finally, we read all the annual 10-K filings of these 428 firms on Edgar till 2008 to identify the firm-years with an ABS program and to collect the useful variables.[3] The final sample has 2183 firm year observations.

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[2] 19 out of the 43 firms from SDC enter into the final sample.

As all the observations in the final sample are manually examined, we are reasonably confident that the likelihood of misidentification is minimal. However, we would also like to know how accurate our search algorithm is in indentifying ABS firms; in another word, how many ABS firms are missed from our sample. To estimate the proportion of the missed ABS firms, we implement another search algorithm. We focus on the 10-K filings in the Compustat and Edgar merged sample that filed in the first quarter of 2006, 3218 firms in total.[4] We search these filings for the word "off balance".[5] Finally, we manually examine the identified filings for ABS samples. In 552 filings with the word "off balance", only 4 firms are ABS firms that are not included in our final sample. This number represents 0.12% (4/3218) of the sample firms. We thus believe that we have accurately identified the majority of the population of firms that disclose their usage of ABS.[6]

For our final sample, we manually collect the following variables: whether the SPE through which an ABS deal is arranged is consolidated or not (Consolidate), how much debt is borrowed through ABS (ABSD), how many assets are moved to the SPE for the ABS deal (ABSA), how much equity in the SPE is hold by the originator, namely retained interest (RET_INT), the maturity of the ABS program (Maturity). In a number of cases, we can get only two out of the three variables: ABSD, ABSA and RET_INT. We assume ABSA is the sum of ABSD and RET_INT to derive the third variable.[7] In addition to the details on the structure of the ABS entity we also collect accounting variables from Compustat, and stock price variables from CRSP. Detailed variable definitions are provided in Appendix A.

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[3] We do not do word search for filings in 1992, 1993 and 2008. However, if a firm is identified as an ABS firm, we read all the 10-K filing including filing in these three years.

[4] Most of these filings represent annual reports for fiscal year of 2005.

[5] We allow any character between "off" and "balance", thus "off-balance" is also a qualified word.

[6] Disclosure of ABS usage becomes much more common in the wake of the Sarbanes Oxley Act following the release of SEC rule 33-8182 in April 2003.

[7] Commonly, the equity in the SPE is jointly held by the firm (the originator) and a third party. By assuming SPEA is the sum of SPED and RET_INT, we assume the equity holding of the third party is zero. Although, this approximation induces errors, we have no reason to believe that it will bias our results. This approach is similar to that used in Dechow and Shakespeare (2009) and Landsman, Peasnell and Shakespeare (2008).

B. Summary statistics

Table 1 reports summary statistics of the ABS programs. Panel A reports the number of ABS firms by year. The number of ABS firms increases over time from the early 90s until the early 21st century and then decreases in recent years. The number of ABS firms peaks in 2002, with 221 firms reporting an ABS program. Only 109 firms have an ABS program in 2007, and 90 of them remain in 2008. The small number in early 90s is partially due to the fact that many firms may not report their ABS programs, especially if an ABS is maintained off-balance sheet. Firms are not required to report their off balance sheet activities until 2003, when Sarbanes-Oxley Act was enforced.[8] The decreasing trend in recent years could also be the result of accounting rule changes. As discussed in Section III.A, changes in accounting regulation have made it more difficult for firms to maintain their ABS usage off-balance sheet.

A firm may have more than one ABS program, and thus more than one SPE, in a given year. The number of SPEs, which are reported in the second column, is larger than the number of ABS firms. The final sample has 2183 firm-years and 2637 ABS-years. On average, every one out of five firms has two SPEs in a given year. About 40% to 60% of SPEs are consolidated. If a firm has both a consolidated SPE and an unconsolidated SPE, it is classified as "unknown". Also classified as "unknown" are firms for which we cannot determine the consolidation status. In the early years, the percentage of firms with consolidated SPEs is quite high. It is likely that firms with consolidated SPEs are more likely to disclose their SPEs/ABSs in their 10-K reports. The percentage of consolidated SPEs increases from mid 90s onwards, partially reflecting the evolution of the consolidation regulations.

The first year when a firm has an ABS program is referred to as the ABS initiation year. The year after the last year that a firm still maintains its ABS program is classified as the

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[8] In January 2003, as part of the Sarbanes-Oxley Act, the SEC released the final rules regarding the disclosure of firms' off-balance sheet arrangements. Public companies must now include a section on off-balance sheet arrangements in registration statements, annual reports and proxy or information statements.

ABS termination year if the 10-K filing for that year is still available on Edgar.[9] A firm may drop out of the sample not because it terminates its ABS, but because its 10-K filings cannot be found on Edgar. Less than 10% of the ABS firms terminate their ABSs during the sample period.

Panel B reports the sample distribution of ABS firms across 49 industries groups. The industries classifications are as defined in Fama and French (1997). Industries, excluding financials and utilities, are listed in descending order by the number of unique ABS firms. The highest incidence of ABS usage occurs in industries such as wholesale, retail, business services, automobiles and trucks and machinery. Industries with no ABS firms include agriculture, beer and liquor, tobacco products, shipbuilding and railroad equipment, defense, precious metals, non-metallic and industrial metal mining.

Panel C summarizes the amount of ABS debt by year and Panel D has the overall summary. ABS debt amount (ABSD) as a percentage of ABS assets (ABSA) ranges from 50% to 80%, with an overall average of 61%. It is decreasing over time from around 80% in early 90s and dropping to 50% in recent years. The debt ratios of the firm, excluding ABS (FirmD/FirmA) and including ABS (TotalD/TotalA), are also reported. For the firm with consolidated ABSs, we take out the debt associated with ABS from the firm's balance sheet debt and balance sheet assets to get FirmD and FirmA. For firms with unconsolidated ABS's we add back debt associated with the ABS to get TotalD and TotalA. Firms' debt ratios (FirmD/FirmA) range from 30% to 40%, which is about half as large as the ABS debt ratios. Consolidating the debt in the ABS's raises firms' debt ratios by about 5%. Debt in the ABS's is about 10% of firms' total assets and about 20% of firms' total debt. These statistics suggest that the amount borrowed through ABS's represents a large amount of a firm's total debt. The numbers are also consistent with the argument that there exist nontrivial fixed costs in setting up an ABS program. The need for small amounts of financing does not justify the costs of setting up an ABS program.

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[9] If a firm with December fiscal year end terminates its ABS program in November 2000, year 1999 is the last year the firm is in the sample and year 2000 is the termination year.

The average maturity of an ABS program is 2.5 years. More than a quarter of the firms have ABS programs that mature in one year. Duration_ABS measures the number of years that an ABS lasts, which averages 4, suggesting many firms choose to renew their ABS programs when they mature. Duration, which measures the number of years when a firm has an ABS program, averages 5 years, implying some firms choose to start a new ABS program when the existing programs matures.

Table 2 reports the summary statistics of the accounting variables in the year prior to the year that firms initiate their ABS programs. Panel A reports results for the sample of firms with consolidated ABSs while Panel B reports results for firms with unconsolidated ABSs. For each ABS firm, we calculate the industry median value for all non-ABS firms in the same industry measured in the same year. A firm is defined as a non-ABS firm if the firm never reports an ABS program during our sample period. The mean of these industry medians is reported in the last column as a basis for comparison to the ABS users.

