How does access to the unsecured debt market affect investment?[‡]

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Abstract

This paper examines the relation between debt structure and investment, by exploiting differences in secured and unsecured debt holdings. In order to address endogeneity concerns, I exploit two sources of exogenous variation for identification. From the firms' side, the *Jobs and Growth Tax Relief Reconciliation Act* of 2003 represents a negative shock to firms' creditworthiness. From the credit market's perspective, the *asset-backed commercial paper market collapse* of 2007 caused a temporary shortage of unsecured commercial paper. Each of these shocks to debt structure is analyzed combining a difference-in-differences approach with an instrumental variable estimation (Waldinger (2010)), which allows studying i) substitution patterns among debt types and ii) the impact on investment. Results show that greater access to unsecured debt leads to larger investment. When firms face lack of access to the unsecured debt market, they substitute toward secured debt, and reduce investment. The reason behind this result is that unsecured debt is more cost-effective in terms of spreads and covenants. These findings suggest that collateral is not key to finance investment, as instead has often been claimed in the literature. Creditworthiness rather than collateral is key to access unsecured debt. Additionally, I analyze implications for optimal debt and capital structure and shed light on how access to the unsecured debt market relates to the balance sheet and credit channels.

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1 Introduction

Firms use different debt instruments with different purposes or contractual provisions, and access and usage of this pool of instruments may significantly affect firms' corporate policy in the presence of financial constraints (Colla et al. (2013), Rauh and Sufi (2010)). Credit quality, debt market types and the priority structure of corporate liabilities (i.e. secured or unsecured debt) have been highlighted as key to understand the cross-sectional variation in debt structure.[1] Further, it has been documented that firms choose debt and capital structure to minimize total financing costs (Graham and Leary (2011)) and there is evidence suggesting that unsecured financing faces lower average spreads across markets.[2] In 2015, the size of the U.S. corporate bond (loans) market was \$1,500 (\$2,100) billions, while only 20% (37%) was secured by collateral.[3] This is surprising, as although the *collateral channel* has received broad attention from the literature (see Chaney et al. (2012) and Kiyotaki and Moore (1997)), firms seem to exhibit a "preference" for unsecured debt and the lack of collateral does not seem to be the reason behind. In this paper I analyze whether and how debt structure heterogeneity, defined as secured versus unsecured debt, affects firms' investment. This is a crucial question both for debt and capital structure literature in corporate finance, as well as for the macroeconomics literature on financial constraints.

Financial constraints limit the availability of external funds for firms with profitable investment opportunities. They may take the form of asymmetric information or limited contract enforceability. Either way, collateral is typically used to alleviate these frictions. Collateral availability increases firms' debt capacity and reduces the likelihood that a firm may be rendered financially constrained.[4] Additionally, it reduces risk from a lender's perspective as it provides enforcement and because it offers protection against claims from other creditors upon default (priority). Moreover, collateral plays a predominant role in the transmission, propagation and amplification of exogenous shocks to the real economy (Kiyotaki and Moore (1997)).

In most cases, the literature on financial constraints assumes that debt is homogeneous along

[1] Diamond, 1991b and Bolton and Freixas, 2000 show that credit quality is the main determinant of optimal debt structure. Rauh and Sufi (2010) build on this previous work to show that debt market types (i.e. bank debt, private placements and public debt) and the priority structure are also key.

[2] Berger and Udell (1990) find that secured borrowers are riskier for bank debt, while Carey et al. (1993) and John et al. (2003) do the analogous for private placements and public debt respectively.

[3] Data on commercial and industrial loans is from the Saint Louis Fed, while data on corporate bonds is from SIFMA.

[4] Chaney et al. (2012) show that for each additional dollar of real estate collateral, the average U.S. corporation invests \$0.06, while Gan (2007) undertakes a similar empirical approach and estimates that the land market collapse of the early 1990's in Japan caused a reduction in investment of 0.8% as a result from a decrease of 10% in the valuation of collateral.

the priority dimension and can be secured by the collateral that the firm posts. However, in practice unsecured debt is quantitatively more relevant than secured debt and does not require the pledge of collateral because creditworthiness of borrowers suffices as a guarantee of repayment.[5] Although counter-intuitive, unsecured debt financing is associated with less risky borrowers and it includes contractual devices that may accomplish the same ends as the pledge of collateral (i.e. negative pledge, sale-leaseback and net worth covenants).[6] As a result, unsecured bank debt, private placements and public debt tend to have lower interest rates attached and the combination of lower spreads and looser covenants helps to minimize total costs of financing.

Several natural questions arise as a result: Can a firm invest more if it has access to the unsecured debt market? Is this relation limited to large, high-credit quality firms or alternatively, smaller unrated firms also benefit from accessing unsecured debt sources of funding? In this paper, I address these question by investigating how shocks to unsecured debt in debt structure influence investment decisions in the presence of financial constraints. Moreover, beyond looking at the priority dimension, I also recognize the debt market type as an additional layer (as in Rauh and Sufi (2010)). I assemble a database for the whole population of U.S. public manufacturing firms using S&P COMPUSTAT (for firm characteristics) and CAPITAL IQ (for debt structure components). I complement the missing debt structure component information by means of a text-search algorithm used on the EDGAR filings database and the manual analysis of 10-K filings.[7]. The lack of appropriate data may be the reason why these questions have not yet been addressed.

The key challenge for this type of cross-sectional analysis is that financial decisions tend to be made jointly along with payout and investment decisions. To overcome the endogeneity concerns, I use a shock from a lending channel perspective (in the absence of changes in creditworthiness or the investment opportunity set). It is a direct shock to the availability and cost of unsecured debt that occurred during the *collapse of the asset-backed commercial paper market* (ABCP) in July 2007.[8] The ABCP represents a liquidity shock that affects some financial institutions more severely

[5]Rauh and Sufi (2010) show that unsecured debt holdings in debt structure are positively related to credit quality for rated firms and to the accumulation of internal funds in the capital structure for unrated firms.

[6]On one hand, negative pledge covenants avoid firms encumbering assets to borrow secured debt beyond some threshold. On the other hand, sale-leaseback agreements prevent the firm from selling assets. Consequently, both types of covenants artificially guarantee that the pool of assets to liquidate in case of default is sufficiently large to satisfy debt repayment. On the other hand, net worth covenants maintain the creditworthiness "cushion" at desired levels.

[7]Capital IQ provides information on senior secured bonds, senior secured loans, senior unsecured bonds and commercial paper. By means of the text-search algorithm, I further identify secured credit lines, unsecured credit lines and senior unsecured loans.

[8]This shock happens prior to Lehman Brother's bankruptcy filing in September 2008 and before the NBER dates the 2008 recession.

than others. These financial institutions are connected to non-financial firms through their usage of unsecured commercial paper (linking specific institutions to specific firms). Financial institutions exposed pass on to these firms the effects of the liquidity shock i) as a function of how affected these financial institutions are to ABCP and ii) the extent to which they reduce the availability of commercial paper to each specific firm. Thus, firms are directly affected by the unwillingness of financial institutions to roll-over commercial paper (Ivashina and Scharfstein (2010)).

In order to set up the difference-in-differences estimation (DID), I sort firms according to their usage of commercial paper before the shock. I conjecture that firms with a large percentage of commercial paper financing (treatment group) face refinancing problems when the ABCP market comes to a halt. I expect the firms in the treatment group to reduce the share of unsecured debt in total debt more severely than firms without commercial paper (control group). However, the best firms may be able to compensate the loss from the liquidity shocks passed through financial institutions by additionally borrowing through the credit market (Khwaja and Mian, 2008). That is, refinancing problems are more severe for firms facing some degree of restricted access to the unsecured bond market. I use reliance on secured debt issues prior to the shock in order to identify those firms that are more likely to face limitations in the access to the unsecured debt market ex-post. Then, I focus on the consequences for the inefficiency of investment decisions or post-treatment real outcomes of changes in the composition of debt structure. I combine DID with IV estimation as in Waldinger (2010). I exploit exogenous variation in terms of debt structure from the ABCP test as an instrument.

One possible identification concern is the choice of the length of the post-treatment period for DID, as the longer the post-treatment period, the more likely the effects of the liquidity shock are mixed with demand effects from the financial crisis of 2008. I address this concerns by focusing on the *pure* liquidity shock period only. That is, I focus on the period after ABCP collapse in July 2007 and before Lehman's bankruptcy filing in September 2008. This reduces endogeneity concerns related to a a drop in investment which is driven by changes in the investment opportunity set, rather than due to changes in the composition of debt structure.

The main findings are as follows. The ABCP test shows that firms in the treatment group experience an average reduction of 7% in unsecured debt over total debt. In order to isolate the level from the composition effects, I look at the short-term response of debt types standardized by total assets. First, firms in the treatment group reduce unsecured debt over total assets by

4.2% more, which is mainly driven by a 4.1% reduction in commercial paper over total assets. Second, the temporary shortage in unsecured commercial paper forces firms in the treatment group to substitute toward other sources of funding. I observe a 1.2% increase in the reliance on unsecured credit lines. Substitution generates a trade-off for firms. Insofar firms already have their optimal (available) debt structure prior to the ABCP shock and there is a pecking-order for debt financing instruments, any substitution toward other sources of funding generates firms to be worse off as compared to before. Firms with a commercial paper program tend to be the least financially constrained firms and tend to use senior unsecured bonds as a long-term financing instrument. As they face higher constraints in the access to the unsecured bond market, they tend to incorporate senior secured bank debt into their debt structure (Rauh and Sufi (2010), Colla et al. (2013)). Results are with firms' optimal debt structure hypothesis: unsecured credit lines are the second-best alternative to substitute unsecured commercial paper. However, firms are unable to replace each dollar of unsecured commercial paper with alternative sources of unsecured debt in the short-term.

Next, I analyze the medium-term effects of the ABCP shock on firms' reliance on alternative sources of funding. Firms with a commercial paper program increase senior unsecured bond holdings as a result from the supply shock by 3.7% more than the control group. However, some firms face restricted access to the bond market and thus, they are forced to substitute toward senior secured bank debt instead. More precisely, firms increase senior secured term loans by 1.2% and senior secured credit lines by 0.6% more than the control group. When substituting toward secured debt higher costs of debt, collateralization costs and new debt covenants in secured debt will affect the firms' corporate policy decisions. Results derived are consistent with evidence in Ivashina and Scharfstein (2010) and Berrospide and Meisenzahl (2015) that credit line draw-downs increased during the financial crisis and with the shift in the composition of credit between loans and bonds evidenced in Adrian et al. (2012), which is driven by the best firms in the economy.

