Let them eat debt but to what end?- Corporate America after the Great Recession

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Abstract

I study the behavior of U.S. non-financial corporates after the financial crisis. I document an increase in the real debt holdings and correspondingly the leverage for these firms. Controlling for firm and time fixed effects, I find a higher long-term debt to asset ratio to be associated with lower capital expenditures and growth in fixed capital post-crisis. This is also true for financially unconstrained firms vis-a-vis pre-crisis. Moreover, firms with a higher share of long-term debt after the crisis appear to have a greater likelihood of repurchasing shares and larger dollar payouts to equity holders. The evidence points to the fact that any loosening in financial constraints as a result of monetary policy actions has had an impact on firms' capital structure and not real investment.

Keywords: Corporate investment; Cash; Financing constraints; Financial crisis
JEL Codes: G01, G31, G35

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1 Introduction

After the onset of the financial crisis, central banks around the world have pursued both standard and unconventional monetary policy actions in an attempt to stimulate economic activity. While the interactions between monetary policy and real outcomes have been widely researched, there is relatively less evidence on the impact of post-crisis monetary policy measures on firm level outcomes. Given the scale of easing undertaken, it is important to understand it's impact on firm behavior.

In this paper, I empirically investigate any changes in firm behavior along the dimensions of investment, payout to equity holders and cash holdings in the aftermath of the great recession. With the short-term nominal rate constrained by the zero lower bound, the Federal Reserve implemented a number of asset purchase programs with the stated objective of loosening balance sheet constraints and spur economic activity[1]. This is the channel which motivates the empirical tests in this paper.

I begin the analyses by documenting an increase in the real value of debt on the balance sheet of U.S. non-financial corporates and that this increase has been driven by long-term debt. Taking this as evidence for a relaxation in the external finance constraint, I investigate the relationship between long-term debt and investment and whether this has changed after the crisis using fixed effects panel regressions. Further, I use the Whited-Wu index (Whited and Wu (2006)) as a measure of financial constraints to test for any changes in investment behavior post-crisis. I find a quarterly drop of 0.12% in investment as a share of total assets for every 1 % increase in the ratio of long-term debt to assets. The effect is stronger quantitatively and statistically post-crisis. Interesting, I also find that an unconstrained firm, as defined by the Whited-Wu index, has a lower investment post-crisis vis-a-vis pre-crisis. In the next set of tests, I evaluate alternate uses of debt namely, payouts to equity holders and cash holdings. I find that after the crisis, a higher long-term debt to asset ratio is positively correlated with payouts and negatively with the growth in cash holdings. Additionally, the likelihood of net share repurchases increases with the share of long-term debt post-crisis.

The analysis provides new evidence on firm behavior post-crisis. It also adds to the debate on the effects of monetary policy actions pursued in the wake of the recent financial crisis. There

[1] https://www.newyorkfed.org/newsevents/speeches/2010/dud101001.html

has been concerns that these policies would have negligible real effects and might even lead to excessive risk taking and distort investment decisions.[2,3]

The paper proceeds as follows. Section 2 discusses related literature. Section 3 describes the data. Section 4 provides descriptive evidence and the basic hypotheses. Section 5 presents the econometric model and results. Section 6 concludes.

2 Related Literature

There are a few studies that evaluate the impact on firm outcomes in the wake of the recent crisis. Duchin, Ozbas and Sensoy (2010) use the financial crisis as a negative shock to financing constraints and find a significant decline in firm investment with larger effects for firms with low cash holdings or high short-term debt. Using a survey based measure of financial constraints, Campello, Graham and Harvey (2010) find that Chief Financial Officers of constrained firms drew down on lines of credit, postponed profitable projects, and reduced investment and employment. Bliss, Cheng and Denis (2015) argue for the financial crisis to be a shock to the net supply of credit and show that firms reduced payouts to maintain cash levels and fund investment. Using debt maturity as an identification strategy, Almeida, Campello, Laranjeira and Weisbenner (2009) show that firms with long-term debt maturing just after 2007Q3 cut investment more than similar firms with debt maturing after 2008. These studies, however, provide evidence on firm behavior using the crisis as a negative shock to credit supply. To the best of my knowledge, this is the first paper to analyze post-crisis firm behavior over an extended time period. Foley-Fisher, Ramcharan and Yu (2016) find that the maturity extension program (MEP) helped relax financing constraints for firms with a higher historical long-term debt dependence (Long-term debt/total debt). Further they show that these firms had a higher growth of property, plant and equipment (PP&E) and employees in 2012, the year of MEP. I find the opposite effect on PP&E growth using quarterly data.