Compared to the industry median, ABS firms are much larger. The average assets of the consolidated ABS firms are around $5619 million, while the industry median of non ABS firms averages only $199 million. The unconsolidated ABS firms have average assets of $6505 million, which is slightly larger than the consolidated ABS firms. ABS firms' accounts receivable to asset ratios are about 4% higher than their non-ABS comparables. Considering the large size of ABS firms, the amount of ABS firms' account receivables is significantly larger than that of non-ABS firms. The market-to-book ratio of consolidated ABS firms is 2.28 and that of unconsolidated ABS firms is 3.10, while that of the same industry non-ABS firms is around 1.68 and 1.81. ABS firms have book debt ratios around 36%, while the debt ratio of non-ABS firms is only 25%. We also obtain data on firms' marginal tax rates (MTR) from John Graham's website.[10] If missing, we use fitted value from the regression model as in Graham and Mills (2007), Table 4 Panel B Model C. The average MTR in our sample is around 0.31.

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[10] See http://faculty.fuqua.duke.edu/~jgraham/taxform.html.

We measure firms' financial health using Altman's Z-score, which is a linear combination of a firm's accounting variables. Higher Z-scores represent more financially healthy firms. The average Z-score of ABS firms is close to industry median, the difference is not statistically significant. We measure a firm's credit rating as a discrete value of 1 to 5 based on the S&P long term domestic issuer credit rating. The variable Rating takes a value of 5 if the S&P rating is 'AAA', 'AA+"; 4 if it is "AA", "AA-" or "A+"; 3 if it is "A", "A-" or "BBB+"; 2 if it is "BBB", "BBB-" or "BB+" and 1 if the S&P rating is any other value but not missing. To keep the firms with missing rating information in the sample, we construct another variable, Rating_whole, which takes the value of 0 if the S&P rating is missing. The ratings of ABS users have median and mean values around 2, which are higher than those of non ABS firms. The better rating of ABS firms is partially due to the fact that ABS firms are much larger, and large firms are both more likely to have a rating and to have a better rating compared to smaller firms.

Stock return volatility (σ_E) and asset volatility (σ_A) measure a firm's risk. σ_E is calculated using daily stock return over the year. σ_A is a leverage-weighted average of stock volatility and bond volatility. The daily market-level bond return for each credit rating group is from Ibbotson for 1994-2005.[11] For the years post-2005, we obtain individual bond return data from Datastream first and then get value weighted bond returns using all the bonds in the same credit rating class. Finally, we assign the market level bond returns for a given credit rating to all the individual firms with the same credit rating. Bond return volatility is then obtained and so is asset volatility. Assuming 252 days per year, we report annualized volatility measures. Each year, we rank all the firms by σ_E and σ_A into deciles and σ_E_rank and σ_A_rank measure the decile ranks of the raw volatility measures. ABS firms have lower stock return volatility and asset volatility than non-ABS comparables, which may also be the results of size differences.

We proxy for the average tax rate of firms using income tax paid divided by operating income after depreciation (EBIT). Before interest income rather than taxable income is used in the numerator so that the ratio is not affected by interest expenses. ABS firms pay

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[11] We were unable to get this data series after Ibbotson was acquired by Morningstar in 2006.

higher tax as a proportion of EBIT. The tax ratio is 17% for consolidated ABS firms and 20% for unconsolidated ABS firms, while that for the industry-median non-ABS firms is around 11%.

Comparing to industry-median of non-ABS firms, ABS firms are much larger, have relatively more debt, and higher market-to-book ratios. Consolidated ABS firms and unconsolidated ABS firms are quite similar, with unconsolidated ABS firms being slightly larger than consolidated ones. Size seems to be the most important determinant in a firm's decisions of whether to use an ABS program.

III. Empirical Results

A. The determinants of ABS usage

In this section, we examine the determinants of ABS usage. We first ask the question that what type of firms is more likely to use ABS. The summary statistics reported in Table 2 has shed some lights on this issue. We now run probit regressions to quantify the partial effects of all the explanatory variables. The probit coefficients are reported in Table 3.

The dependent variable is an indicator variable for whether the firm has an ABS program. The observations taking value of 1 are ABS firms measured at the year right before the firm initiates its ABS program. Every ABS firm counts one observation. In Full Sample, the observations taking value of 0 are firm year observations for all non-ABS firms from 1992 till 2007. In this sample, we have much more non-ABS observations than ABS observations, 64606 vs. 318, not only because we have fewer ABS firms than non ABS firms but also because one ABS firm courts one observation while one non-ABS firm counts multiple observations.

To restrict non-ABS firms being the ones more comparable with ABS firms, we construct two subsamples. As size seems to be the key characteristic differing ABS from non-ABS firms, in Large Firm Sample, we restrict firms to have assets value larger than 350

million, which is around the 10th percentile of assets value for ABS firms. 90 percent of ABS firms are in Large Firm Sample while only a third of the non-ABS firms entering this sample. Finally, in Match Firm Sample, we match each ABS firm to three non-ABS firms which are in the same industry and have the closest asset value at the year right before the ABS initiation. The two subsamples can allow us to identify other determinants of ABS usage, without being dominated by the size effect.

The independent variables are natural logarithm of firms' asset, accounting receivable as asset ratio, market-to-book ratio, leverage ratio, earning-to-asset ratio, R&D-to-asset ratio, dividend yield, annual growth rate of sales, and the marginal tax rate. To measure the riskiness of the firm, we use σ_A_rank and two indicator variables capturing a firm's credit rating (Lowrating and Norating). Norating takes value of 1 if S&P rating is missing and 0 otherwise; while Lowrating takes value of 1 if S&P credit rating is lower than BBB+ but not missing, and 0 otherwise.

One strong result is that firm size as measured by logarithm of assets has a positive coefficient, suggesting that large firms are more likely to use ABS. This result is not a surprise given the summary statistics reported in Table 2 in that ABS firms are much larger than non-ABS firms. The results also show that firms with high debt ratios, with low R&D-to-assets ratios, and with high account receivable-to-asset ratio are more likely to use ABS. The marginal probability change for on unit change form the sample average in the covariates of the logarithm of total assets, account receivable-to-assets, debt ratio, and R&D-to-assets leads to a 0.2%, 0.03%, 0.1% and 0.07% increase in the probability of a firm using ABS, respectively. Given that the unconditional probability of a firm using ABS is only 0.5% (318/(318+64606)), the effects of firm size, account receivables-to-assets, debt ratio, and R&D-to-assets are economically significant.

The coefficients for several risk measures do not have unanimous signs. σ_A_rank is insignificant most of the time. Lowrating has a significantly positive coefficient while Norating is insignificant or significantly negative. The results suggest that there is a threshold for using ABS. Risky firms, such as firms with no credit rating, are less likely

to reach the threshold, thus unable to use ABS. The positive coefficient of Lowrating is consistent with the risk hypothesis that for firms that meet the threshold, riskier firms are more likely to use ABS.

In sum, large firms, firms with more account receivables, with more debt, with low R&D-to-assets, and with a credit rating are more likely to use ABS. The results are consistent with the fixed costs and threshold interpretation. The necessary conditions for a firm to initiate an ABS are: the firm is large enough, has ample securitizable assets (account receivables) and is preferred to have a credit rating. For firms that meet these criteria, risky firms are more likely to use ABS.

The next question we ask is: what explains the amount of ABS financing. We measure the amount of ABS financing using two ratios, ABS debt to total debt ratio and ABS debt to total assets ratio. Table 4 reports the regression results of these ratios on a set of explanatory variables. Firms with more account receivables, high profitable firms (E/A), firms with higher debt ratios use more of ABS debt. High dividend yield (DIV/ME) firms, large firms and firms with high market-to-book use less ABS debt.