The real effects for firms affected by the ABCP collapse depend on the extent to which they are able to substitute toward other sources of funding. The baseline coefficient is 0.4, so that each 1% decrease in unsecured debt over total debt decreases investment by 0.4%. The estimated coefficient is significant at a 1% level. The effect is economically large: a one standard deviation decrease in unsecured debt in debt structure causes investment to reduce by 0.04 standard deviation units. The results derived have two important contributions. First, it shows that not only the

level of debt is important for investment, but the composition of debt also plays a role.[9] Second, it yields interesting implications in terms of the so-called *collateral channel*. When the level of debt is considered, more collateral means a higher level of investment. However, when the composition of debt is considered, results are just the opposite: more collateral pledged, through incorporating more secured debt into the debt structure leads to lower investment. The aggregate implications of these results can be relevant to understand cyclical variations in the presence of financial constraints.

Three alternative potential explanations could be behind the observed results. First, senior unsecured bonds rely on performance pricing. One possibility is that firms reduce investment for reasons unrelated to the composition of debt structure but due to a downgrade in their credit rating. Second, I test whether the ABCP shock affected the investment opportunity set of firms in the treatment group. I use four different proxies to capture firms' investment opportunities (i.e. market-to-book, R&D investment, sales growth and assets growth). Finally, I check whether the decrease in investment is driven by firms not having collateral to pledge. That is, firms find themselves unable to issue enough secured debt because of the lack of collateral. None of these three tests provide evidence to support these alternative explanations for the results.

One possible limitation of the approach is the external validity of the results. The ABCP identification strategy is consistent with the internal validity required, however, one could argue that the treatment group in ABCP is not representative of the whole population of firms, as firms relying on commercial paper or unsecured bonds, may not behave as firms that tend to rely more heavily on bank debt financing. To strengthen the external validity of results, I examine the effects of an alternative shock affecting firms debt structure. I study the decrease in the tax rate on dividends in the U.S. associated with the *Jobs and Growth Tax Relief Reconciliation Act* of 2003 (JGTRRA).

I follow the same identification procedure as in Li and Flannery (2013). However, instead of looking at the effects of the policy change on total leverage, I look at the effect on the composition of debt. More precisely, I exploit the heterogeneity in firm ownership structure and the fact that individual investors suffer a tax disadvantage on dividend payouts prior to the policy change (treatment group). I analyze the substitution patterns that arise as a result from the shock and

[9] Although, I focus on secured versus unsecured debt in this paper, results suggest that other definitions of debt structure heterogeneity may also yield the implications. A recent paper by Tengulov (2015) exploits the debt structure heterogeneity definition in **?** to conclude that borrowing diversity has real effects.

the effects on investment of these substitution patterns.[10] The treatment group selection, to the extent that it is composed of smaller firms with high investment opportunities) allows looking at the response for firms that tend to rely more on bank financing.

The tax reform generates a trade-off between payout policy and short-term financing and longer term investment decisions. As firms try to issue debt in order to finance both dividend payouts and investment projects, lower creditworthiness reduces repayment capacity in the eyes of unsecured (bank) creditors and puts upward pressure on spreads (Berger and Udell (1990)). This in turn may restrict access to the unsecured debt market and force substitution toward secured debt issues for firms in the treatment group. Results suggest that senior secured bank debt issues increase by 1.2%, while senior secured bonds increase by 0.6% more than the control group as a result from the policy change. I then focus on the response of investment for firms that substitute toward secured debt. Results depend on whether firms in the treatment group face lack of access to the unsecured (bank) debt market. For firms with access to the unsecured bank debt market, there is no significant effect on investment. However, for firms facing lack of access to the unsecured bank debt market, investment reduces by 0.8% more for the treatment group.

According to the evidence reported in both identification strategies, JGTRAA and ABCP, when a negative shock impacts unsecured debt holdings in debt structure and firms find themselves unable to substitute toward other unsecured debt sources of financing, they substitute toward secured debt. When substitution occurs, different types of financial constraints become more relevant as the substitution is not solely limited to debt types (secured vs. unsecured), but also to debt market types (bank debt vs. bonds and private placements). The reduction in investment when substitution occurs depends on the extent to which contract terms are adjusted to reflect the presence of the specific financial constraints that become more relevant.[11] Moreover, results show that this is not limited to larger, high-rated firms, but evidence from JGTRRA shows that the same patterns emerge for smaller, unrated firms. Therefore, lack of access restricted access to the unsecured debt market offers a valid benchmark to proxy financial constraints faced by firms.[12] The innovation in this paper relies on the fact that firms that are unconstrained according

[10] Insofar a declaration of dividends generates a reduction in retained earnings of the size of the dividends declared, I exploit this effect on firms creditworthiness as a source of variation. Biguri (2016) analyzes performance pricing in bank debt contracts using this same identification strategy. The JGTRRA experiment shows that a one standard deviation decrease in creditworthiness as measured by retained earnings over total assets causes the share of unsecured debt over total debt to decrease by 0.2 standard deviations. For the purpose of this paper, however, I focus only on the effects of JGTRRA in terms of substitution patterns in debt and investment.

[11] Including amount outstanding, collateral requirements, maturity, spreads and covenants.

[12] The traditional ex-ante definitions for being financially constrained tend to yield inconsistent conclusions across definitions as evidenced in Farre-Mensa and Ljungqvist (2015).

to traditional definitions, or have access to a credit line as in Sufi (2009), can still be constrained if their access to the most cost-effective source of financing is limited. Therefore, there is a pecking-order in terms of debt types and instruments and restricted access to the unsecured debt market has a theoretical justification and is statistically significant enough to understand whether a firm is exposed to financial frictions. The fact that lack access to unsecured debt markets can operate both from a demand and a supply side of credit provides cross-sectional evidence for a balance sheet and a credit channel and thus, debt structure choice can have aggregate implications.

This paper relates to the finance literature on the relevance of debt structure heterogeneity and to the macroeconomics literature on the collateral channel. I contribute to this literature by shedding light on an alternative definition for financial constraints: lack of access to the unsecured debt market. Focusing on the corporate finance literature, Rauh and Sufi (2010) demonstrate that abstracting from debt structure heterogeneity considerations may lead to missing substantial variation in capital structure. On the other hand, Colla et al. (2013) show that most firms tend to specialize in one type of debt, and then relate usage to demand- and supply-driven factors.[13] Additionally, Giambona et al. (2015) conclude that firms actively manage their debt structure and that unsecured debt tends to have looser covenants attached and shorter maturities.[14] I contribute to this strand of the finance literature by being the first to show that debt structure heterogeneity defined as secured vs. unsecured debt has real effects on investment.

On the other hand, it relates to the extensive macro-finance literature on how collateral helps to solve market imperfections caused by asymmetric information (Holmstrom and Tirole (1997) or Stiglitz and Weiss (1981)) or limited contract enforceability (Kiyotaki and Moore (1997), Bernanke and Gertler (1989), Hennessy and Whited (2005) or Livdan et al. (2009)). Moreover, this literature concludes that collateral plays a role in the transmission, propagation and amplification of exogenous shocks to the real economy, as in the seminal papers by Kiyotaki and Moore (1997) and Bernanke and Gertler (1989). I contribute to this literature by providing the micro-foundations to recognize a balance sheet channel and a credit channel through which the composition of debt structure could generate real effects on investment. Although the role of collateral is relevant in generating cyclical fluctuations, the channel through unsecured debt should be further explored to shed light on the specific mechanisms and to quantify the effect in business cycle dynamics.

[13] Rauh and Sufi (2010) look at secured debt, senior unsecured debt, and subordinated debt. Colla et al. (2013) use the different debt structure components available in S&P's Capital IQ, including commercial paper, drawn credit lines, term loans, senior bonds and notes, subordinated bonds and notes, capital leases, and other debt.

[14] This is consistent with evidence in Brunnermeier and Oehmke (2013), who argue that creditors shorten maturities to artificially achieve priority.

2 Identification Strategy

Asset-backed commercial paper is an off-balance sheet securitization instrument used by financial institutions to short-term finance long-term assets. In the summer of 2007, two German banks and BNP Paribas suspended net asset value calculations, which sharply increased the cost of overnight asset-backed commercial paper relative to the Federal Funds Rate. Financial institutions exposed to the collapse were also suppliers to the non-financial sector (Acharya and Schnabl (2010)). Although non-financial corporate firms do not have access to this form of financing, the collapse generated a downturn in the non-financial corporate commercial paper market, which caused a temporary shortage (Brunnermeier (2009), Ivashina and Scharfstein (2010)).

Non-financial corporate commercial paper is short-term unsecured debt; thus, it does not require the pledge of collateral. According to Colla et al. (2013), the 90^{th} percentile of the commercial paper distribution is zero, suggesting that less than 10% of U.S. public firms use commercial paper for financing. Moreover, they also rely on (unsecured) public debt for long-term financing, as evidenced by Rauh and Sufi (2010). Therefore, firms relying on commercial paper are "unconstrained" according to the traditional ex-ante definitions of financial constraints in Farre-Mensa and Ljungqvist (2015). When non-financial corporate commercial paper becomes unavailable or too costly for firms, this represents a direct shock to unsecured debt holdings for exposed firms.[15]

Defining the treatment group solely as a function of whether they had a commercial paper program prior to the shock is unlikely to adequately reflect financial constraints in terms of restricted access to unsecured debt markets. Moreover, the empirical specification may be subject to a selection bias, as it is difficult to justify that firm characteristics for treatment and control groups are as good as randomly assigned. Therefore, the conditional independence assumption would not be satisfied. I address this concern in the following manner. I define the *treatment group* as firms satisfying two conditions in pre-treatment years: i) having a commercial paper program and ii) issuing secured debt. Although firms' reliance on secured or unsecured debt depends on firm characteristics, whether firms issued secured in the three fiscal years before the collapse is exogenous to those firms' performance after the ABCP collapse. Therefore, there will be a differential effect of the shock according to whether or not firms had a commercial paper program and such differential effect is heterogeneous according to whether firms were facing some degree of restricted access to the unsecured debt market. I focus in the dynamics of firms that although rely on commercial

[15] As Ivashina and Scharfstein (2010) acknowledge "*Unsecured commercial paper holders refused to roll over their debt*".

paper, have a mixed debt structure and are not 100% unsecured debt financed. This is important, as the behavior of the *best* firms, which do not face restricted access to the unsecured debt market, should imply substituting toward unsecured public debt *if needed*.[16]

One possible identification concern is the choice of the length of the post-treatment period for DID, as the longer the post-treatment period, the more likely the effects of the liquidity shock are mixed with demand effects from the financial crisis of 2008. I address this concerns by focusing on the *pure* liquidity shock period only. That is, I focus on the period after ABCP collapse in July 2007 and before Lehman's bankruptcy filing in September 2008. This reduces endogeneity concerns related to a a drop in investment which is driven by changes in the investment opportunity set, rather than due to changes in the composition of debt structure.