This study is related to the classical corporate finance research thread on the impact of financial constraints and supply of capital on investment (Fazzari, Hubbard, Petersen, Blinder and Poterba (1988) & Kaplan and Zingales (1997)). Additionally, this work is also related to studies

[2]https://www.federalreserve.gov/newsevents/speech/stein20130207a.htm

[3]http://www.bis.org/events/agm2013/sp130623.htm

that expostulate the relationship between corporate financing and macroeconomic conditions. Broadly, these can be divided into two groups. The first focuses on the demand for capital as a function of firm characteristics. If agency problems and asymmetric information are the main determinants for the demand of capital, improved macroeconomic conditions should be positively correlated with equity issuances while periods of economic contractions should induce a shift towards less information sensitive sources of financing. Choe, Masulis and Nanda (1993) and Bolton and Freixas (2000) exposit these demand based models. However, Baker (2009) points out, the time series of capital structure decisions, payout policy, and investment are not very well explained by the demand based theories. A supply driven mechanism is postulated by Holmstrom and Tirole (1997) where a financial crisis leads to a tightening in credit supply for firms. Poor macroeconomic conditions can also lead to episodes of 'flight to quality' where investors have a preference for high quality information insensitive securities. Empirically, Kashyap, Stein and Wilcox (1993) show that firms, in response to higher interest rates, switch to commercial paper from bank loans. Erel, Julio, Kim and Weisbach (2012) provide evidence for macroeconomic conditions influencing both choice of capital structure and a firms' ability to raise capital subject to firm quality. The findings in this paper corroborate the supply driven mechanism.

3 Data & Variables

A majority of the studies in empirical finance utilize annual data. However, a firms' response to a loosening in the financing constraints might manifest itself over a shorter time horizon. Therefore, I use quarterly data from CRSP/Compustat Merged (CCM) Fundamentals for 1990Q1-2015Q4.[4] The sample excludes financial firms and utilities (Standard Industrial Classification(SIC) 4900-4949 and 6000-6999). Some of the variables used in the analysis are only available annually. For these, the quarterly values are determined by subtracting the past quarter from the current value[5] except for the first quarter. All observations with missing assets are dropped. Assets (atq) is the book value of assets. Long-term debt (dlttq) comprises bonds, mortgages, loans, long-term leases and any obligations that require interest payments due more

[4]Following the adoption of the statement of Financial Accounting Standard 95, 1989 was the first year for the standardized statement of cash flows.

[5]For year to date variables, the fiscal quarter definition is used to convert to quarterly frequency.

than one year from the firms' balance sheet date. *Cash* is defined as cash and short-term investments (cheq) and comprises of cash and all readily transferable securities to cash. Sales (saleq) represents the gross amount of sales less any cash discounts, trade discounts, returned sales and credit allowance to customers. Net Income (niq) is the net fiscal period gain or loss after accounting for discontinued operations, extraordinary items, minority interest and income taxes. Tobin's Q is defined as the ratio of market value of assets to book value of assets. Market value of assets is the sum of liabilities and market capitalization. Liabilities (ltq) comprises of current liabilities, long-term debt, deferred taxes and investment tax credit, other liabilities and minority interest. Market capitalization is the product of common shares outstanding (cshoq) and end of quarter share price (prccq). Market leverage is the ratio of market value of assets to market capitalization. Two measures are used to define *Investment*. the first, capital expenditures (capxy), includes expenditures on PP&E, capital leases, construction, leaseback transactions or reclassification of inventory to PP&E. Second, PP&E (ppentq) which represents the net tangible fixed property used in revenue production excluding accumulated depreciation. Payout to equity holders is the sum of dividend payments (dvpsxq*cshoq) plus purchase of common and preferred stock (prstkcy) minus any reduction in the value of redeemable preferred stocks outstanding (pstkrq). Net share repurchases excludes dividends and adjusts for sale of common stock (sstky).

4 Descriptive Evidence & Basic hypotheses

In response to the recent financial crisis, by december 2008, the Federal Reserve lowered it's target short term interest rate to 0-25 basis points. The federal funds rate (FFR) is the primary interest rate in the U.S. financial market. It impacts interest rates on savings, loans, and mortgages. Figure 1 plots the effective FFR and the spread between corporate bonds rated Baa and AAA. With GDP growth and employment numbers weak, the Fed embarked on a series of Quantitative Easing (QE) programs. QE was aimed at lowering long-term borrowing costs and improve credit availability for firms and households. Krishnamurthy and Vissing-Jorgensen (2011) evaluate the impact of Federal Reserve's QE1 and QE2 on interest rates and find a significant impact for Treasuries, Agency bonds , and highly-rated corporate bonds. Swanson (2011) also finds a lowering of treasury and corporate bond yield as a consequence of QE2.

While theses studies evaluate the immediate impact, Cahill, DÁmico, Li, Sears et al. (2013) show a longer-term effect of the various asset purchase programs on treasury yields.