The marginal tax rate has a positive and significant coefficient, consistent with our hypothesis that firms with higher marginal tax rate use more ABS debt. If firms use ABS debt to better take advantage of the interest tax shield, ABS debt is more valuable for firms with higher marginal tax rate. A two standard deviation increase of marginal tax rate leads to a 4% increase of ABS debt to total debt ratio.[12] Norating and $\sigma_{A\_}$rank have positive coefficients, suggesting risky firms tend to use more ABS debt, consistent with our hypothesis.

The risk measures such as Norating have opposite signs in Table 3 and Table 4, which merits further discussions. Table 3 reflects a combination of a selection effect and an incentive effect. The selection effect captures whether firms meet the threshold of using ABS while the incentive effect reflects whether firms have incentive to use ABS. It's

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[12] 0.366*0.056 *2=0.04, where 0.056 is the standard deviation of MTR.

likely that firms that have strong incentive to use ABS are also firms that do not reach the standard. Firms that barely reach the standard are the firms most likely to use ABS and they will use more of ABS debt. The negative coefficient for Norating in Table 3 may reflect the selection effect. Although firms with Norating equal to 1 may prefer to use ABS, they are less likely to meet the standard. Since the sample in Table 4 covers only ABS firms, the coefficients only reflect firm's incentive effect. The positive coefficient for Norating in Table 4 reflects that risky firms have high incentive to use ABS and they use more of ABS debt.

Last but not least, we find that firms with consolidated ABS use less ABS debt. This is not predicted by Leland's model. In Leland's model, how firms report their ABS is irrelevant to firms' ABS financing decisions. This result, on the other hand, suggests that firms care about their accounting reporting in their ABS financing decisions. If a firm has to consolidate the ABS, it tends to use less ABS debt. In another word, if a firm can manage to maintain the ABS off-balance sheet, it intends to borrow more through it. The result is consistent with previous accounting studies which argue that accounting reporting is an important determinant of firms' decisions.

Given the importance of consolidation status in the ABS debt regression, we also investigate the determinants of a firms' consolidation status. As we do not have predictions regarding the explanatory variables, the tests are mainly for exploratory purpose. The results are reported in Table 5. We do not find any explanatory variables have significant predicting power in a firm's consolidation choice. The only weak evidence is that large firms are slightly more likely to keep SPEs unconsolidated.

B. The consequence of ABS usage

This section investigates the consequence of ABS usage. Table 6 reports the characteristics of the ABS firms over event years. Event year 0 represents all the years when a firm has an ABS program. The averages across all the event year 0 are reported. Event year -1 is the year right before a firm initiates its ABS program and event year 1 is

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the year when the firm terminates its ABS program. Other event years are defined similarly.

The account receivable-to-assets ratios of ABS firms decrease from event year -1 to event year 0, as predicted. Balance sheet debt ratios increase from event year -3 to -1; the market-to-book ratios decrease slightly. The stock returns volatilities increase over event years, especially from year -1 till year 0, which could be attributed to increasing assets volatilities and increasing debt ratios.

Our hypotheses predict that after a firm initiates ABS, the assets of the originator will become more volatile because ABS assets are predicted to be much safer assets than the originator's other assets. As a result, the risk of the firm, excluding ABS, is predicted to increase after the ABS initiation. To measure the risk shifting, we measure the difference of post-event and pre-event risk for ABS firms. However, the shift of risk may reflect unmeasured time series shocks which change a firm's risk. To control for these time series shocks, we implement a difference-in-difference approach.

For each ABS firm, we find matching firms using propensity score method. For each firm each year, we calculate the predicted probability, or propensity scores, from the probit estimation reported in Table 3, Regression 3. We then match each ABS firm to three non-ABS firms which are in the same industry and have the closest propensity score as the ABS firm measured at event year -1. The equal weighted average of the three matched non-ABS firms is used in the tests.

The results are reported in Table 7. Pre event year is event year -1 and post event year is the average across event year 0. The first year of event year 0 is excluded. For each ABS firm, we subtract the pre event value from the post event value to get the difference. This difference is then averaged over ABS firms. A similar procedure is performed for the matched non ABS firms. The first row of each panel reports measures for ABS firms while the second raw for non ABS firms. Last row reports the difference-in-difference, which is the difference between ABS firms and non-ABS firms.

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Risk is measured using credit rating, stock returns volatility and assets volatility. Comparing to non-ABS firms, ABS firms' credit rating becomes worse and equity and assets volatilities become higher post ABS initiations. The results are consistent with our hypotheses that ABS splits the best assets out of the firm and both the rating agencies and investors are aware of the consequence of this action.

Another important hypothesis is that ABS firms will use more debt, including debt associated with ABS, after ABS initiations. The model predicts that by setting up two separate legal entities, a firm can achieve two separate optimal capital structure. The entity with safer assets can borrow more debt to take advantage of the tax benefit of the debt, resulting in a higher debt ratio for the two entities as a whole. The last two panels of Table 6 reports the debt ratios difference. Comparing to non-ABS firms, the debt ratio of the originator doesn't change, while the total debt ratio, including the debt associated with ABS increases by about 5%.

A direct implication from the model is that the firm pays less tax after ABS initiations. We measure tax payment as tax paid divided by EBIT. Given a certain amount of EBIT, if a firm borrows more debt with tax deductible interest, the firm will pay less tax every year, resulting in a low tax-to-EBIT ratio. This hypothesis is tested in Table 8. The sample includes all ABS firms at event year -3 till 0. Dummy variable Time_D takes value of 1 if it is measured at event year 0 and 0 otherwise. We exclude the first year of event year 0, which is the ABS initiation year. Since we don't know the time of the year when a firm starts its ABS, the tax payment at the ABS initiation year reflects the mixed effects of with and without ABS.

In the first regression, we use Time_D as the only explanatory variable. It is significant with a coefficient of -0.036, which represents about 20% reduction of the tax payment ratio. The effect of ABS on the firm's tax payment is not only statistically but also economically significant. Adding control variables does not change the results, not even

the magnitude of the coefficient for Time_D. This result is a strong support for Leland's model.

C. Borrowing costs analyses

If a firm transfers the best part of its assets to a legally separate entity, and if investors are aware of the firm's actions, we expect the firm's borrowing costs to rise. To test the hypothesis, we compare the spreads of bonds/loans issued pre and post ABS initiations. We use two approaches to implement the tests. First, we directly compare the bond/loan spreads of ABS firms across the ABS initiation years. Second, we run regressions of bond/load spreads on a time dummy capturing ABS initiations and a set of control variables.

Bond issuance data is collected from the Mergent Fixed Income Securities Database (FISD) while loan issuance data from LPC Dealscan database. Table 9 reports the comparison of spreads and other issue characteristics pre and post ABS initiations. The sample firms are ABS firms with bond or loan issues in the six year window around the ABS initiation years. The ABS initiation year is excluding from the sample.