2.1 Empirical Design: Effect of Debt Structure on Investment

I perform DID estimation to quantify ABCP's effect on the share of unsecured debt over total debt for firms in the treatment group. To alleviate concerns regarding other sources of firm heterogeneity underlying the observed relations, I choose treatment and control groups with similar firm characteristics in terms of investment determinants, with the only difference being their pre-treatment degree of financial constraints faced, measured by their access to unsecured debt markets. The treatment and control groups display no ex-ante significant differences in profitability, investment opportunities, retained earnings, or net worth for instance. This implies that treatment assignment is independent conditional on observed covariates, minimizing the possible existence of a selection bias.

Then, I use treatment-induced exogenous variation in unsecured debt in debt structure to establish a causal relation with investment. I follow the same empirical design as for JGTRRA. The causal diagram with the associated empirical tests are summarized in Figure 1. The structural equation for capital expenditures over total assets ($Capex_{it}$) is as follows:

$$Capex_{it} = \gamma_t + \theta_i + \rho Punsec_{it} + X_{it}^{\prime borrower}\beta_{c,b} + X_{it}^{\prime contract}\beta_{c,c} + \varphi_{it} \tag{1}$$

[16] The following excerpt from the SEC's 10-K filings provides indirect evidence to sustain the argument:

> Ingersoll Rand Inc., fiscal year 2008: *"The credit markets, including the commercial paper markets in the United States, have recently experienced adverse conditions. Although* ***we have not been materially impacted*** *by these conditions, continuing volatility in the credit markets may increase costs associated with issuing commercial paper or other debt instruments due to increased spreads over relevant interest rate benchmarks."*

The financial statements in the SEC filings allow to determine that the *"other debt instruments" were unsecured debentures in fiscal year 2008.*

$$Punsec_{it} = \gamma_t + \theta_i + \psi Z_{it} + X_{it}^{\prime borrower}\beta_{p,b} + X_{it}^{\prime contract}\beta_{p,c} + \eta_{it} \quad (2)$$

where $Punsec_{it}$ is unsecured over total debt or the variable that we want to instrument and $Z_{it} = (D_i * Post_t)$ is the source of exogenous variation from ABCP. D_i are firms with a commercial paper conduit that are issuing secured debt in the pre-treatment years and $Post_t$ takes a value of 1 in the post-treatment years. $X_{it}^{borrower}$ contains all observable firm characteristics that are relevant for investment, including; retained earnings over total assets, tangibility, size, profitability, market-to-book, level of debt and volatility of cashflows. $X_{it}^{contract}$ contains all observable contract terms for the firms' corporate debt, including; average maturity of debt, average spread on debt and net worth, dividend and investment covenants dummies in both secured and unsecured debt contracts. θ_i and γ_t capture firm and year fixed effects, respectively. I include firm and year fixed effects instead of D_i and $Post_t$, to limit the role of firm unobservable confounding factors and recession-driven estimated coefficients. Finally, errors are clustered at the firm-level, the source of variation.

I am interested in the sign and the statistical and quantitative significance of ρ. I expect $\rho > 0$, implying that as firms increase the proportion of unsecured debt in their debt structure, they are able to sustain larger investment projects. Moreover, ψ should be highly statistically significant to satisfy instrument relevance. As my data is clustered at the firm level, I use the Kleibergen-Paap rk Wald F-statistic to test whether instrument relevance is satisfied.[17]

Although this is a well-identified supply shock, the fact that the shock is contemporaneous to the financial crisis poses concerns on confounding factors affecting firms' responses. Two main concerns can be highlighted. First, the substitution pattern for ABCP is not clear. Firms can substitute toward other liquidity management instruments as hoarded cash or credit lines (Acharya et al. (2013), Berrospide and Meisenzahl (2015), Ivashina and Scharfstein (2010)) or, they can instead overcome the shortage of short-term unsecured debt by issuing bank debt or bonds (Adrian et al. (2012)).[18] Second, although ABCP takes place in 2007, the recession and expectations of

[17] I also require $Z_{it} \perp \{\text{Capex}_{it}(d)|X_{it}\}$ for all d (the possible values of treatment status), implying that the instrument is conditionally independent of potential investment, Capex_{it}.

[18] The following two excerpts from the SEC's 10-K filings acknowledge these two possibilities:

> Carterpillar Inc., fiscal year 2007: *"If our access to the commercial paper market is adversely affected due to a change in market conditions, we would expect to rely on a combination of* ***available cash and our unsecured committed credit facility*** *to provide short-term funding. In such event, the cost of borrowings under our unsecured committed credit facility could be higher than the cost of commercial paper borrowings."*
>
> Gannet Company Inc., fiscal year 2008: *"During September 2008, liquidity in the commercial paper*

further deterioration of economic conditions after Lehman Brothers' collapse in September 2008, may also affect the demand for credit by firms.

The first concern becomes relevant if firms substituted toward hoarded cash in order to overcome the liquidity shock, as reliance on credit line drawdowns is already reflected in the definition of debt structure used throughout the paper. Acharya et al. (2013) state that the trade-off between cash and credit lines is maximized when aggregate uncertainty is high and for firms that are financially constrained. That is, firms in the control group. Evidence in Berrospide and Meisenzahl (2015) suggests that only large and investment grade firms drewdown on credit lines for precautionary reasons, namely, firms in the treatment group. Therefore, lower cash holdings to finance investment could be behind the observed responses and this poses a threat on the exclusion restriction. However, by means of DID on cash holdings' reaction as a result from ABCP I rule out a statistically significant heterogeneous response between treatment and control groups. The second concern, is easier to justify. Demand effects as a result from the expectation of a recession after the collapse of ABCP would imply that firms financially constrained (control group) are able to overcome the financial crisis with a reduction in investment which is lower than that of firms financially unconstrained (treatment group). However, there is an extensive literature validating that differences between firms financially constrained and unconstrained are the main driver of the cyclicality observed, as in Bernanke et al. (1996). That is, if demand effects were confounding my results, then, it would go against me finding that a reduction in unsecured debt in debt structure leads to a decrease in investment.

I perform some robustness and falsification tests to rule out that there are confounding factors affecting the relation between debt structure and investment. First, I analyze the response of firms with a commercial paper conduit and unconstrained according to traditional ex-ante definitions for financial constraints in Farre-Mensa and Ljungqvist (2015). Firms with a commercial paper conduit that are not facing restricted access to public debt markets should not be subject to a significant decrease in investment compared to the control group. Additionally, I test whether substitution toward secured debt issues reduces investment when considering a demand-for-credit perspective. I redefine the treatment group in the JGTRRA identification strategy to capture restricted access to unsecured debt markets, namely, firms in the fourth quartile of the individual

market was highly constrained [...] The company anticipates reducing the level of borrowings under its revolving credit facilities over time with cashflows from operations and will look to strategically refinance amounts borrowed with the issuance of ***longer-term debt.****"*

investors' share ownership distribution that issued secured in the pre-treatment years. I should observe a significant decrease in investment compared to the control group. I conclude that the effect of debt structure on investment is robust.[19]

2.2 Substitution Patterns: Empirical Design

I also analyze the substitution patterns toward secured debt issues that emerge from the shock for both the treatment group. Rauh and Sufi (2010) and Colla et al. (2013) evidence that firms in the treatment group in ABCP are the "best" firms in the economy. Therefore, according to the traditional ex-ante financial constraints definitions, firms in the treatment group for ABCP will be considered unconstrained.

Analyzing the substitution patterns of both groups is important as different types of debt instruments have different maturities (Diamond (1993)), priorities (Barclay and Smith (1985), Brunnermeier and Oehmke (2013), sensitivity to information (Gomes and Phillips (2012), Denis and Mihov (2003)) and claims over the assets of the firm. Moreover, we need to make sure that the observed response in debt structure is driven by a substitution effect instead of an income effect.

In order to analyze substitution patterns for ABCP, I implement the following specification for the different debt types standardized by total assets ($\frac{\text{Debt Type}}{\text{Assets}}_{it}$):

$$\left(\frac{\text{Debt Type}}{\text{Assets}}\right)_{it} = \gamma_t + \theta_i + \psi\left(D_i^{abcp} * Post_t^{abcp}\right) + X_{it}^{\prime borrower}\beta_b + X_{it}^{\prime contract}\beta_c + \eta_{it} \qquad (3)$$

where $\frac{\text{Debt Type}}{\text{Assets}}_{it}$ is i) secured debt, ii) senior secured loans, iii) senior secured bonds or iv) senior unsecured bonds standardized by total assets. D_i^{abcp} is firms with a commercial paper conduit that issued secured the in pre-treatment years and $Post_t^{abcp}$ is post-treatment years of ABCP. $\left(D_i^{abcp} * Post_t^{abcp}\right)$ is the source of exogenous variation. $X_{it}^{borrower}$ considers the relevant covariates in capital structure regressions as in Rajan and Zingales (1995), including; retained earnings over total assets, tangibility, size, profitability and market-to-book. Additionally it includes level of debt and volatility of cashflows. $X_{it}^{contract}$ contains all observable contract terms for the firms' corporate debt, including; average maturity of debt, average spread on debt and net worth, dividend and investment covenants dummies in both secured and unsecured debt contracts. γ_t and θ_i are year and firm fixed effects respectively.