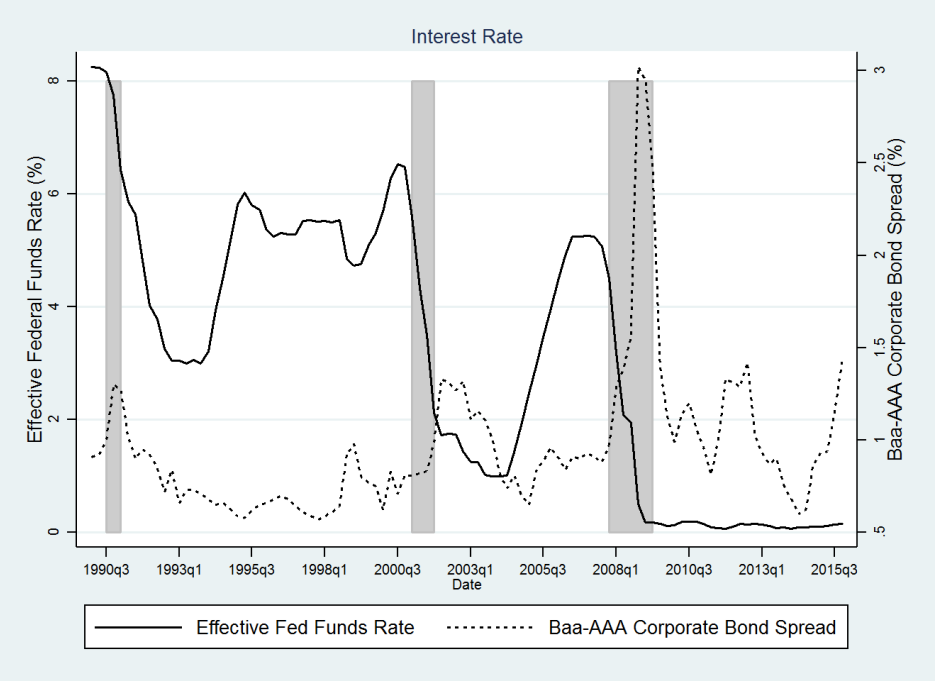

Figure 1: Effective Federal Funds Rate and Baa-AAA Corporate bond spread

There are a number of channels via which quantitative easing might affect the cost of borrowing for firms and the behavior of corporate debt issuances. Vayanos and Vila (2009) model a segmented bond market, where a subset of investors[6] have a preference for specific maturities of debt. A reduction in supply of long-term treasuries would then result in the lowering of bond spreads corresponding to the maturity of purchases. Greenwood, Hanson and Stein (2010) argue that when the relative supply of long-term government debt to short-term debt falls, firm fill in this supply gap by issuing longer-term debt and vice-versa. Badoer and James (2016) provide empirical evidence for this gap filling behavior. In a sample of U.S. corporate debt issues, between 1987 and 2009, they find that a 1 percent decrease in the relative supply of outstanding Treasuries with maturity greater than or equal to 20 years results in a 2.6 percent increase in the likelihood of investment grade corporate debt issuance of similar maturity. A safety premium channel is exposited in Krishnamurthy and Vissing-Jorgensen (2012). Due to an investor preference for long-term safe assets, a decrease in supply of long-term Treasuries

[6]An example would be pension funds and life insurers

increases the demand for highly rated long-term corporate debt. Hanson and Stein (2015) document the presence of a "search for yield" channel. When short-term interest rates are low, investors motivated by current portfolio returns increase holdings of long-term debt. This in turn lowers cost of long-term borrowing for firms. Based on these channels, the impact of an yield curve flattening and lower risk premium should be an increase in the demand and issuance of long-term corporate debt. Figure 2 presents the evolution of balance sheet debt for U.S. corporates excluding financials and utilities. The figure reveals an increase leading up to 2001 recession followed by a modest decline. However between 2010Q2 and 2015Q4, it has increased by 51 percent from USD 2.47 trillion to USD 3.73 trillion. This is mirrored in the increase in book leverage (Figure 3) which has increased from a post-crisis low of 25 percent to 33 percent. The spike in leverage during the financial crisis is mostly due to a fall in assets. Further, net issuance of long-term debt has closely tracked total debt issuance (Figure 4).