Panel A characterizes the bond issues while Panel B the loan issues. We first report the average of all the bond/loan issues three years before and three years after ABS initiations. The average bond spreads is 197 basis points before ABS initiations and 315 basis points post ABS. Alternatively, we restrict the sample to be the last issue before ABS initiation and the first issue post ABS initiation. In this restricted sample, the average bond spreads is 202 and 317 basis points pre and post initiation years. Finally, we construct an overlapping sample using firms with at least one issue pre and one issue post the initiation years. For this sample, we could calculate the change of spreads differences. The post ABS bond spreads is significantly higher than the pre ABS bond spreads. The difference is 98 basis points, which represents about 50% increase. Similar to bond spreads, the loan spreads also rise post ABS initiations. The difference of 18 basis points implies around 45% increase. The bond issue amount, issue maturity and put

option feature are not significantly different around the initiation years. For loan issue sample, number of lenders increase post ABS, the use of proceeds is less likely to for refinancing reason post ABS.

The summary statistics indicate that firms initiating ABS programs have their loan and bond spreads increased significantly and dramatically. This is consistent with our hypothesis that the borrowing costs become higher post ABS initiations. The summary results are based on a univariate analysis without taking into account the potential impacts of other variables. We next implement regression tests to control for the impacts of other variables, as reported in Table 10 for bond issues and Table 11 for loan issues.

Panel A uses a sample of ABS firms alone while Panel B sample has both ABS firms and non-ABS firms. Same as Table 9, we restrict the issues to be in the six year window around ABS initiations. Each issue counts one observation. The key variable is Time_D, which takes value of 1 if the issue is post ABS and 0 otherwise. The hypothesis predicts Time_D to be positive. Regression (1) use firms characteristics as controls, including logarithm of sales, R&D-to-sales, market-to-book value of equity, earning-to-sales, and leverage ratio. Regression (2) add a set of bond/load issue variables, including issuance amount, issuance maturity, a put-option feature dummy. The results show that large firms, firms with high market-to-book, and more profitable firms have lower spreads, suggesting that these firms are less risky and have high probability to pay back their debt. On the other hand, firms with high debt ratios have larger spreads. Large borrowing amount implies higher spread. Time_D is always positive with coefficient around 60.

Panel B sample incorporates bond issues by non-ABS firms. Time_D is 0 for bonds issued by non ABS firms. We add ABS_D to capture the potential differential spreads between ABS and non ABS firms, which takes value of 1 for issues by ABS firms and 0 otherwise. As in Panel A, Time_D is still positive and significant with coefficients around 65.

The results of loan spreads reported in Table 11 resemble that of bond spreads. Time_D is always positive and significant. The regression results complement the summary statistics evidence reported in Table 9. Even taking into accounts of the control variables, post ABS bond and loan spreads are much higher. The evidence suggests that investors are aware of the facts that parts of the safe assets are moved out of the firms.

Finally, we compare ABS spreads with bond spreads. If the assets associated with ABS are safe assets, we expect the borrowing costs through ABS be lower than the borrowing costs of the originator. To carry out the comparison, we match each ABS to one bond issue. In Panel A of Table 12, ABS spreads are compared to the spreads of bonds issued before ABS initiations. In Panel B, ABS spreads are compared to that of bonds issued post ABS initiations. Finally, in Panel C, we select the bonds issued most close to the ABS initiation years. All three samples show strong evidence that ABS spreads are more than 140 basis points lower than bond spreads. The results are consistent with the argument that the assets in ABS are safer than the other assets in the firm. As we need both ABS spreads and bond spreads to implement the tests, the sample size is small. The evidence should be treated as suggestive only.

IV Conclusion

Asset-backed Securitizations (ABS hereafter) as a source of financing for firms have grown at phenomenal rate during the past decade. This study collects a large data set regarding ABS usage by non-financial and non-utilities firms. Understanding the use of ABS by nonfinancial firms is particularly important given the current crisis in credit markets that originated with losses on securities backed by mortgage assets. Providing evidence on how firms use non-mortgage related ABS to finance their operations be of value not only to academics, but also to regulators and practitioners as they reexamine the role that these securities play in financial markets.

We find that ABS users are larger, with high account receivable to assets ratios, highly levered, and with lower R&D intensity compared to other firms in the industry. The

evidence suggests that there exists a fix costs and threshold for entering into the ABS market. Size, amount of account receivables and whether a firm has a credit rating or not are likely criterions for initiating ABS program. For firms which satisfy the criterion, risky firms are likely to use more ABS debt.

Upon initiating ABS usage, firms experience an increase in asst return volatility, a decrease in bond rating, and increase in their total leverage (including the leverage associated with ABS). Firms with higher marginal tax rates borrow more using ABS. ABS users also experience an increase in their bond and loan spreads post ABS initiation, while the ABS spreads are much lower than bond spreads.

Overall, our results are consistent with Leland's (2007) model where firms use ABS financing to take advantage of financial synergies. Finally, we find that firms use less ABS when the securitization has to be consolidated and that ABS usage has declined following changes in the accounting treatment of these transactions, suggesting that firms also care about accounting reporting in determining their ABS usage.

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Appendix: Variable Definitions

ABSD	Debt associated with ABS or in another word, debt borrowed by SPE
ABSA	Assets in SPE
FirmD	Debt of the firm, excluding debt in SPEs
FirmA	Asses of the firm, excluding assets in SPEs
TotalD	Total debt of the firm, including debt in SPEs
TotalA	Total assets of the firm, including debt in SPEs
Maturity	The maturity of an ABS
Duration_ABS	Number of years an ABS program lasts
Duration	Number of years from the first year a firm initiates an ABS program till the last year the firm maintains its ABS
A	Total assets (#6)
AR	Account receivable (#2)
MB	Market value of equity (#199*#25) divided by book value of equity (#60+#74)
E	Earnings ()
R&D	Research and development expense (#46)
Div	Total dividend payment (#19+#21)
gS	Growth rate of sales
MTR	Simulated marginal tax rate (before) obtained from John Graham, if missing, using the fitted value from the regression model as in Graham and Mills (2007), Table 4 Panel B Model C. MTR=0.331-0.075*LowUSETRDummy-0.012*NOLDummy-0.106BookLossDummy+0.037ForeignActivityDummy, where all the dummy variables take value of 0 except for the following, LowUSETRDummy=1 if U.S. current tax/U.S. pretax income (#63/#272 or #16/#272 if missing)<10 percent, NOLDummy=1 if Net Operating Loss Carryover (#52) >0, BookLossDummy=1 if U.S. pretax income (#272 or #170 if missing) <=0, ForeignActivityDummy=1 if absolute foreign/worldwide pretax

	income ($|\#273/\#170|$) >0.05.
Zscore	1.2*Working Capital (#4-#5)/A+1.4*Retained earnings(#36)/A+3.3*Earnings before interest and taxes(#178)/A+0.6*Market value of equity (#188*#25)/Total liabilities (#181)+1.0*Sales(#12)/A
Rating	Discrete variable taking values 1 to 5 based on the S&P Long Term Domestic Issuer Credit Rating (#280). Rating is 5 if #280 is 'AAA', 'AA+' rating; 4 if 'AA', 'AA-' and 'A+'; 3 if 'A', 'A-', 'BBB+'; 2 if BBB', 'BBB-', 'BB+', and 1 if #280 takes other values but not missing
Rating_whole	Similar as Rating, but take value of 0 if #280 is missing
Lowrating	Dummy variable taking value of 1 if Rating is 2 or 1 and zero otherwise
Norating	Dummy variable taking value of 1 if Rating is missing and zero otherwise
σ_E	Stock return standard deviation obtain using daily stock return over the year
σ_E_rank	The decile of σ_E
σ_A	(D/A)* σ_B +(1-D/A)* σ_E, where σ_B is the aggregate daily bond return standard deviation by bond rating.
σ_A_rank	The decile of σ_A
Tax	Income tax paid (#317)
EBIT	Operating income after depreciation (#178)
Consolidate	An indicator variable equal to 1 if the SPE is consolidated, and zero otherwise
Spread	Bond or loan yield spread
Amount	Bond or loan issue amount
Maturity	Maturity of the bond or loan issue
Put_D	An indictor variable equal to 1 if the bond has an put option associated with it, and zero otherwise
# of lenders	Number of leading banks in a syndicated bank loan deal
secured_D	An indictor variable equal to 1 if the loan is a secured loan and zero