[19] I discuss possible threats to the exclusion restriction further in the Results section.

3 Sample Construction

To construct the sample, I start with U.S. firms traded on AMEX, NASDAQ, and NYSE, and covered by Standard&Poor's (S&P) database Compustat, from 2000 to 2010. I remove all firm-year observations which are not from the manufacturing sector (SIC codes 2000-3999). I further remove firm-year observations with missing, negative or zero i) total assets and ii) property, plant and equipment. Finally, I winsorize all key firm characteristics at the 1^{st} and 99^{th} percentiles (*initial sample*).

Total debt secured is defined by means of item #241 in Compustat, *Mortgages and Other Secured Debt*, which allows to define unsecured debt as the difference between total financial debt, short- and long-term, minus total secured debt. Collateral availability is proxied by tangibility, retained earnings is standardized by total assets following DeAngelo et al. (2006) and in constructing the rest of firm characteristics, namely, profitability and market-to-book, I use definitions as in Lemmon et al. (2008). I then merge the Compustat sample with Capital IQ in order to construct debt structure-specific variables. Following Colla et al. (2013), I remove firm-year observations for which the difference between total debt as reported in Compustat and the sum of debt types as reported in Capital IQ exceeds 10% of total debt. From the resulting sample I define: i) senior secured loans, ii) senior secured bonds and iii) senior unsecured bonds, all standardized by total assets.

In order to construct the sample for the ABCP identification strategy, I drop all firm-year observations not included in 2005-10 (based on Bertrand et al. (2004)), the pre-treatment period consisting of a pooled sample from 2005-2007 and allowing post-treatment years to include i) 2008, ii) 2008-09 and 2008-2010 in order to test whether the effect of shock vanishes within a year or lasts longer. As before, I require at least one observation per firm in pre- and post-treatment periods, so as to avoid attrition caused by the 2007 financial crisis and firms filing in Chapter 11, reorganization, or Chapter 7, liquidation. The final sample comprises 5,291 firm-year observations.

In Panel b) in Table 1 summary statistics for ABCP are shown (2005-2010). Firms exhibit an average (median) preference for unsecured debt both in terms of debt structure, 67% (86%) and in terms of capital structure, where 16% (13%) is unsecured and 7% (1%) is secured. On the other hand, Figure 2 shows evidence on the effect of ABCP. It shows asset-backed commercial paper outstanding from 2002 to 2015, where we can observe the sharp contraction experienced in August 2007 as a result from the collapse.

4 Results

Table 2 shows DID estimation results for the effect of the shock on unsecured debt in debt structure as a result from ABCP on the treatment group. Columns (1)-(2), (3)-(4) and (5)-(6) show estimated coefficients for the different post-treatment periods defined: 2008, 2008-09 and 2008-10, respectively. There is a differential effect of ABCP according to whether firms had a commercial paper conduit and this effect is heterogeneous according to whether or not firms were issuing secured debt or not in the pre-treatment years. We are focusing on the response of those assumed to be facing some degree of restricted access to the unsecured bond market among the unconstrained.[20]

The average causal effect is negative and statistically significant. The supply shock generates a decrease in a range of 6-7% in unsecured debt in debt structure for firms in the treatment group (columns (1)-(6)). When an unsecured debt instrument becomes unavailable or access is restricted, firms unable to substitute toward other unsecured debt sources as credit lines or medium term notes, decrease the loading of unsecured debt in debt structure as they are forced to substitute toward secured debt issues. Moreover, estimated coefficients do not significantly vary when considering different post-treatment periods 2008 (columns(1)-(2)), 2008-09 (columns(3)-(4)) and 2008-10 (columns(5)-(6)). This could be interpreted as evidence suggesting that the pre-Lehman collapse (liquidity shock) and the post-Lehman collapse (demand effects from the financial crisis) considerations may not be driving the results in this set-up. The reason behind this result could be the unconstrained nature of those firms relying on commercial paper. Interestingly, when comparing specifications without and with controls, the existence of a selection bias seems unlikely. The additional explanatory power provided by the controls or the differences in estimated coefficients are not statistically significantly different.

Then, we can analyze the effect of shock-induced variation in debt structure on investment. Table 3 shows OLS and 2SLS estimation results for investment when unsecured debt in debt structure, is assumed to be endogenous and therefore, correlated with the error term in equation (1). Columns (1)-(2) show the results for post-treatment year 2008, while (3)-(4) and (5)-(6) show those for post-treatment years 2008-09 and 2008-10, respectively. The estimated coefficients for 2SLS are positive and statistically significant, implying that a one unit increase in unsecured debt in debt structure generates an increase in capital expenditures over total assets of 0.6-0.7%. Firms

[20] Figure 1 in the Appendix shows that the parallel trends assumption is satisfied for unsecured debt in debt structure, while Table 2 in the Appendix shows pre-treatment summary statistics for treatment and control groups in ABCP to rule out the existence of a possible selection bias.

with a higher loading of unsecured debt in their debt structure are able to sustain a larger size for their investment projects and this is independent of their collateral availability. Results are also quantitatively relevant: a 1 standard deviation increase in unsecured debt in debt structure, generates an increase of 0.06 ($= \frac{0.6}{100}\frac{0.38}{0.04}$ from column (6)) standard deviation units on capital expenditures over total assets.[21] Note that, 2SLS results for post-treatment periods 2008 in column (2) and 2008-09 in column (4) are not valid to derive causal statements about the relation of interest as the instrument relevance is not satisfied according to the Keibergen-Paap rk Wald F-statistic.

This result suggests that the attention devoted by the literature to how collateral promotes investment may have been misplaced, as in the context of the identification strategy, the pledge of collateral leads to lower investment. Moreover, by focusing on how firms in the treatment group reacted to ABCP, we can conclude that there is a credit channel operating, through the use of unsecured debt, that can have real effects on investment.

I claim that treatment-induced variation through unsecured debt in debt structure is the *only* channel affecting capital expenditures as a function of treatment status. However, I identify and discuss one possible channel that could threat the exclusion restriction: the *collateral channel*. Real estate prices decreased sharply after August 2007 and according to Chaney et al. (2012) this is important, as the average U.S. corporation invests \$0.06 out of each additional \$1 of real estate collateral. Therefore, the fact that firms had the market value of their collateral shrunk, might have generated the reduction in investment. There are two reasons why this is unlikely to be the case. First, firms with a commercial paper conduit tend to have at least an A credit rating. As Rauh and Sufi (2010) show, these firms do not rely on secured debt extensively.[22] Thus, the reduction in investment cannot be generated by the reduction in the market value of their collateral, as the usual dependence on secured debt is not large. Second, several authors (Cerqueiro et al. (2014), Liberti and Mian (2010), Degryse et al. (2014)) show that firms pledge other sources of collateral beyond property, plant and equipment such as; accounts receivable, inventories or intangible assets. Therefore, it is unlikely that decreases in collateral availability/valuation are responsible for the observed response in investment for the treatment group as firms can also pledge other sources of collateral in addition to property, plant and equipment.

[21] So as to guarantee that the variance-covariance matrix is full-rank given clustered standard errors and singleton dummies in the form of firm and year fixed effects, I use the Frisch-Waugh-Lowell Theorem to partial out fixed effects included in the specification.

[22] Check Figure 1 in Rauh and Sufi (2010) for further evidence.

We can test through DID estimation whether the change in policy affected other firm characteristics beyond unsecured debt holdings, such that we can rule out that the effect from ABCP goes through some other channel other than debt structure. Table 1 in the Appendix shows the suggestive evidence in support of the exclusion restriction. Retained earnings, tangibility or capital expenditures are not affected by the effect ABCP.[23]

4.1 Results: Substitution Patterns

Table 4 shows the results for DID estimation from ABCP when firms face restricted access to unsecured debt due to a shortage in supply for post-treatment period 2008-2010. I analyze the response of secured debt over total assets (column (1)), senior secured bonds over total assets (column (2)), senior secured loans over total assets (column (3)) and senior unsecured bonds over total assets (column (4)). As we can observe, firms substitute from unsecured bonds (-2% in column (8)) to bank debt. More precisely, they substitute toward senior secured loans (0.9% in column (6)). However, when analyzing the substitution patterns for those firms that were relying on commercial paper *only* before ABCP, which is reflected by variable *Commercial Paper 2008-10* in Table **??**, the patterns of substitution are just the opposite. We observe that firms that did not face restricted access to the unsecured bond market, increased senior unsecured bond issues significantly, 3.7% in column (8), and decreased senior secured loans by 1.4% more in column (6).

The temporary shortage in unsecured commercial paper forces firms in the treatment group to substitute toward other unsecured debt sources of financing as senior unsecured bonds. Firms with a commercial paper program increased senior unsecured bond holdings as a result from the supply shock by 3.7% more than the control group. However, some firms may face restricted access to the bond market and thus, they are forced to substitute toward bank debt instead. As asymmetric information becomes more relevant when firms switch markets, creditors require the pledge of collateral to enforce repayment. More precisely, firms reduced senior unsecured bond holdings by 2.2% and increased senior secured bank debt by 0.9% more than the control group. These results are consistent with evidence in Ivashina and Scharfstein (2010) and Berrospide and Meisenzahl (2015) that credit line drawdowns increased during the financial crisis. Moreover, it also explains the shift in the composition of credit between loans and bonds evidenced in Adrian et al. (2012).

[23] Unreported results show that investment opportunities, profitability or size do not significantly react for firms in the treatment group either.

5 Threats to Validity: Robustness, Placebo and Falsification Tests

In this section I explore the plausibility of alternative explanations to the observed responses in the different variables of interest in ABCP. Additionally, I perform some falsification tests.

5.1 External Validity: The Jobs and Growth Tax Relief Reconciliation Act of 2003

One possible limitation of the approach is the external validity of the results. The ABCP identification strategy is consistent with the internal validity required, however, one could argue that the treatment group in ABCP is not representative of the whole population of firms, as firms relying on commercial paper or unsecured bonds, may not behave as firms that tend to rely more heavily on bank debt financing. To strengthen the external validity of results, I examine the effects of an alternative shock affecting firms debt structure. I study the decrease in the tax rate on dividends in the U.S. associated with the *Jobs and Growth Tax Relief Reconciliation Act* of 2003 (JGTRRA).