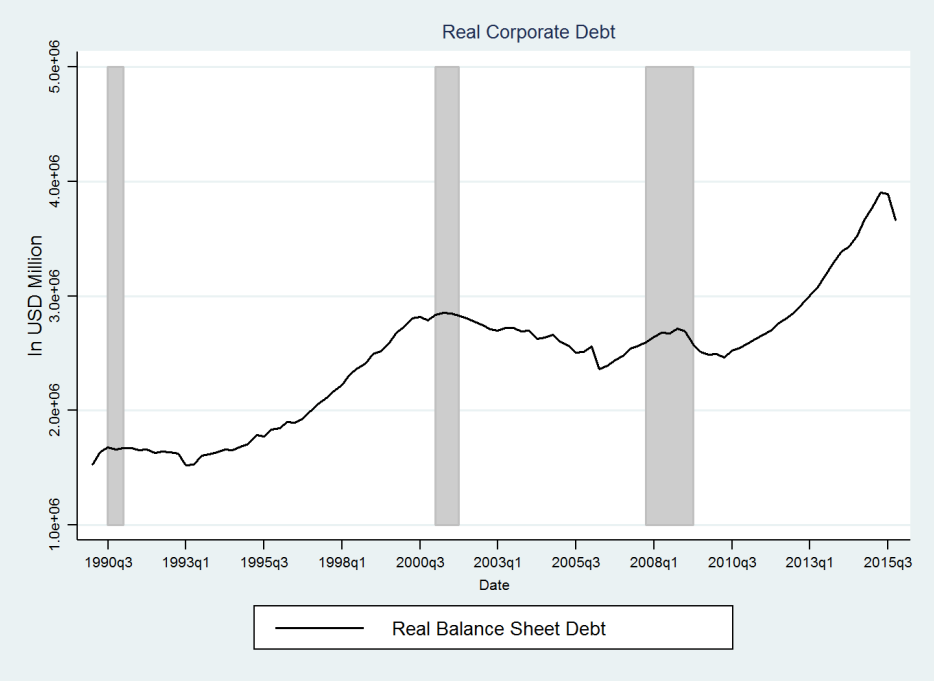

Figure 2: Real Balance Sheet Debt

Motivated by this idea that an effective FFR close to zero and QE relaxes the external financing constraint, I test for the impact on firm outcomes. Assuming that a lower cost of financing manifests itself via an increase in long-term debt, I test for it's impact on capital expenditures and growth in PP&E. In the next test, for a more holistic measure of external financing constraint, I use the Whited-Wu index to separate firms into two groups - constrained

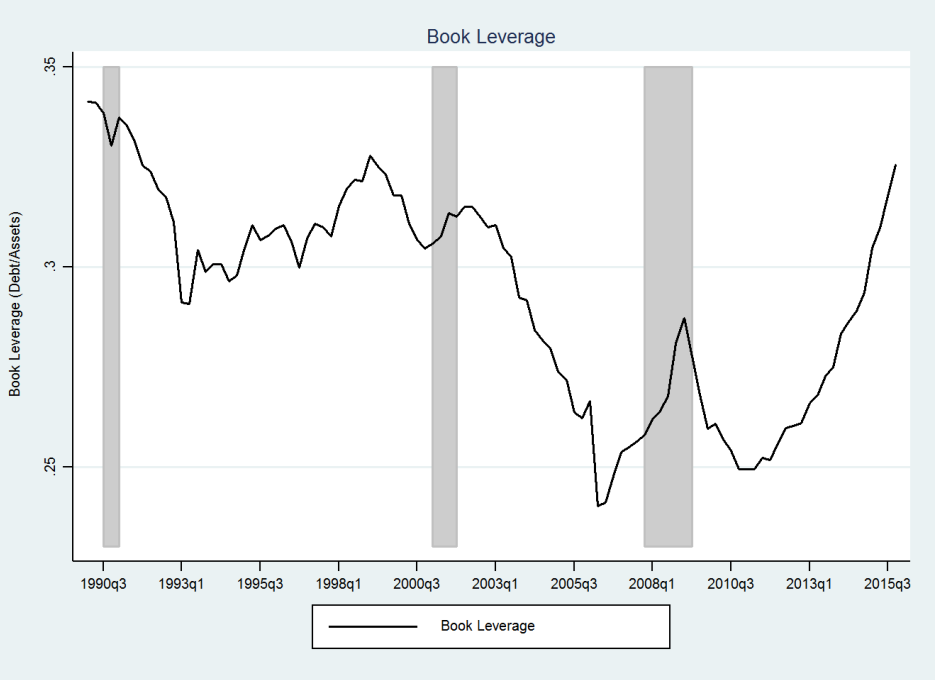

Figure 3: Book Leverage

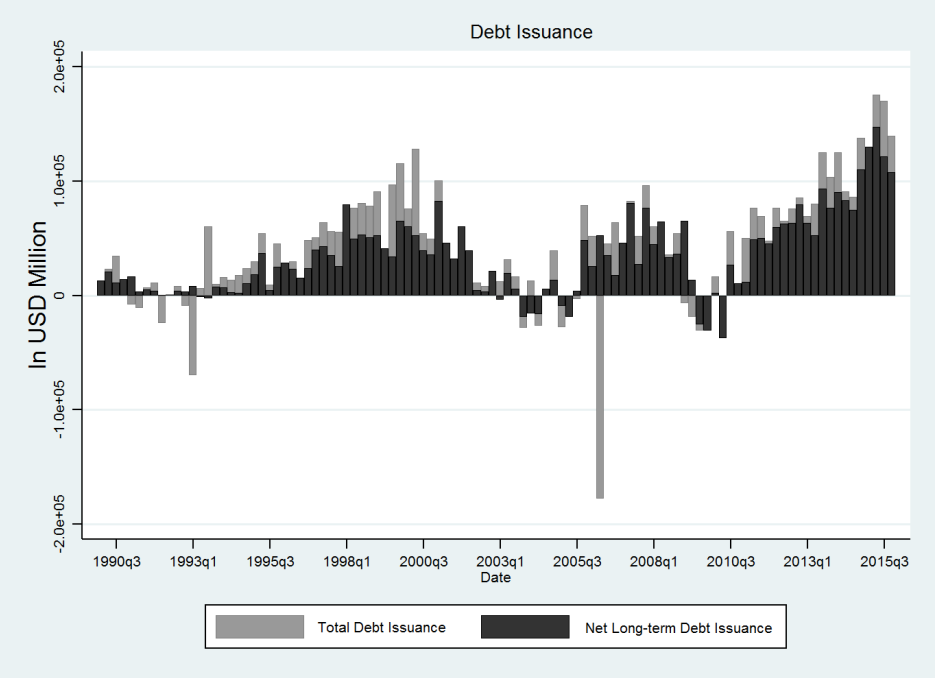

Figure 4: Net Debt Issuance: Total and Long-term

and unconstrained. In the cross-section, unconstrained firms should invest more vis-a-vis unconstrained firms. I test if this hypothesis holds true post-crisis.