	otherwise
guarantor_D	An indictor variable equal to 1 if the loan is a loan with guarantee, and zero otherwise
corporate_D	An indictor variable equal to 1 if the loan issue is for corporate purpose, and zero otherwise
takeover_D	An indictor variable equal to 1 if the loan issue is for takeover purpose, and zero otherwise
workcapital_D	An indictor variable equal to 1 if the loan proceeds is to be used as working capital, and zero otherwise
refinance_D	An indictor variable equal to 1 if the loan issue is for refinancing purpose, and zero otherwise
Time_D	An indicator variable equal to one if the issue is post ABS initiation and zero otherwise
ABS_D	An indicator variable equal to one if the bond or loan is issued by an ABS firm, and zero otherwise

Table 1 Summary statistics for ABS programs

This table presents the summary statistics of ABS programs. Panel A reports the summary of ABS programs by year. The 1st column has the number of firms with ABS in a given year. The 2nd column has the number of SPEs, through which ABS programs are arranged, in a given year. The 3rd and 4th columns report the numbers of firms that have its SPE consolidated and non-consolidated respectively. The 5th column has the number of firms whose accounting treatment of SPE cannot be determined or firms with both a consolidated SPE and an unconsolidated SPE. The 6th column has the percentage of firms in the sample with consolidated SPEs. The 7th and 8th columns have number of firms that initiate and terminate their ABS programs in a given year, respectively. The last two columns report the percentage of firms initiating and terminating their ABS programs in a given year, respectively.

Panel A Number of ABS firms by year

	# of total firms	# of total SPEs	# of consolidated	# of nonconsolidated	# of unknown	# of consolidated /#total	# of initiation	# of termination	# of initiation /# of total	# of termination /# of total
1992	5	6	3	2	1	0.500	5		1.000	
1993	27	36	16	16	4	0.444	22	0	0.815	0.000
1994	53	67	31	30	6	0.463	28	1	0.528	0.037
1995	70	79	31	41	8	0.392	25	4	0.357	0.075
1996	94	109	39	60	10	0.358	32	2	0.340	0.029
1997	115	138	53	72	13	0.384	26	3	0.226	0.032
1998	129	156	66	78	12	0.423	32	7	0.248	0.061
1999	143	166	63	89	14	0.380	37	8	0.259	0.062
2000	166	200	83	104	13	0.415	51	11	0.307	0.077
2001	218	258	115	129	14	0.446	73	14	0.335	0.084
2002	221	263	131	116	16	0.498	32	16	0.145	0.073
2003	210	243	125	101	17	0.514	27	24	0.129	0.109
2004	202	235	123	96	16	0.523	22	20	0.109	0.095
2005	185	221	122	88	11	0.552	14	21	0.076	0.104
2006	146	185	113	65	7	0.611	2	19	0.014	0.103
2007	109	149	93	50	6	0.624	2	12	0.018	0.082
2008	90	126	70	53	3	0.556	0	6	0.000	0.055
Total	**2183**	**2637**	**1277**	**1190**	**171**		**430**	**168**		

Table 1 Cont.

Panel B reports the number of unique ABS firms across the Fama and French (1997) industry classification. Industries are listed in descending order based on number of unique ABS firms in that industry. Financial and utility industries are not listed.

Panel B Number of unique ABS firms by industry

	# of unique firms		# of unique firms
Wholesale	55	Shipping Containers	6
Retail	44	Recreation	5
Business Services	31	Personal Services	5
Chemicals	30	Printing and Publishing	4
Automobiles and Trucks	21	Healthcare	4
Machinery	18	Medical Equipment	4
Steel Works Etc	17	Coal	4
Transportation	17	Restaraunts, Hotels, Motels	4
Petroleum and Natural Gas	15	Almost Nothing	4
Communication	15	Entertainment	3
Electronic Equipment	15	Aircraft	3
Business Supplies	12	Measuring and Control Equipment	3
Food Products	11	Candy & Soda	2
Consumer Goods	11	Fabricated Products	2
Construction Materials	11	Pharmaceutical Products	1
Computer Hardware	9	Agriculture	0
Textiles	8	Beer & Liquor	0
Electrical Equipment	8	Tobacco Products	0
Apparel	7	Shipbuilding, Railroad Equipment	0
Computer Software	7	Defense	0
Rubber and Plastic Products	6	Precious Metals	0
		Non-Metallic and	
Construction	6	Industrial Metal Mining	0
		Total	**428**

Table 1 Cont.

Panel C and D report summary statistics of debt borrowed through ABS. ABSD denotes debt associated with ABS. ABSA measures amount of assets moved to the SPE for the ABS deal. FirmD and FirmA measure debt and assets associated with the firm/originator, excluding ABS. TotalD is the sum of ABSD and FirmD, measuring the total debt in the firm and the SPE, while TotalA measures the total assets in the firm and the SPE.

Panel C Summary statistic of ABS debt by year

Year	#	ABSD/ABSA	FirmD/FirmA	TotalD/TotalA	ABSD/TotalA	ABSD/TotalD
1992	5	0.946	0.408	0.476	0.109	0.217
1993	25	0.895	0.318	0.389	0.124	0.334
1994	49	0.830	0.346	0.419	0.126	0.299
1995	68	0.786	0.364	0.428	0.120	0.285
1996	91	0.797	0.351	0.426	0.142	0.297
1997	111	0.779	0.362	0.431	0.134	0.282
1998	127	0.716	0.383	0.444	0.115	0.265
1999	140	0.752	0.362	0.417	0.105	0.248
2000	162	0.658	0.333	0.389	0.099	0.247
2001	215	0.622	0.340	0.383	0.080	0.206
2002	217	0.578	0.316	0.355	0.067	0.190
2003	205	0.508	0.301	0.339	0.060	0.191
2004	198	0.523	0.274	0.314	0.063	0.189
2005	179	0.540	0.275	0.317	0.065	0.193
2006	141	0.541	0.271	0.319	0.072	0.209
2007	106	0.499	0.299	0.349	0.081	0.190
2008	2	.	0.162	0.162	0.000	0.000

Panel D Summary statistic of ABS debt

	Mean	Median	Std Dev	10th Pctl	25th Pctl	75th Pctl	90th Pctl
ABSD/ABSA	0.608	0.679	0.290	0.085	0.448	0.831	0.933
FirmD/FirmA	0.320	0.300	0.183	0.100	0.195	0.413	0.567
TotalD/TotalA	0.370	0.347	0.185	0.150	0.244	0.481	0.634
ABSD/TotalA	0.087	0.046	0.115	0.000	0.012	0.109	0.225
ABSD/TotalD	0.223	0.129	0.245	0.000	0.036	0.343	0.601
Maturity	2.459	2.000	2.108	1.000	1.000	3.000	5.000
Duration_ABS	4.003	3.000	2.833	1.000	2.000	5.000	8.000
Duration	5.165	4.000	3.393	1.000	2.000	7.000	10.000

Table 2 Summary statistics for ABS firms

This table reports the descriptive statistics of firms' characteristic variables for ABS firms categorized by whether the ABS firm is consolidated with the SPE or not. The last column reports the median characteristics for non-ABS firms in the same industry as ABS firms. Non-ABS firms are firms that have never had an ABS in their whole life. ***, ** and * indicate significant difference between the ABS firms and the industry median of non-ABS firms for the variables of the same raw at 1%, 5% and 10% levels, respectively.