I follow the same identification procedure as in Li and Flannery (2013). However, instead of looking at the effects of the policy change on total leverage, I look at the effect on the composition of debt. More precisely, I exploit the heterogeneity in firm ownership structure and the fact that individual investors suffer a tax disadvantage on dividend payouts prior to the policy change (treatment group). I analyze the substitution patterns that arise as a result from the shock and the effects on investment of these substitution patterns. The treatment group selection, to the extent that it is composed of smaller firms with high investment opportunities) allows looking at the response for firms that tend to rely more on bank financing.

The tax reform generates a trade-off between payout policy and short-term financing and longer term investment decisions. As firms try to issue debt in order to finance both dividend payouts and investment projects, lower creditworthiness reduces repayment capacity in the eyes of unsecured (bank) creditors and puts upward pressure on spreads (Berger and Udell (1990)). This in turn may restrict access to the unsecured debt market and force substitution toward secured debt issues for firms in the treatment group. Table **??** shows the results for the substitution patterns that arise as a result from the shock. Results suggest that senior secured bank debt issues increase by 1.2%, while senior secured bonds increase by 0.6% more than the control group as a result from the policy change. I then focus on the response of investment for firms that substitute toward secured debt. These results are shown in Table 6. Results depend on whether firms in the

treatment group face lack of access to the unsecured (bank) debt market. For firms with access to the unsecured bank debt market, there is no significant effect on investment. However, for firms facing lack of access to the unsecured bank debt market, investment reduces by 0.8% more for the treatment group. These results are consistent with those derived under ABCP. Moreover, they suggest that the effect of debt structure on investment is not only present for large, high-rated firms, but smaller and unrated firms face the same dynamics.

5.2 Point Estimates in ABCP for the Effect of Debt Structure on Investment are driven the Demand Effects for the Recession

Unconstrained Firms' Response: I run DID estimation for the causal effect of ABCP on capital expenditures for those financially unconstrained according to ex-ante definitions in Farre-Mensa and Ljungqvist (2015). The main idea is that commercial paper program holders are likely to be unconstrained firms but the reversal may not be true. Not all firm considered unconstrained have a commercial paper conduit. Given this, if we find no statistically significant response on investment, it would imply that the results are not driven by the recession but to the fact that those affected by ABCP were affected in terms of debt structure. Table 1 in Robustness Checks shows these results using size as a measure for being financial constrained and rules out the hypothesis.[24], while Table 4 shows that investment did not significantly respond for these firms as a result from ABCP.

6 Discussion

I address the traditional question in corporate finance of how firms' financing decisions affect investment policy. However, I innovate by linking financial constraints to debt structure choice and firms facing restricted access to the unsecured debt market. More precisely, by means of two identification strategies to avoid endogeneity concerns, I shed light on the role of unsecured debt in debt structure in generating an effect on investment in the presence of financial constraints. This paper exploits the *Jobs and Growth Tax Relief Reconciliation Act* of 2003, which reduced the tax rate for dividends and long-term capital gains, as an exogenous demand shock affecting firms' creditworthiness. A lower repayment capacity in connection with unsecured debt allows analyzing the response of debt structure and investment as a result. Then, by means of the *Asset-backed Commercial Paper Market Collapse* of 2007, I explore the effect on investment of a reduction in unsecured debt in firms' debt structure due to a temporary shortage in short-term unsecured commercial paper.

I derive two main results. First, results suggest a positive causal mechanism from firms'

[24] I unreported results I also use the Kaplan&Zingales Index, the Size&Age Index in Hadlock and Pierce (2010), a dividend payer dummy and a S&P Long-term Bond Rating. They yield the same conclusion.

creditworthiness to the share of unsecured debt over total debt. The accumulation of retained earnings increases firms' repayment capacity in the eyes of creditors, especially for unsecured creditors. This in turn, allows them to use more unsecured debt sources of financing, which is consistent with evidence reported in Rauh and Sufi (2010). This is important because it highlights that firms may not necessarily render financially constrained when the valuation of their collateral drops or have limited collateral to pledge to secure debt financing. Additionally, the preference for holding unsecured debt sources of financing in debt structure suggests that even if firms have available collateral to pledge, firms prefer not to do it.

Second, I show that as firms increase their holdings of unsecured debt in debt structure, they are able to finance larger investment projects. Moreover, the effect is quantitatively relevant: a one standard deviation increase in unsecured debt in debt structure leads to an increase of 0.06 standard deviation units in investment. Although the income effect is interesting to analyze, I focus on the substitution effect arising from the positive relation between unsecured debt and investment. I show that when firms face restricted access to unsecured sources of debt due to i) a deterioration of the financial condition or to ii) a shortage of an unsecured debt instrument, they substitute toward secured debt issues. As a result, firms are forced to reduce the size of their investment projects. I argue that the cost-effectiveness of unsecured debt and the a different intensity of the different financial constraints faced is behind this result. Therefore, as opposed to the traditional literature on the so-called *collateral channel* suggests, this paper shows that the pledge of collateral can also have a dampening effect on firms' investment. Moreover, the empirical strategy allows identifying a balance sheet channel and a credit channel through which financial constraints can impact investment through debt structure choice.

The main contribution of the paper is to show that a departure from the debt homogeneity assumption by allowing unsecured debt to play a role, is able to generate a sizable effect on investment. Additionally, it contributes by showing that restricted access to the unsecured debt market provides a useful benchmark to assess the effect of financial constraints. This result may be relevant in terms of business cycle dynamics. Therefore, it should be further explored to shed light on the specific mechanism that generates the reduction in investment from relying more on secured debt sources of financing. Real effects of debt structure heterogeneity in this paper along with the conclusions in a recent paper by Azariadis et al. (2015) suggest that collateral constraints may not be binding. The authors show that unsecured debt has a role in generating variation in output over the business cycle that is larger than that of secured debt. Relaxing the assumption that all

financial contracts available are secured may generate dynamics on aggregate investment and over the business cycle that are worth being studied further.

Appendix A. Variable Description

Compustat

- **Total Debt**: Debt in current liabilities (item 34) + Long-term debt (item 9).
- **Percentage of Debt Unsecured in Debt Structure:** Total Debt minus Mortgages and Other Secured Debt (item 241) over Total Debt.
- **Percentage of Debt Unsecured in Capital Structure:** Total Debt minus Mortgages and Other Secured Debt (item 241) over Total Assets (item 6).
- **Percentage of Debt Secured in Capital Structure:** Mortgages and Other Secured Debt (item 241) over Total Assets (item 6).
- **Retained Earnings:** Retained Earnings (item 36) over Total Assets (item 6).
- **MV Equity:** Stock price (item 199) times Common shares used to calculate earnings per share (item 54).
- **Net Worth, Book:** Equity (item 6 - item 181) over Equity plus Total Debt (item 6 - item 181 + item 9). Equity is computed as Total Assets minus Total Liabilities.
- **Net Worth, Market:** MV Equity over MV Equity plus Total Debt.
- **Tangibility or Collateral Availability:** Property, Plant and Equipment, Net (item 8) over Total Assets (item 6).
- **Investment:** Capital Expenditures (item 128) over Total Assets (item 6).
- **Size:** Total assets (item 6), total assets in million USD.
- **Profitability:** Operating income before depreciation (item 13) over Total assets (item 6).
- **Market-to-Book:** Market Value of Equity plus Total debt plus Preferred stock liquidating value (item 10) minus Deferred taxes and investment tax credit (item 35) over Total assets (item 6).
- **Dummy Rated:** Dummy variable, takes the value of one if the firm-year observation has a S&P Long-term Bond Rating (item 280).
- **Dummy Dividend Payer:** Dummy variable, takes the value of one if the firm-year observation has a positive value for common dividends (item 21).

Capital IQ:

- **Sr Secured Bonds and Notes:** SR SEC BONDS NOTES over Total assets (item 6).
- **Sr Unsecured Bonds and Notes:** SR UNSEC BONDS NOTES over Total assets (item 6).
- **Sr Secured Loans:** SR SEC LOANS over Total assets (item 6).
- **Commercial Paper Outstanding:** CP.

Thomson One:

- **Individual Investors:** Number of shares in hands of individual investors.

CRSP Daily Files:

- **Dummy Initiate/Increase Dividends:** Dummy variable, takes the value of one if the firm-year observation has initiated/increased dividends per share adjusted for stock splits, CRSP data.

Appendix B. Text-search Algorithm Description

I use a text-search algorithm searching for keywords in every 10-K, 10-KT, 10-K405, 10KSB, and 10KSB40 available in SEC's EDGAR system to generate specific data requirements. More precisely, I generate the following dummy variables: covenants restricting dividend payouts in secured contracts and covenants restricting dividend payouts in unsecured contracts.

For each specific text-search:

- **Covenants for Dividends in Secured Contracts:** I look for "covenant" in combination with "secured" or "security interest". When the keywords are identified, I further search for the keyword "dividend" excluding those hits that contain "no/not".
- **Covenants for Dividends in Unsecured Contracts:** I look for "covenant" in combination with "unsecured". When the keywords are identified, I further search for the keyword "dividend" excluding those hits that contain "no/not".
- **Covenants for Investment in Secured Contracts:** I look for "covenant" in combination with "secured" or "security interest". When the keywords are identified, I further search for the keywords "capital expenditures" and "investment" excluding those hits that contain "no/not".

- **Covenants for investment in Unsecured Contracts:** I look for "covenant" in combination with "unsecured". When the keywords are identified, I further search for the keywords "capital expenditures" and "investment" excluding those hits that contain "no/not".
- **Covenants for Net Worth in Secured Contracts:** I look for "covenant" in combination with "secured" or "security interest". When the keywords are identified, I further search for the keywords "net worth", "leverage", and "debt-to-ebitda" excluding those hits that contain "no/not".
- **Covenants for Net Worth in Unsecured Contracts:** I look for "covenant" in combination with "unsecured". When the keywords are identified, I further search for the keywords "net worth", "leverage", and "debt-to-ebitda" excluding those hits that contain "no/not".