Alternatively, it is possible that firms could have put the borrowed funds to alternate use. This

could be the case if the post-crisis recovery was sluggish or there was continued macroeconomic uncertainty. I explore two different uses of financing in this paper; (1) Payouts to equity holders and (2) Increase in cash holdings. While it is beyond the scope of this paper to take a stand on the post-crisis recovery and macroeconomic environment, the extant literature has explored reasons for firms wanting to increase cash holdings and/or postpone investment. Bates, Kahle and Stulz (2009) provide evidence of an increase in cash holdings for firms with riskier cash flows. Firms have an incentive to buyback their stock if it is optimal to postpone capital expenditures as in the presence of uncertainty Bloom (2009). Panel A of Figure 5 presents the evolution of cash and short-term investments as a share of total assets in the aggregate. The sharpest increase is observed after the dot-com bubble when this share increased from 7 percent to about 11.5 percent. While this ratio did go up during the great recession, it has remained relatively stable at the same level since. In panel B, I document a steady increase in payout to equity holders in the form of dividends and equity repurchases leading up to the great recession. It collapses during the crisis but has now surpassed it's pre-crisis peak. I further break down dividend payouts and equity repurchases in Figure 6. Payouts in the form of dividends and equity repurchases sharply increase between 2004 and 2008. During the crisis, however, equity repurchases show a sharp decrease while dividends remain stable. Post-crisis, we again observe a sharp increase in both. It is important to distinguish between the two payout policies as it might influence real outcomes. Almeida, Fos and Kronlund (2016) show that repurchases motivated by earnings per share are associated with reductions in investment and employment. On the other hand, Brav, Graham, Harvey and Michaely (2005) report that dividend payments are sticky and a sustainable increase in earnings or demand from institutional investors are the main reasons for initiating or increasing dividend payments. In Table 1, I present the transition probabilities for firms switching in and out of dividend payments and positive net share repurchases from one quarter to the next. The transition probabilities support the hypothesis that there is a persistence in dividend paying firms while share repurchases constitute a more flexible payout policy. I estimate a linear probability model with fixed effects to test for any post-crisis effects of the long-term debt to asset ratio on the likelihood of net share repurchases and dividend payments.

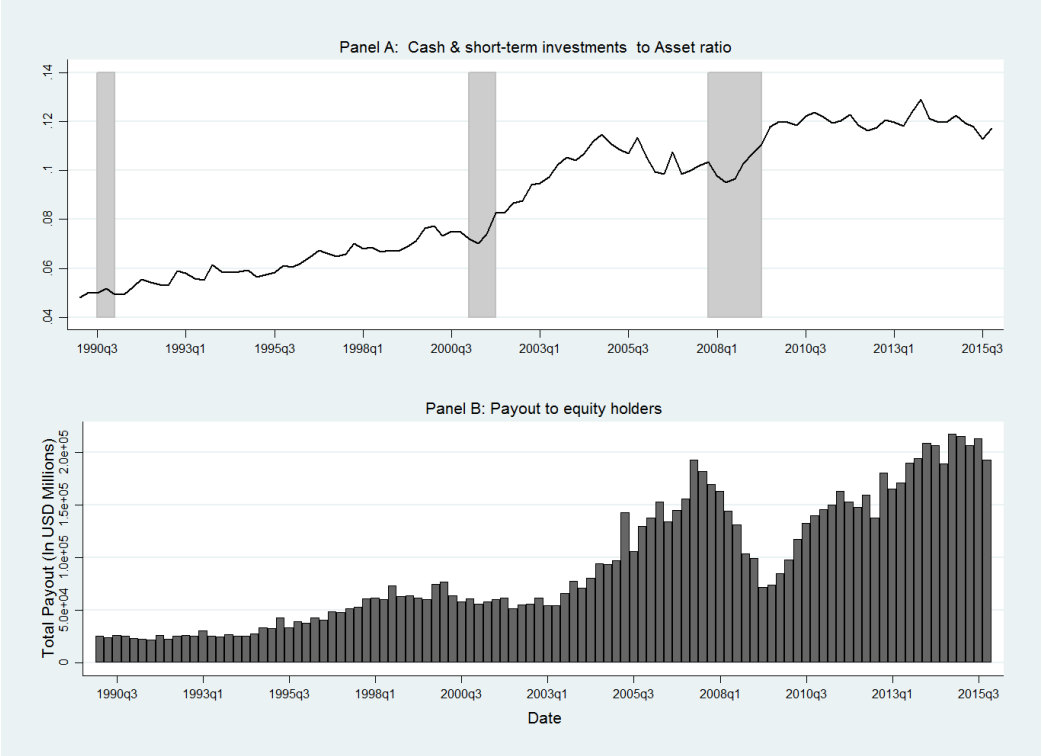

Figure 5: Aggregate time-series of cash & short-term investments to asset ratio and the payout to equity holders.