Panel A Summary statistic of ABS firms (consolidated)

	Mean	Median	Std Dev	10th Pctl	25th Pctl	75th Pctl	90th Pctl	Industry Median
A	5619.428	1191.870	20254.310	351.261	561.714	3142.881	13362.000	198.992***
AR/A	0.211	0.178	0.146	0.063	0.114	0.264	0.427	0.169***
MB	2.284	1.484	2.371	0.700	1.041	2.892	4.405	1.683***
D/A	0.357	0.334	0.172	0.150	0.247	0.455	0.602	0.247***
E/A	-0.001	0.029	0.256	-0.043	0.001	0.054	0.083	0.010
R&D/A	0.014	0.000	0.054	0.000	0.000	0.005	0.036	0.009
Div/ME	0.015	0.007	0.026	0.000	0.000	0.022	0.037	0.001***
gS	0.199	0.110	0.466	-0.061	0.018	0.244	0.463	0.092***
MTR	0.312	0.345	0.062	0.187	0.290	0.345	0.371	0.310
Zscore	2.878	2.768	5.490	1.073	1.856	3.950	5.374	2.903
Rating	2.011	2.000	0.905	1.000	1.000	3.000	3.000	1.460***
Rating_whole	1.158	1.000	1.209	0.000	0.000	2.000	3.000	0.018***
σ_E	0.477	0.430	0.225	0.266	0.341	0.541	0.701	0.610***
σ_E_rank	3.408	3.000	1.807	1.000	2.000	4.000	6.000	4.979***
σ_A	0.315	0.270	0.167	0.179	0.215	0.366	0.499	0.431***
σ_A_rank	2.647	2.000	1.845	1.000	1.000	4.000	5.000	4.418***
Tax/EBIT	0.165	0.161	0.269	-0.007	0.062	0.278	0.343	0.107**

Table 2 Cont.

Panel B Summary statistic of ABS firms (unconsolidated)

	Mean	Median	Std Dev	10th Pctl	25th Pctl	75th Pctl	90th Pctl	Industry Median
A	6505.144	1727.648	22365.667	280.514	690.300	5185.000	12793.000	196.197***
AR/A	0.191	0.171	0.131	0.061	0.097	0.260	0.340	0.147***
MB	3.097	1.797	4.077	0.714	1.119	3.214	6.643	1.809***
D/A	0.329	0.328	0.189	0.066	0.201	0.413	0.615	0.224***
E/A	0.026	0.026	0.083	-0.043	-0.005	0.064	0.104	0.012**
R&D/A	0.014	0.000	0.029	0.000	0.000	0.016	0.038	0.016
Div/ME	0.019	0.007	0.036	0.000	0.000	0.024	0.047	0.002***
gS	0.422	0.113	2.969	-0.115	0.011	0.250	0.566	0.099
MTR	0.314	0.345	0.060	0.197	0.290	0.355	0.371	0.309
Zscore	3.299	2.665	2.318	1.125	1.780	4.261	5.962	3.090
Rating	2.031	2.000	0.814	1.000	1.000	3.000	3.000	1.559***
Rating_whole	1.211	1.000	1.180	0.000	0.000	2.000	3.000	0.019***
σ_E	0.485	0.461	0.191	0.252	0.340	0.595	0.725	0.614***
σ_E_rank	3.420	3.000	1.832	1.000	2.000	5.000	6.000	4.835***
σ_A	0.333	0.299	0.162	0.159	0.225	0.409	0.559	0.450***
σ_A_rank	2.882	3.000	2.022	0.000	1.000	4.000	6.000	4.497***
Tax/EBIT	0.197	0.180	0.333	-0.009	0.045	0.298	0.409	0.121***

Table 3 Probit regression results for determinants of ABS use

This table reports marginal effects of firm characteristics on the probability of a firm having an ABS program. The depend variable is an indictor variable equal to 1 if a firm has an ABS program (ABS firm) and 0 if a firm has never had an ABS program (non-ABS firm). The sample counts one observation per ABS firm and the independent variables are measured at the year right before the firm initiates the ABS program. In the full sample, the observations taking value 0 include firm years from 1992 till 2007 for all non-ABS firms. The large firm sample keeps only firms with assets larger than 350 million. In the match firm sample, each ABS firm is matched to three non-ABS firms which are in the same industry and has the closest asset value at the year right before the ABS firm initiates the ABS program. All the regressions include 49 industry dummies, the coefficients of which are not reported. All the standard errors are in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels, respectively.

	Full Sample			Large Firm Sample			Match Firm Sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(A)	0.215***	0.191***	0.189***	0.131***	0.089***	0.109***	0.077**	0.008	0.038
	(0.013)	(0.013)	(0.015)	(0.019)	(0.020)	(0.022)	(0.037)	(0.038)	(0.041)
AR/A	1.238***	1.397***	1.443***	1.514***	1.729***	1.668***	1.785***	1.922***	1.997***
	(0.172)	(0.170)	(0.179)	(0.217)	(0.216)	(0.222)	(0.355)	(0.343)	(0.362)
MB	-0.002	-0.001	-0.000	0.001	0.002	0.001	0.014	0.015	0.015
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.012)	(0.012)	(0.013)
D/A	0.784***	0.649***	0.479***	0.994***	0.600***	0.712***	0.968***	0.652**	0.611*
	(0.141)	(0.134)	(0.156)	(0.163)	(0.154)	(0.182)	(0.300)	(0.260)	(0.318)
E/A	-0.098	-0.020	-0.096	-0.125	-0.105	-0.112	-0.008	0.021	-0.001
	(0.137)	(0.159)	(0.145)	(0.140)	(0.160)	(0.154)	(0.297)	(0.294)	(0.289)
R&D/A	-2.434***	-2.167**	-2.276**	-2.355**	-1.997*	-2.259**	-4.478**	-3.878**	-4.200**
	(0.928)	(0.884)	(0.912)	(1.114)	(1.075)	(1.113)	(1.879)	(1.710)	(1.865)
Div/ME	0.166	-0.188	0.401	0.462	-0.086	0.686	-1.007	-1.403	-1.089
	(0.861)	(0.718)	(0.803)	(0.867)	(0.814)	(0.840)	(1.711)	(1.549)	(1.622)
gS	-0.000	-0.000	-0.000	0.000	-0.000	0.000	0.047*	0.051**	0.057**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.024)	(0.022)	(0.024)
MTR	-0.255	0.002	-0.134	-0.267	-0.373	-0.165	-1.661*	-1.562*	-1.408
	(0.491)	(0.483)	(0.494)	(0.558)	(0.542)	(0.564)	(0.929)	(0.858)	(0.930)
σ_{A}_rank	-0.017		-0.022	0.020*		0.016	0.016		0.017
	(0.013)		(0.013)	(0.012)		(0.012)	(0.028)		(0.028)
Low Rating		0.287***	0.316***		0.168**	0.175**		0.240**	0.283**
		(0.075)	(0.077)		(0.079)	(0.082)		(0.118)	(0.121)
No Rating		-0.181**	-0.093		-0.268***	-0.188**		-0.339***	-0.190
		(0.083)	(0.087)		(0.080)	(0.084)		(0.123)	(0.131)
# of 0s	64606	83964	64606	21011	24540	21011	1159	1300	1159
# of 1s	318	325	318	289	294.0	289	318	325	318
Pseudo R^2	0.18	0.21	0.20	0.09	0.1	0.10	0.04	0.07	0.06

Table 4 Determinants for ABS borrowing amount

The sample covers ABS firms at years when an ABS program exists. Dependent variables are debt associated with ABS scaled by total debt or total assets of the firm, including ABS. All the standard errors are reported in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels, respectively.