When a hit is found, I read the surrounding text and to rule out false positives. If a firm-year's filing has no reference of my keywords, or contains such keywords but the surrounding text suggests that the firm does not use/have that financial contract or limitation, I treat that firm-year as nonuser. Finally, I match the dummy variable generated by the text-search algorithm with my sample.

References

Acharya, Viral V., and Philipp Schnabl (2010) 'Do global banks spread global imbalances? the case of asset-backed commercial paper during the financial crisis of 2007-09.' *NBER Working Paper, No. 16079*

Acharya, Viral V., Heitor Almeida, and Murillo Campello (2013) 'Aggregate risk and the choice between cash and lines of credit.' *Journal of Finance, 68 (5), 2059 2116*

Adrian, Tobias, Paolo Colla, and Hyun Song Shin (2012) 'Which financial frictions? parsing the evidence from the financial crisis of 2007-09.' *NBER Working Papers, No. 18335*

Azariadis, Costas, Leo Kaas, and Yi Wen (2015) 'Self-fulfilling credit cycles.' *CESifo Working Paper Series No. 5289*

Berger, Allen N., and Gregory F. Udell (1990) 'Collateral, loan quality and bank risk.' *Journal of Monetary Economics*

Bernanke, Ben, and Mark Gertler (1989) 'Agency costs, net worth, and business fluctuations.' *American Economic Review, 79(1), 14-31*

Bernanke, Ben, Mark Gertler, and Simon Gilchrist (1996) 'The financial accelerator and the flight to quality.' *The Review of Economics and Statistics, 78 (1), 1-15*

Berrospide, Jose M., and Ralf R Meisenzahl (2015) 'The real effects of credit line drawdowns.' *Finance and Economics Discussion Series 2015-007. Board of Governors of the Federal Reserve System.*

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan (2004) 'How much should we trust differences-in-differences estimates?' *Quarterly Journal of Economics, 119 (1), 249-275*

Brunnermeier, Markus K., and Martin Oehmke (2013) 'The maturity rat race.' *Journal of Finance, 68 (2), 483-521*

Carey, Mark, Stephen Prowse, John Rea, and Gregory Udell (1993) 'The economics of the private placement market.' *Federal Reserve Bulletin*

Cerqueiro, Geraldo, Steven Ongena, and Kasper Roszbach (2014) 'Collateralization, bank loan rates, and monitoring.' *Journal of Finance, Fourthcoming*

Chaney, Thomas, David Sraer, and David Thesmar (2012) 'The collateral channel: How real estate shocks affect corporate investment.' *American Economic Review, 102(6), 2381-2409*

Colla, Paolo, Filippo Ippolito, and Kai Li (2013) 'Debt specialization.' *Journal of Finance, 68(5), 2117-2141*

DeAngelo, Harry, Linda DeAngelo, and Rene M. Stulz (2006) 'Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory.' *Journal of Financial Economics 81(2), 227-254*

Degryse, Hans, Vasso Ioannidou, Jose Liberti, and M. Jason Sturgess (2014) 'When do laws and institutions affect the recovery rate of collateral?' *Working Paper*

Farre-Mensa, Joan, and Alexander Ljungqvist (2015) 'Do measures of financial constraints measure financial constraints?' *Review of Financial Studies, Forthcoming*

Gan, Jie (2007) 'Collateral, debt capacity, and corporate investment: Evidence from a natural experiment.' *Journal of Financial Economics 85(3), 709-734*

Giambona, Erasmo, Joseph H. Golec, and Florencio Lopez-Silanes (2015) 'Financing choices and growth prospects: Evidence from the introduction of biosimilar drugs.' *Working Paper*

Graham, John R., and Mark T. Leary (2011) 'A review of empirical capital structure research and directions for the future.' *Annual Review of Financial Economics, 3*

Hadlock, Charles J., and Joshua R. Pierce (2010) 'New evidence on measuring financial constraints: Moving beyond the kz index.' *Review of Financial Studies, 23 (5), 1909-1940*

Hennessy, Christopher A., and Tony M Whited (2005) 'Debt dynamics.' *Journal of Finance, 60, 1129-1165*

Holmstrom, Bengt, and Jean Tirole (1997) 'Financial intermediation, loanable funds, and the real sector.' *Quarterly Journal of Economics, 112(3), 663-691*

Ivashina, Victoria, and David Scharfstein (2010) 'Bank lending during the financial crisis of 2008.' *Journal of Financial Economics, 97(3), 319-338*

John, Kose, Anthony Lynch, and Manju Puri (2003) 'Credit ratings, collateral and loan characteristics: Implications for yield.' *Journal of Business, 76(3), 371-409*

Kiyotaki, Nobuhiro, and John Moore (1997) 'Credit cycles.' *Journal of Political Economy, 115(2)*

Lemmon, Michael L., Michael L. Roberts, and Jaime F. Zender (2008) 'Back to the beginning: Persistence and the cross-section of corporate capital structure.' *Journal of Finance, 63(4), 1575-1608*

Liberti, Jose M., and Atif R. Mian (2010) 'Collateral spread and financial development.' *Journal of Finance, 65(1), 147-177*

Livdan, Dmitry, Horacio Sapriza, and Lu Zhang (2009) 'Financially constrained stock returns.' *Journal of Finance, 64 (4), 1827-1862*

Rauh, Joshua D., and Amir Sufi (2010) 'Capital structure and debt structure.' *Review of Financial Studies, 23(12), 4242-4280.*

Stiglitz, Joseph E., and Andrew Weiss (1981) 'Credit rationing in markets with imperfect information.' *American Economic Review, 71(3), 393-410*

Sufi, Amir (2009) 'Bank lines of credit in corporate finance: An empirical analysis.' *Review of Financial Studies, 22(3), 1057-1088*

Waldinger, Fabien (2010) 'Quality matters: The expulsion of professors and the consequences for phd student outcomes in nazi germany.' *Journal of Political Economy, 118(4), 787-831*

Table 1: **Summary Statistics, JGTRRA 2000-2005 and ABCP 2005-2010**

This table contains summary statistics for key firm characteristics from U.S. public manufacturing firms (SIC codes 2000-3999) from Compustat. Panel a) contains summary statistics for JGTRRA (2000-2005), where the treatment group is defined as firms in the fourth quartile of the individual investors' share ownership distribution (Reuter's ThomsonOne data), while Panel b) contains summary statistics for ABCP (2005-2010), where the treatment group is defined as firms with a commercial paper conduit issuing secured (Capital IQ data). Dividend payout data is from CRSP's daily files. Appendix A provides a detailed description of the variables used in the analysis.

	Panel a) (2000-2005)			Panel b) (2005-2010)		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Individual Investors Shares	0.15	0.03	0.25	n/a	n/a	n/a
Increase/Initiate Dividends	0.19	-	0.39	n/a	n/a	n/a
Commercial Paper Program	n/a	n/a	n/a	0.31	-	0.46
Unsecured (Total Debt)	0.67	0.86	0.37	0.65	0.82	0.38
Unsecured (Total Assets)	0.16	0.13	0.15	0.14	0.11	0.14
Secured (Total Assets)	0.07	0.01	0.10	0.07	0.01	0.11
Retained Earnings	- 0.25	0.14	1.24	- 0.34	0.15	1.54
Net Worth (Book)	0.70	0.71	0.21	0.70	0.72	0.21
Capital Expenditures	0.04	0.03	0.04	0.04	0.03	0.04
Log (Size)	5.62	5.51	1.97	6.01	6.07	2.05
Profitability	0.06	0.10	0.17	0.07	0.11	0.17
Mkt-to-book	1.59	1.14	1.27	1.46	1.13	1.06
Tangibility	0.26	0.23	0.17	0.24	0.20	0.16
# Observations	5,074			5,291		

Notes: n/a stands for not applicable.

Table 2: **Unsecured debt in Debt Structure's reaction to ABCP Market Collapse of 2007 Pre-Lehman Collapse, First-Stage IV**

This table contains regression results for the average treatment effect, ATE_{it}(=Post*CPSec$_{it}$), on the share of unsecured debt over total debt (the dependent variable) as a result from the supply shock for the treatment group (2005-2008). ATE_{it} is computed as the interaction term between, $Post_t$ and $CPSec_i$, where $Post_t$ takes value one for firm-year observations in post-treatment years and $CPSec_i$ takes value one for firms in with a commercial paper conduit and issuing secured in pre-treatment years (Capital IQ data), the treatment group. Unsecured debt is multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and regressions include firm and year fixed effects. Columns (1)-(2) and (3)-(4) show results for post-treatment years 2007 and 2007-08, respectively. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

$$Punsec_{it} = \gamma_t + \theta_i + \psi \text{ATE}_{it} + X_{it}^{\prime borrower}\beta_{p,b} + X_{it}^{\prime contract}\beta_{p,c} + \eta_{it}$$

	Dependent Variable: % Unsecured (Total Debt)			
Post-treat	2007		2007-08	
Pre-treat		2005-06		
	(1)	(2)	(3)	(4)
ATE 2007	-7.564**	-8.140***		
	(2.965)	(2.853)		
ATE 2007-08			-6.729***	-6.966***
			(2.126)	(2.110)
RetEarnings	-1.978	-2.083	-1.624	-1.735
	(1.934)	(1.923)	(1.177)	(1.178)
Tangibility	-18.57	-17.32	-5.439	-4.428
	(23.56)	(23.63)	(19.41)	(19.37)
Mkt-to-book	1.027	0.997	0.930	0.884
	(1.453)	(1.462)	(1.157)	(1.164)
Log(Size)	-2.123	-0.281	-0.773	0.499
	(5.467)	(5.405)	(4.370)	(4.289)
Profitability	11.32	9.012	8.066	6.863
	(13.97)	(13.87)	(10.75)	(10.75)
Log(Debt)	1.382		1.063	
	(1.652)		(1.337)	
Delta Debt		-0.000366		0.000450
		(0.00105)		(0.000927)
sigma(CF)	-30.60	-29.52	-16.82	-15.24
	(36.29)	(35.97)	(30.51)	(30.52)
Contract Terms	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm
Firm&Year FE	Yes	Yes	Yes	Yes
R-squared	0.872	0.872	0.835	0.835
# Obs	2,037	2,037	2,844	2,844