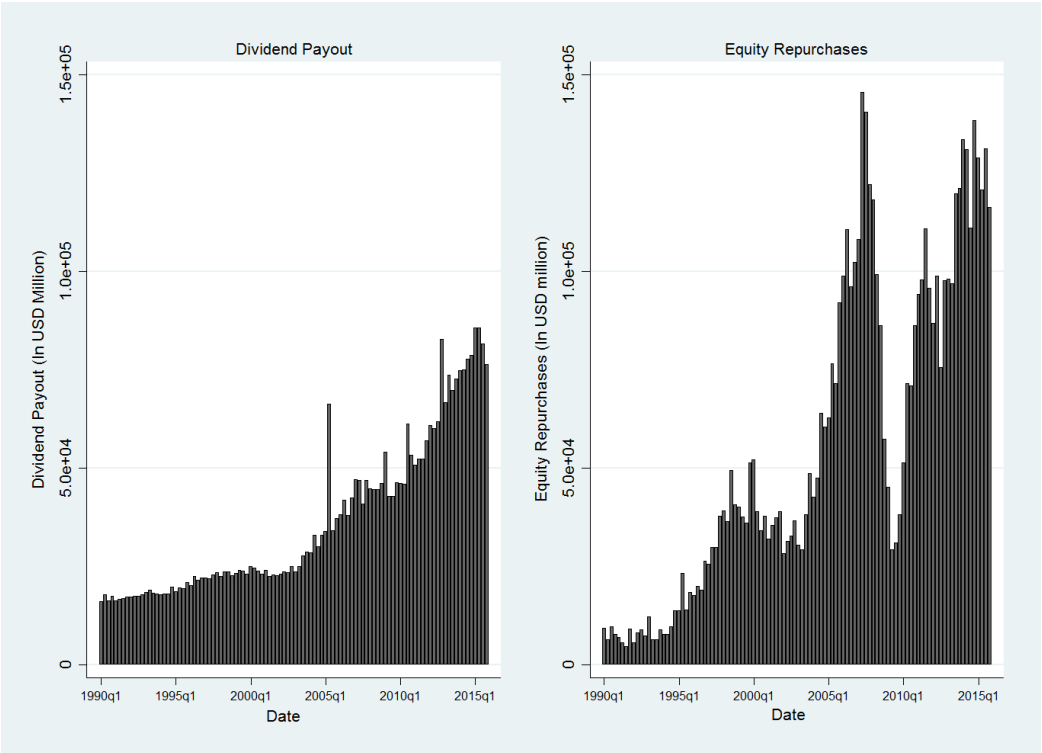

Figure 6: Aggregate time-series behavior of dividend payments and share repurchases.

Table 1: Transition Probabilities (percentage)

	(1) Positive Payout = Yes	(2) Positive Payout = No
Dividend Payment		
Positive Payout = Yes	93.87	6.13
Positive Payout = No	97.90	2.10
Net Share Repurchases		
Positive Payout = Yes	55.65	44.35
Positive Payout = No	88.41	11.59

5 Econometric Model and Results

5.1 Impact of Long term debt on corporate investment

To the extent that post-crisis monetary policy actions helped loosen external finance constraints, I estimate the following equation using the fixed effects framework to determine the impact on investment. In equation 1, I evaluate the impact of long-term debt to asset ratio on investment. Investment is capital expenditures at time, t scaled by firm assets at time, *t-1* or the growth in PP&E between t and *t-1*. Post-crisis is a dummy variable that takes a value equal to one starting 2009Q1[7].

$$\begin{aligned} Investment_{i,t} \;=\; & \beta_0 + \beta_1(LTD_{i,t-1}/\ TA_{i,t-2}) + \beta_2(Cash_{i,t-1}/\ TA_{i,t-2}) + \beta_3(Sales_{i,t-1}/\ TA_{i,t-2}) + \\ & \beta_4(Tobin's\ q)_{i,t-1}/ + \beta_5(Net\ Income_{i,t-1}/\ TA_{i,t-2}) + \beta_6(Market\ Leverage)_{i,t-1} \\ & + \beta_7(Log\ Assets)_{i,t-2} + \beta_8 Post\ Crisis * (LTD_{i,t-1}/\ TA_{i,t-2}) + \\ & \beta_9 Post\ Crisis * (Cash_{i,t-1}/\ TA_{i,t-2}) + \beta_{10} Post\ Crisis * (Sales_{i,t-1}/\ TA_{i,t-2}) + \\ & \beta_{11} Post\ Crisis * (Tobin's\ q)_{i,t-1}/ + \beta_{12} Post\ Crisis * (Net\ Income_{i,t-1}/\ TA_{i,t-2}) \\ & + \beta_{13} Post\ Crisis * (Market\ Leverage)_{i,t-1} + firm_i + time_t + \sigma_{ijt} \end{aligned} \tag{1}$$

Columns 1 and 2 of Table 2 report the results. The primary coefficients of interest are the ones on ratio of long-term debt to assets and the interaction with the post-crisis dummy, *PC*.