	ABSD/TotalD		ABSD/TotalA	
Ln(A)	-0.043***	-0.022***	-0.010***	-0.003
	(0.005)	(0.005)	(0.002)	(0.002)
AR/A	0.364***	0.316***	0.157***	0.138***
	(0.047)	(0.046)	(0.021)	(0.021)
MB	-0.007***	-0.005***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
TotalD/TotalA	0.264***	0.237***	0.411***	0.403***
	(0.053)	(0.051)	(0.024)	(0.023)
E/A	0.484***	0.532***	0.247***	0.260***
	(0.106)	(0.104)	(0.054)	(0.052)
R&D/A	-0.833***	-1.045***	-0.059	-0.141*
	(0.261)	(0.285)	(0.081)	(0.085)
Div/ME	-0.820***	-0.624***	-0.444***	-0.367***
	(0.207)	(0.217)	(0.093)	(0.094)
gS	-0.043**	-0.050***	-0.011	-0.014
	(0.018)	(0.017)	(0.009)	(0.009)
MTR	0.476***	0.366***	0.163***	0.123**
	(0.125)	(0.122)	(0.057)	(0.055)
Consolidate	-0.066***	-0.064***	-0.029***	-0.028***
	(0.011)	(0.011)	(0.005)	(0.004)
σ_A_rank	0.035***	0.034***	0.017***	0.017***
	(0.004)	(0.004)	(0.002)	(0.002)
Lowrating		-0.012		-0.016**
		(0.015)		(0.007)
Norating		0.136***		0.039***
		(0.023)		(0.010)
#	1377	1377	1377	1377
R2	0.29	0.34	0.44	0.48

Table 5 Determinants for consolidation status of ABS

This table reports the probit regression results with dependent variable an indicator variable taking value of 1 if the firm has a consolidated ABS and 0 if the firm has a unconsolidated ABS. All the standard errors are reported in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Ln(A)	-0.078*	-0.080	-0.103	-0.119*
	(0.047)	(0.060)	(0.068)	(0.070)
AR/A		0.487	0.394	0.523
		(0.638)	(0.603)	(0.648)
MB		-0.042	-0.045*	-0.042
		(0.026)	(0.026)	(0.026)
D/A		0.082	0.585	0.134
		(0.622)	(0.510)	(0.631)
E/A		-0.712	-0.246	-0.756
		(1.140)	(1.149)	(1.154)
R&D/A		-1.313	-1.716	-1.598
		(2.945)	(2.946)	(2.957)
Div/ME		-1.140	-1.059	-1.361
		(3.430)	(3.243)	(3.467)
gS		-0.082	-0.136	-0.077
		(0.065)	(0.255)	(0.053)
MTR		-0.187	-0.398	-0.338
		(1.683)	(1.609)	(1.685)
σ_A_rank		-0.075		-0.072
		(0.054)		(0.054)
Low Rating			-0.278	-0.263
			(0.231)	(0.232)
No Rating			-0.366	-0.339
			(0.277)	(0.281)
# of 1s	165	137	141	137
# of 0s	326	269	276	269
Pseudo R^2	0.01	0.03	0.03	0.04

Table 6 Summary statistics for ABS firms over event year

This table reports the mean of several characteristics of ABS firms over event years. Event year 0 is the years when an ABS program exists in a ABS firm; event year -1 is the year right before the year when a firm initiates an ABS program and event year 1 is the year right after the last year when the firm maintains its ABS program. Event year -2, -3, 2, and 3 are self explaining.

	AR/A	D/A	MB	Rating	Rating_whole	σ_E_rank	σ_A_rank	FirmD/FirmA	TotalD/TotalA
-3	0.207	0.296	3.071	2.319	1.207	2.560	2.600	0.296	0.296
-2	0.209	0.321	2.952	2.215	1.210	2.771	2.696	0.321	0.321
-1	0.205	0.342	2.755	2.055	1.209	2.910	2.635	0.342	0.342
0	0.177	0.333	2.431	1.854	1.310	3.225	2.819	0.318	0.367
1	0.164	0.304	2.322	1.683	1.104	4.058	3.627	0.304	0.304
2	0.165	0.300	2.784	1.652	1.069	4.216	3.607	0.300	0.300
3	0.182	0.300	2.816	1.595	1.041	4.269	3.892	0.300	0.300

Table 7 Consequences of ABS initiations

This sample is a propensity score matched sample of ABS firms and non-ABS firms. The parameter estimates from the probit model in Table 3 regression (3) is used in estimating the propensity scores for the ABS firms and non-ABS firms. For each ABS firm, we estimate its propensity score at event year -1; we then match this ABS firm with three non-ABS firms, which are in the same industry as the ABS firm at that fiscal year end and has the closest propensity scores as the ABS firm. We implement matching with replacements. Pre is the average value at even year -1 and Post is the average value at event years 0, excluding the first year of event year 0. Diff-in-diff is the difference between the average difference for ABS firms and matched non-ABS firms. All the standard errors are reported in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels, respectively.

	Rating				Rating_whole				σ_E_rank		
	Pre	Post	Post-Pre		Pre	Post	Post-Pre		Pre	Post	Post-Pre
ABS firms	2.078	1.921	-0.156***	ABS firms	1.426	1.364	-0.062*	ABS firms	2.921	3.431	0.510***
			(0.040)				(0.037)				(0.087)
Non ABS firms	2.100	2.136	0.036	Non ABS firms	1.359	1.399	0.041*	Non ABS firms	2.962	3.173	0.211***
			(0.029)				(0.023)				(0.058)
Diff-in-Diff			-0.193***	Diff-in-Diff			-0.103**	Diff-in-Diff			0.300***
			(0.046)				(0.040)				(0.089)

	σ_A_rank				FirmD/FirmA				TotalD/TotalA		
	Pre	Post	Post-Pre		Pre	Post	Post-Pre		Pre	Post	Post-Pre
ABS firms	2.672	3.136	0.465***	ABS firms	0.328	0.296	-0.032***	ABS firms	0.328	0.340	0.012
			(0.081)				(0.007)				(0.007)
Non ABS firms	2.627	2.909	0.281***	Non ABS firms	0.335	0.301	-0.034***	Non ABS firms	0.335	0.301	-0.034***
			(0.052)				(0.004)				(0.004)
Diff-in-Diff			0.183**	Diff-in-Diff			0.003	Diff-in-Diff			0.046***
			(0.086)				(0.008)				(0.008)

Table 8 Tax payment consequences of ABS initiations

The sample has all ABS firms measured at event year -3 till 0. The first year of event year 0 are excluded. The dependent variable is Tax-to-EBIT ratio. Time_D takes value of 1 if the observation is post ABS initiation and 0 if it is pre ABS initiation. All the standard errors are reported in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels, respectively.