Table 3: **IV Estimation, Pre-Lehman Collapse, Effect of Debt Structure on Investment**

This table contains OLS and 2SLS estimation results of the causal effect from the share of unsecured debt over total debt to capital expenditures over total assets (dependent variable) (2005-2008). Debt structure is instrumented ($Z_{it} = (Post * CPSec)_{it}$) with the average treatment effect from ABCP market collapse of 2007 on the treatment group in Table 2. Capital expenditures are multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and all specifications include firm and year fixed effects. Columns (1)-(4) and (5)-(8) show the just-identified results for post-treatment years 2007 and 2007-08, respectively. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

$$Capex_{it} = \gamma_t + \theta_i + \rho Punsec_{it} + X_{it}^{\prime borrower}\beta_{c,b} + X_{it}^{\prime contract}\beta_{c,c} + \varphi_{it}$$

$$Punsec_{it} = \gamma_t + \theta_i + \psi Z_{it} + X_{it}^{\prime borrower}\beta_{p,b} + X_{it}^{\prime contract}\beta_{p,c} + \eta_{it}$$

	Dependent Variable: Capital Expenditures over Total Assets							
Post-treat	2007				2007-08			
Pre-treat	2005-06							
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
% Unsecured	-0.247	0.413	-0.255	0.413	-0.170	0.442*	-0.159	0.435*
	(0.426)	(0.267)	(0.426)	(0.266)	(0.394)	(0.254)	(0.393)	(0.253)
Log(Debt)	-0.0455	-0.0131			0.0283	-0.0282		
	(0.130)	(0.0704)			(0.121)	(0.0661)		
Delta Debt			-0,0887	0.485*			-0.000158	0.000534**
			(0.257)	(0.277)			(0.228)	(0.239)
Sigma(CF)	-1.516	1.324	-1.444	1.418	-0.689	1.199	-0.735	1.299
	(2.318)	(1.686)	(2.307)	(1.685)	(2.224)	(1.610)	(2.215)	(1.608)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contract Terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Year&Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.792	0.335	0.792	0.336	0.774	0.337	0.774	0.339
# Obs	2,036	2,036	2,036	2,036	2,216	2,216	2,216	2,216

Table 4: **DID, Substitution Patterns ABCP. Credit Channel**

This table contains regression results for the average treatment effect, ATE_{it}(=(Post*CPSec)$_{it}$), on debt types over total assets (the dependent variable) as a result from the shock for the treatment group (2005-2010). ATE_{it} is computed as the interaction term between, $Post_t$ and $CPSec_i$, where $Post_t$ takes value one for firm-year observations in post-treatment years and $CPSec_i$ takes value one for firms in with a commercial paper conduit and issuing secured in pre-treatment years (Capital IQ data), the treatment group. Debt types are multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and all specifications include firm and year fixed effects. Columns (1)-(4) and (5)-(9) show the short-term (2007) and the medium term effects (2008-09) of the shock, respectively. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

$$\frac{\text{Debt Type}_{it}}{\text{Assets}_{it}} = \gamma_t + \theta_i + \psi \text{ATE}_{it} + X_{it}^{\prime borrower}\beta_{d,b} + X_{it}^{\prime contract}\beta_{d,c} + \eta_{it}$$

	Dependent Variable: Debt Type over Total Assets								
	Short-term effects				Medium-term effect				
Post-treat	2007				2008-09				
Pre-treat	2004-06				2005-07				
	Unsecured	Unsecured RC	Commercial paper	Secured	Unsecured	Unsecured RC	Secured	Sr Secured Loans	Secured RC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ATE2007	-4.207**	1.158**	-4.192**	0.262					
	(2.064)	(0.453)	(1.951)	(1.103)					
ATE2008-09					-3.695***	1.050**	1.074	1.165*	0.600**
					(1.281)	(0.428)	(0.827)	(0.650)	(0.278)
Log(Debt)	4.093***	0.827***	0.0122	2.904***	4.185***	0.923***	2.878***	2.324***	0.521***
	(0.584)	(0.183)	(0.0219)	(0.508)	(0.474)	(0.230)	(0.420)	(0.364)	(0.116)
$\sigma(CF)$	23.40*	-1.447	-0.216	7.550	9.484	3.779	25.04**	12.84	-3.715
	(13.67)	(4.340)	(0.407)	(10.85)	(11.40)	(4.185)	(10.86)	(8.818)	(3.182)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contract Terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Firm&Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.834	0.683	0.783	0.783	0.812	0.685	0.761	0.778	0.630
Observations	2,298	2,298	2,298	2,298	3,063	3,063	3,063	3,063	3,063

Table 5: **DID, Capital Expenditures Response to Substitution to Secured, JGTRRA**

This table contains regression results for the average treatment effect, *ATE*, for capital expenditures over total assets as a result from the policy change for the treatment group (2000-2005). Data is from U.S. public manufacturing firms (SIC codes 2000-3999). The treatment group is defined as firms in the fourth quartile of the individual investors' share ownership distribution and issuing secured debt in pre-treatment years. Capital expenditures are multiplied by 100. Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and the specification includes firm and year fixed effects. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

$$\text{Capex}_{it} = \gamma_t + \theta_i + \psi \text{ATE}_{it} + X_{it}^{\prime borrower}\beta_{c,b} + X_{it}^{\prime contract}\beta_{c,c} + \eta_{it}$$

	Dependent Variable: Capital Expenditures over Total Assets					
Post-Treatment Years	2003		2003-04		2003-05	
Pre-treatment Years			2000-02			
	(1)	(2)	(3)	(4)	(5)	(6)
ATE 2003	-0.627	-0.484				
	(0.661)	(0.633)				
Q4 Individual Investors 2003	0.250	0.186				
	(0.367)	(0.358)				
ATE 2003-04			-0.514	-0.525		
			(0.580)	(0.553)		
Q4 Individual Investors 2003-04			0.227	0.225		
			(0.332)	(0.326)		
ATE 2003-05					-0.783	-0.866*
					(0.533)	(0.505)
Q4 Individual Investors 2003-05					0.310	0.261
					(0.310)	(0.306)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
Contract Terms	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm
Firm&Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.615	0.647	0.582	0.623	0.566	0.605
Observations	3,221	3,210	4,267	4,247	5,074	5,052

Notes:
The double interactions, *Issue Secured 2003-**, are omitted. No statistical significant.

Table 6: **DID, Substitution Patterns JGTRRA. Balance Sheet Channel**

This table contains regression results for the average treatment effect, ATE_{it}(=(Post*Q4)$_{it}$), on debt types over total assets (the dependent variable) as a result from the policy change for the treatment group (2000-2005). ATE_{it} is computed as the interaction term between, $Post_t$ and $Q4_i$, where $Post_t$ takes value one for firm-year observations in post-treatment years and $Q4_i$ takes value one for firms in the fourth quartile of the individual share ownership distribution in pre-treatment years (ThomsonOne data), the treatment group. Debt types are multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009). ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

$$\frac{\text{Debt Type}_{it}}{\text{Assets}_{it}} = \gamma_t + \theta_i + \psi \text{ATE}_{it} + X_{it}^{\prime borrower}\beta_{d,b} + X_{it}^{\prime contract}\beta_{d,c} + \eta_{it}$$

	Dependent Variable: Debt Type over Total Debt							
	Secured Debt		Sr Secured Bonds		Sr Secured Loans		Unsecured Debt	
Post-treatment Years	2003-05							
Pre-treatment Years	2002							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ATE 2003-05	1.665***	1.888***	0.495*	0.636**	1.147**	1.145**	-1.857**	-0.614
	(0.575)	(0.569)	(0.258)	(0.262)	(0.475)	(0.476)	(0.817)	(0.825)
Post 2003-05	0.966***	1.512***	0.319**	0.490***	0.420*	0.770***	5.910***	5.026***
	(0.267)	(0.277)	(0.132)	(0.138)	(0.224)	(0.236)	(0.575)	(0.578)
Q4 Individual Investors	3.059***	0.00961	0.526*	-0.382	2.320***	0.431	-4.104***	0.857
	(0.557)	(0.602)	(0.290)	(0.311)	(0.472)	(0.503)	(0.786)	(0.909)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contract Terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
R-squared	0.103	0.163	0.048	0.089	0.084	0.121	0.117	0.202
# Observations	3,471	3,471	3,471	3,471	3,471	3,471	3,471	3,471

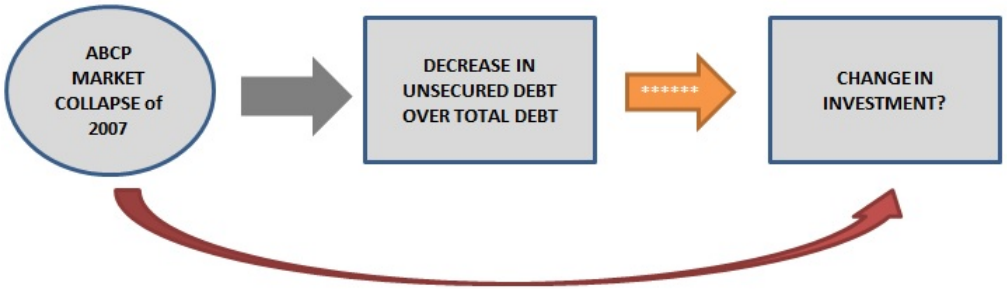

Figure 1: **Summary of Identification Strategy: Asset-backed Commercial Paper Market Collapse of 2007.**

Goal: Showing that an increase in unsecured debt in debt structure increases investment (orange arrow).

The *Asset-backed Commercial Paper Market Collapse* of 2007 causes a downturn in the market for non-financial corporate commercial paper market. The effect of the shock reduces unsecured debt in debt structure for those relying on commercial paper and unable to substitute toward other unsecured financial debt sources (DID estimation). The substitution toward secured debt issues forces firms to reduce the size of their investment (IV estimation).

I rule out the following lines of causation to support the *exclusion restriction* (red arrow).

1. The collapse does not directly affect investment (DID estimation). Results in Yagan (2015) are also consistent with this result.
2. Tangibility, retained earnings, market-to-book, profitability and size are not directly affected by the shock (DID estimation).