[7]Results are qualitatively and statistically similar if I chose a later date for switching on the post crisis dummy, for e.g. 2010Q2

Both the coefficient on the long-term debt ratio and the interaction term are negative. In the previous section, I documented the increase in long-term debt holdings of non-financial firms post-crisis. The results indicate that a higher share of long-term debt has a negative impact on both capital expenditures and PP&E growth and that this relationship has been reinforced post-crisis. In addition, I find a statistically significant difference in how firm characteristics influence investment behavior after the crisis. I expect firms with higher liquidity (cash to asset ratio), profitability (Net Income to Assets) and investment opportunities (Tobin's Q) to invest more. Importantly, I find the effects to be opposite or insignificant post-crisis. The findings suggest a significant post-crisis departure from established firm behavior. Next, I evaluate the impact of financial constraints, as determined by the Whited-Wu index[8], on capital expenditures and PP&E. Unconstrained is an indicator variable equal to one if the firm is less constrained than the median firm for that quarter. Additionally, I interact it with the post-crisis dummy. The results are reported in columns 3 and 4 of Table 2. While an unconstrained firm has higher capital expenditure and growth in PP&E in the cross-section, the effects are reversed post-crisis. Also of interest is the reversal in the relationship between Tobin's Q and investment post-crisis. This could potentially indicate a divergence between investors' and a firms' own perception of growth opportunities or a re-balancing of portfolios towards equities and away from fixed income by yield oriented investors. Overall, the results outlined in table 2 do not indicate any positive effects on investment due to a relaxation in financial constraints. In the next section, I analyze alternate uses of funds by firms.

5.2 Use of financing

To examine the relationship between long-term debt and payout to equity holders or the growth in cash holdings, I estimate equation 2. Use of financing at time, t, is the logarithm of the real

[8] $-0.091CF_{i,t} - 0.062DIVPOS_{i,t} + 0.021TLTD_{i,t} - 0.044LNTA_{i,t} + 0.102ISG_{i,t} - 0.035SG_{i,t}$

Table 2: Long term debt and Firm investment

	(1) Capita Expenditures	(2) PP&E Growth	(3) Capital Expenditures	(4) PP&E Growth
LTD/TA	-0.00119**	-0.00595**	-0.00157***	-0.0120***
	(-2.23)	(-1.99)	(-3.11)	(-4.29)
PC*LTD/TA	-0.00162*	-0.0257***		
	(-1.83)	(-5.80)		
Unconstrained			0.00145***	0.0174***
			(8.18)	(14.79)
PC*Unconstrained			-0.000971***	-0.00425***
			(-3.43)	(-2.82)
Cash/TA	0.0000707	0.118***	0.0000816	0.117***
	(0.16)	(33.06)	(0.18)	(32.63)
Sales/TA	0.00682***	0.0309***	0.00679***	0.0304***
	(11.61)	(8.20)	(11.54)	(8.07)
Tobin's Q	0.00181***	0.0145***	0.00179***	0.0143***
	(30.16)	(33.65)	(29.93)	(33.16)
Net Income/TA	0.0116***	0.208***	0.0113***	0.206***
	(11.45)	(24.69)	(11.13)	(24.45)
Market Leverage	-0.00141***	-0.00868***	-0.00139***	-0.00831***
	(-27.97)	(-30.24)	(-27.97)	(-29.40)
Log Assets	-0.0000997	0.00414***	-0.000291**	0.00149*
	(-0.77)	(5.45)	(-2.23)	(1.92)
PC*Cash/TA	-0.000184	-0.0314***	-0.000386	-0.0278***
	(-0.30)	(-6.04)	(-0.61)	(-5.37)
PC*Sales/TA	-0.00131	-0.0122***	-0.00120	-0.00792*
	(-1.59)	(-2.87)	(-1.44)	(-1.89)
PC*Tobin's Q	-0.000632***	-0.000628	-0.000620***	-0.000882
	(-5.94)	(-0.77)	(-5.82)	(-1.07)
PC*Net Income/TA	-0.00436**	-0.0198	-0.00267	-0.0141
	(-2.27)	(-1.19)	(-1.40)	(-0.84)
PC*Market Leverage	0.000248***	0.00255***	0.000209**	0.00154***
	(2.59)	(5.28)	(2.28)	(3.43)
Firm & Time Fixed Effects	Yes	Yes	Yes	Yes
N	345779	344792	345779	344792
adj. R^2	0.464	0.148	0.464	0.149

This table reports fixed effect regressions for the period 1990Q1-2015Q4. Variables are winsorized at 1 and 99 percent. Errors are clustered by firm.