	(1)	(2)
Time_D	-0.036***	-0.036***
	(0.013)	(0.014)
Ln(A)		-0.006
		(0.005)
MB		-0.002
		(0.002)
E/A		0.789***
		(0.130)
R&D/A		-0.034
		(0.415)
DIV/ME		-0.144
		(0.417)
gS		-0.012
		(0.007)
σ_A_rank		-0.001
		(0.005)
#	2283	1948
R^2	0.00	0.04

Table 9 Summary statistics for bond issues and loan issues around ABS initiation years

This table reports the characteristics of bonds and loans issued by ABS firms around the ABS initiation years. The sample uses ABS firms with bond or loan issues data available at six years window around the ABS initiation years. Panel A reports bond issues and panel B reports loan issues. The first and second columns report the average for all the issues three years before and three years post the ABS initiation years. The fourth and fifth columns report the value for the last issues before and the first issues post the ABS initiation years. The last three columns report a restricted sample of ABS firms with at least one issue before and one issue post the ABS initiation years. Three year averages and the difference between the post and pre sample are reported for the overlapping sample. ***, ** and * indicate that the differences are significant at 1%, 5% and 10% levels respectively.

Panel A Bond issue characteristics

	3 years' average		right before and right after ABS		3 year's average for overlapping sample		
	Before	After	Before	After	Before	After	After-Before
Spread	197.364	314.601	201.949	317.042	179.236	277.509	98.273***
Ln(Amount)	12.417	12.631	12.452	12.643	12.673	12.763	0.090
Ln(Maturity)	2.328	2.243	2.400	2.258	2.313	2.286	-0.027
put_D	0.022	0.010	0.025	0.009	0.035	0.011	-0.024
#	81	108	81	108	42	42	

Panel B Loan issue characteristics

	3 years' average		right before and right after ABS		3 year's average for overlapping sample		
	Before	After	Before	After	Before	After	After-Before
Spread	44.215	56.565	45.419	58.708	40.457	58.015	17.557***
Ln(Amount)	19.949	19.904	19.944	19.820	19.984	20.157	0.174*
Ln(Maturity)	0.613	0.769	0.578	0.672	0.543	0.714	0.184*
# of lender	12.043	12.437	12.547	10.917	11.597	14.244	2.646***
secure_D	0.064	0.080	0.058	0.094	0.083	0.092	0.009
guarantor_D	0.036	0.080	0.047	0.094	0.026	0.102	0.076**
corporate_D	0.269	0.340	0.244	0.313	0.282	0.376	0.094
takeover_D	0.142	0.042	0.116	0.031	0.101	0.047	-0.054
workcapital_D	0.047	0.145	0.058	0.167	0.041	0.127	0.087**
refinance_D	0.134	0.078	0.105	0.063	0.145	0.015	-0.131***
#	86	96	86	96	54	54	

Table 10 Effects of ABS initiations on bond spreads

The sample in Panel A is the bond issues by ABS firms at three years before or three years after the ABS initiation years. Panel B adds to the sample bond issues by non-ABS firms. Dependent variable is bond spreads. All the standard errors are reported in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels respectively.

	Panel A		Panel B	
	ABS firms sample		ABS firms and non-ABS firms sample	
	(1)	(2)	(1)	(2)
Time_D	62.436***	56.592***	69.629***	65.795***
	(14.028)	(12.948)	(14.645)	(14.166)
Ln(S)	-32.616***	-51.727***	-35.623***	-49.214***
	(5.575)	(5.963)	(1.186)	(1.407)
R&D/Sale	256.442	22.407	-14.040	-16.446
	(240.255)	(223.007)	(10.339)	(9.997)
MB	-7.752***	-7.426***	-1.784***	-2.527***
	(2.290)	(2.110)	(0.636)	(0.617)
E/Sale	-271.482***	-293.129***	-11.919***	-9.090***
	(81.150)	(74.602)	(1.813)	(1.761)
D/A	250.390***	227.599***	36.810***	53.163***
	(49.279)	(45.428)	(10.511)	(10.378)
Ln(Amount)		65.922***		44.501***
		(9.409)		(2.739)
Ln(Maturity)		-17.202*		0.235
		(9.567)		(3.187)
put_D		-83.073**		-85.890***
		(36.471)		(13.636)
ABS_D			-3.684	8.355
			(10.865)	(10.530)
#	359	359	4709	4691
R^2	0.23	0.36	0.20	0.25

Table 11 Effects of ABS initiations on loan spreads

The sample in Panel A is the loan issues by ABS firms at three years before or three years after the ABS initiation years. Panel B adds to the sample loan issues by non-ABS firms. Dependent variable is loan spread. All the standard errors are reported in parentheses. ***, ** and * indicate that the estimated coefficients are significant at 1%, 5% and 10% levels respectively.

	Panel A ABS firms sample		Panel B ABS firms and non-ABS firms sample	
	(1)	(2)	(1)	(2)
Time_D	11.114***	8.718***	11.592***	8.590***
	(2.435)	(2.413)	(2.858)	(2.739)
Ln(Sale)	-6.148***	-3.268***	-10.394***	-6.335***
	(0.915)	(1.171)	(0.286)	(0.387)
R&D/Sale	72.041*	87.332**	-8.958***	-7.560***
	(39.961)	(38.713)	(2.104)	(1.989)
MB	-2.544***	-2.088***	-1.119***	-0.980***
	(0.456)	(0.431)	(0.117)	(0.113)
E/Sale	-34.262**	-21.424	-8.665***	-7.035***
	(14.324)	(13.702)	(2.169)	(2.050)
D/A	-29.073***	-10.348	6.778***	17.337***
	(9.571)	(9.604)	(2.528)	(2.548)
Ln(Amount)		-3.019**		-5.854***
		(1.506)		(0.536)
Ln(Maturity)		-2.380		0.197
		(1.643)		(0.583)
# of lender		-0.052		0.366***
		(0.129)		(0.062)
secured_D		24.845***		26.156***
		(5.119)		(1.522)
guarantor_D		1.338		6.594***
		(4.883)		(1.686)
corporate_D		16.017***		7.848***
		(2.982)		(1.045)
takeover_D		6.895		8.253***
		(4.578)		(1.855)
workcapital_D		7.374		11.410***
		(4.612)		(1.307)
refinance_D		-6.338		-6.530***
		(4.580)		(1.850)
ABS_D			-1.232	0.875
			(2.201)	(2.123)
#	427	410	4711	4534
R^2	0.22	0.36	0.25	0.35

Table 12 ABS spreads v.s. bond spreads

This table compares ABS spreads with bond spreads. The sample includes ABS firms which have both an ABS spread and a bond spread data available. For each ABS, we match it to the closest bond issue before ABS initiation in Panel A, to the closest bond issue after ABS initiation in Panel B, and to the closest bond issue around ABS initiation in Panel C. The third column reports the average difference between ABS spreads and bond spreads. All the standard errors are reported in parentheses. ***, ** and * indicate that the difference are significant at 1%, 5% and 10% levels respectively.

	Panel A		
	ABS	Bond	ABS-Bond
spread	129.831	273.982	-144.151***
	(12.095)	(25.665)	(26.911)
#	57	57	57

	Panel B		
	ABS	Bond	ABS-Bond
spread	108.447	358.928	-250.480***
	(13.331)	(41.974)	(43.808)
#	51	51	51

	Panel C		
	ABS	Bond	ABS-Bond
spread	117.037	284.034	-166.997***
	(11.277)	(22.408)	(25.761)
#	74	74	74