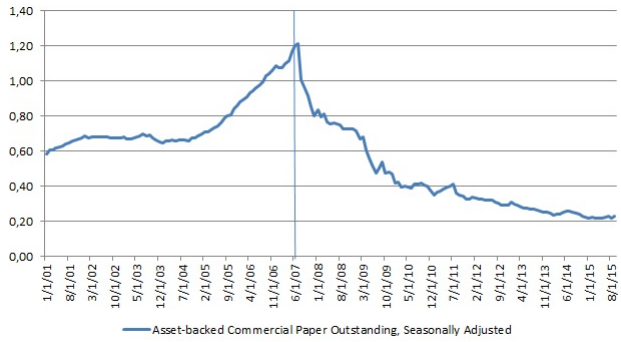

Figure 2: **Asset-backed Commercial Paper Outstanding, 2002-2015.**

Source: Federal Reserve Bank of Saint Louis.

Appendix, Figure 1. Parallel Trends Assumption ABCP: Unsecured debt over Total Debt, controlling for firm observables, from 2005-10. The treatment period is from 2008-10. The table reports output of stata dqd command, which tests the parallel trends assumption conditional on observed covariates. The p-value of 0.97 implies that the parallel trends assumption for the pre-treatment period is satisfied.

Unconditional Fully Flexible Model
Output: f_punsec — Number of obs = 5291
Sample Period: 2005:2010 — H0: Common Pre-dynamics = .0546
Treatment Period: 2008:2010 — p-value = .9731

	s=1	s=2	s=3	H0: q=q-1	H0: s=s-1
q=1	-.0411166	.111827	-.0038813		11.14343
	(0.0433)	(0.0406)	(0.0560)		[0.0038]
q=2	-.0501014	.0938574	-.0308357	.0089848	10.59966
	(0.0670)	(0.1015)	(0.1488)	[0.8170]	[0.0050]
q=3	-.0620847	.0579076	-.1027353	.0119833	10.61933
	(0.1229)	(0.2913)	(0.5416)	[0.8649]	[0.0049]

Std. Err. in parenthesis adjusted for clusters in gvkey
p-values in brackets

Appendix, Table 1: Exclusion Restriction, JGTRRA and ABCP

This table contains suggestive evidence to that support the exclusion restriction is not a concern. Panel a) shows DID results for the average treatment effect, *ATE*, on tangibility (1)-(3), debt structure (4)-(6) and investment (7-9) as a result from the policy change for the treatment group (2000-2005) in JGTRRA. Panel b) shows DID results for the average treatment effect, *ATE*, on retained earnings (1)-(3), tangibility (4)-(6) and collateral pledged (7-9) as a result from the shock for the treatment group (2005-2010) in ABCP. Dependent variables are multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and includes firm and year fixed effects. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

Panel a) Exclusion Restriction JGTRRA

	Tangibility			Unsecured (Total Debt)			Capital Expenditures		
Post-treatment Years	2003	2003-04	2003-05	2003	2003-04	2003-05	2003	2003-04	2003-05
Pre-treatment Years					2000-02				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ATE 2003	0.434			0.751			-0.0179		
	(0.471)			(1.938)			(0.306)		
ATE 2003-04		0.205			0.0996			0.0191	
		(0.474)			(1.781)			(0.272)	
ATE 2003-05			0.247			0.450			-0.0121
			(0.471)			(1.765)			(0.252)
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Firm&Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.948	0.937	0.931	0.796	0.779	0.750	0.614	0.582	0.565
Observations	3,221	4,267	5,074	3,221	4,267	5,074	3,221	4,267	5,074

Panel b) Exclusion Restriction ABCP

	Retained Earnings			Tangibility			Capital Expenditures		
Post-treatment Years	2008	2008-09	2008-10	2008	2008-09	2008-10	2008	2008-09	2008-10
Pre-treatment Years					2005-07				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ATE 2008	-6.998			0.452			-0.157		
	(9.160)			(0.545)			(0.283)		
ATE 2008-09		0.592			0.234			-0.139	
		(8.416)			(0.511)			(0.245)	
ATE 2008-10			1.803			0.220			0.0571
			(9.164)			(0.512)			(0.240)
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Firm&Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.934	0.918	0.908	0.946	0.935	0.929	0.720	0.669	0.650
Observations	3,238	4,491	5,275	3,243	4,504	5,291	3,243	4,504	5,291

Appendix, Table 2: Pre-treatment Summary Statistics for JGTRRA of 2003 and ABCP of 2007

This table contains summary statistics for pre-treatment firm characteristics in both identification strategies. Panel a) shows summary statistics for treatment and control groups in JGTRRA. The treatment group is defined as firms in the fourth quartile of the individual investors' ownership distribution in the pre-treatment years. Panel b) shows summary statistics for treatment and control groups in ABCP. The treatment group is defined as firms with a commercial paper program that were issuing secured in the pre-treatment years. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). The *p-value* column provides results for the difference in means test. Appendix A provides a detailed description of the variables used in the analysis.

Panel a) Pre-treatment Summary Statistics, JGTRRA (2000-02)

	TG: Q4 II			CG: Rest			
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	p-value
Unsecured (Total Debt)	0.55	0.56	0.37	0.76	0.97	0.34	0.00
Retained Earnings	- 0.37	0.06	1.26	0.01	0.20	0.88	0.00
Net Worth	0.69	0.71	0.22	0.68	0.68	0.21	0.12
Log (Size)	4.44	4.34	1.44	6.65	6.60	1.68	0.00
Profitability	0.02	0.09	0.20	0.09	0.12	0.14	0.00
Mkt-to-book	1.38	0.90	1.25	1.61	1.15	1.35	0.00
Tangibility	0.27	0.24	0.17	0.27	0.23	0.17	0.36
Capital Expenditures	0.05	0.03	0.04	0.05	0.04	0.04	0.05
	1,293			1,237			

Panel b) Pre-treatment Summary Statistics, ABCP (2005-07)

	TG: CP&Sec			CG: Rest			
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	p-value
Unsecured (Total Debt)	0.56	0.57	0.37	0.66	0.85	0.37	0.00
Retained Earnings	- 0.47	0.07	1.65	- 0.23	0.18	1.37	0.01
Net Worth	0.68	0.70	0.19	0.71	0.73	0.21	0.01
Log (Size)	5.53	5.17	2.44	6.03	6.10	1.95	0.00
Profitability	0.06	0.10	0.17	0.08	0.12	0.16	0.03
Mkt-to-book	1.71	1.30	1.26	1.69	1.33	1.13	0.36
Tangibility	0.27	0.25	0.17	0.23	0.19	0.16	0.00
Capital Expenditures	0.06	0.05	0.05	0.04	0.03	0.04	0.00
	434			2,259			

Robustness Checks, Table 1: Longer Post-treatment period ABCP, IV estimation on Investment

This table contains OLS and 2SLS estimation results of the causal effect from the share of unsecured debt over total debt to capital expenditures over total assets (dependent variable) (2005-2010). Debt structure is instrumented ($Z_{it} = (Post * CPSec)_{it}$) with the average treatment effect from ABCP market collapse of 2007 on the treatment group. Capital expenditures are multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and all specifications include firm and year fixed effects. Columns (1)-(2), (3)-(4) and (5)-(6) show the just-identified results for post-treatment years 2008, 2008-09 and 2008-10, respectively. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

$$Capex_{it} = \gamma_t + \theta_i + \rho Punsec_{it} + X_{it}^{'}\beta_c + \varphi_{it}$$

$$Punsec_{it} = \gamma_t + \theta_i + \psi Z_{it} + X_{it}^{'}\beta_p + \eta_{it}$$

	Dependent Variable: Capital Expenditures over Total Assets											
Post-treat	2008				2008-09				2008-10			
Pre-treat							2005-07					
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
% Unsecured	-0.142	0.674***	-0.137	0.686***	-0.185	0.497**	-0.193	0.506**	-0.106	0.520***	-0.121	0.522***
	(0.345)	(0.239)	(0.345)	(0.238)	(0.266)	(0.199)	(0.266)	(0.198)	(0.230)	(0.187)	(0.230)	(0.185)
Log(TotDebt)	0.0109	0.0324			-0.0492	0.0128			-0.0953	-0.0110		
	(0.109)	(0.0620)			(0.0818)	(0.0486)			(0.0714)	(0.0444)		
$\Delta Debt$			-0.000157	0.000579**			-4.03e-05	0.000804***			2.83e-05	0.000673***
			(0.000216)	(0.000238)			(0.000180)	(0.000199)			(0.000152)	(0.000171)
$\sigma(CF)$	1.479	2.753**	1.446	2.800**	0.277	1.104	0.282	1.171	-1.202	0.717	-1.204	0.790
	(1.975)	(1.108)	(1.972)	(1.107)	(1.643)	(0.845)	(1.643)	(0.843)	(1.114)	(0.759)	(1.115)	(0.758)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contract Terms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ClustSE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Year&Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.758	0.349	0.758	0.350	0.698	0.320	0.698	0.324	0.683	0.308	0.682	0.310
# Obs	2,405	2,405	2,405	2,405	3,408	3,408	3,408	3,408	4,029	4,029	4,029	4,029

Robustness Checks, Table 2: Response of Unconstrained's Capital Expenditures to ABCP

This table contains regression results for the average treatment effect, *ATE*, for capital expenditures over total assets as a result from the policy change for the treatment group (2005-2010). Capital expenditures are multiplied by 100. Data is from U.S. public manufacturing firms (SIC codes 2000-3999). The treatment group is defined as firms with a commercial paper conduit and unconstrained in terms of size in the pre-treatment years. Standard errors are clustered at the source of variation, at a firm-level as in Petersen (2009) and the specification includes firm and year fixed effects. ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Appendix A provides a detailed description of the variables used in the analysis.

	Capital Expenditures		
Post-treatment Years	2008	2008-09	2008-10
Pre-treatment Years		2005-07	
	(1)	(2)	(3)
ATE 2008	-0.279		
	(0.259)		
ATE 2008-09		-0.251	
		(0.242)	
ATE 2008-10			-0.105
			(0.231)
Borrower Controls	Yes	Yes	Yes
Contract Terms	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm
Firm&Year FE	Yes	Yes	Yes
R-squared	0.764	0.704	0.688
Observations	3,238	4,491	5,275