* Statistical significance at the 10% level

** Statistical significance at the 5% level

*** Statistical significance at the 1% level

total payout to equity holders or the growth in cash holdings between t and *t-1*.

$$
\begin{aligned}
Use\,of\ financing_{i,t} \;=\; & \beta_0 + \beta_1(LTD/\ TA)_{i,t-1} + +\beta_2(Sales/\ TA_{i,t-1}) + \beta_3(Tobin's\ q)_{i,t-1} + \\
& \beta_4(Net\ Income/\ TA)_{i,t-1} + \beta_5(Market\ Leverage)_{i,t-1} + \beta_6(Log\ Assets)_{i,t-1} + \\
& \beta_7 Post\ Crisis * (LTD/\ TA)_{i,t-1} + \beta_8 Post\ Crisis * (Sales/\ TA)_{i,t-1} + \\
& \beta_9 Post\ Crisis * (Tobin's\ q)_{i,t-1} + \beta_{10} Post\ Crisis * (Net\ Income/\ TA)_{i,t-1} \\
& + \beta_{11} Post\ Crisis * (Market\ Leverage)_{i,t-1} + firm_i + time_t + \sigma_{ijt} \qquad (2)
\end{aligned}
$$

Table 3 reports the estimates from the specification outlined above. Column 1 shows that the relationship between long-term debt to asset ratio and payout has reversed post-crisis. The same is true for the impact on cash growth in column 2. Taken together, the results indicate that firms have utilized new borrowings to manage their capital structure as opposed to investment or increasing cash holdings. In the following section, I test whether a higher share of long-term debt has any impact on the probability of net share repurchases or dividend payments.

5.3 Long-term debt and the likelihood of payouts

The empirical specification is similar to equation 2. The dependent variable, however, is now a dummy variable that takes a value of one if a firm has a positive dollar amount of net share repurchases or dividend payments. Because, a firm with a positive dividend payment in one quarter shows a high propensity towards a positive dividend payment in the next, I estimate the model with both random and fixed effects.[9] Both the Lagrangian Multiplier[10] and the Hausman specification tests[11] reject the null of individual effects being insignificant at the 1% level. The results are reported in Table 4. The results in columns 1 and 3 qualitatively indicate no post-crisis change in relationship between the propensity to pay dividends and the long-term debt to asset ratio. However, as columns 2 and 4 show, a higher long-term debt to asset ratio after the crisis implies a positive likelihood of net share repurchases. The other interesting coefficient is the one on Tobin's Q. The change in sign of the coefficient post-crisis implies that

[9]Given some of the statistical concerns with linear probability models, in appendix A, I report the marginal effects using a fixed effects logit estimation. However, in the fixed effect logit only firms which switch between states are included in the estimation.

[10]Breusch and Pagan, 1980

[11]Hausman, 1978

Table 3: Use of financing - payouts vs. cash

	(1) Log(Real Payout)	(2) Cash Growth
LTD/TA	-1.263***	0.167***
	(-14.28)	(6.91)
PC*LTD/TA	0.459***	-0.134***
	(3.42)	(-4.19)
Sales/TA	0.0435	0.542***
	(0.47)	(15.97)
Tobin's Q	0.119***	0.0437***
	(9.72)	(18.07)
Net income/TA	1.510***	-0.367***
	(6.05)	(-6.39)
Market Leverage	-0.192***	0.00989***
	(-14.82)	(3.78)
Log Assets	0.913***	-0.0514***
	(41.21)	(-11.89)
PC*Sales/TA	-0.0118	-0.139***
	(-0.09)	(-4.15)
PC*Tobin's Q	0.140***	0.0105***
	(6.83)	(2.68)
PC*Net Income/TA	1.903***	-0.0155
	(3.82)	(-0.16)
PC*Market Leverage	-0.105***	-0.00655
	(-3.67)	(-1.45)
Firm & Time Fixed Effects	Yes	Yes
N	138671	353530
adj. R^2	0.764	0.033

This table reports fixed effect regressions for the period 1990Q1-2015Q4. Variables are winsorized at 1 and 99 percent. Errors are clustered by firm.

* Statistical significance at the 10% level

** Statistical significance at the 5% level

*** Statistical significance at the 1% level

firms with more investment opportunities are the ones diverting more resources to dividend payments and share repurchases.

Table 4: Share repurchases or dividends

	Random Effects		Fixed Effects	
	Dividends	Net share repurchase	Dividends	Net share repurchase
Mean of dependent variable	0.238 (1)	0.230 (2)	0.238 (3)	0.230 (4)
LTD/TA	-0.0752***	-0.178***	-0.0803***	-0.207***
	(-20.06)	(-30.05)	(-21.10)	(-31.43)
PC*LTD/TA	-0.0248***	0.0650***	-0.0327***	0.0499***
	(-3.62)	(5.77)	(-4.75)	(4.18)
Sales/TA	0.0398***	-0.00456	0.0166***	-0.0364***
	(9.97)	(-0.81)	(3.97)	(-5.03)
Tobin's Q	-0.000222	-0.0148***	0.000126	-0.0157***
	(-0.64)	(-26.21)	(0.36)	(-25.62)
Net Income/TA	-0.0374***	0.0934***	-0.0416***	0.0882***
	(-4.58)	(7.06)	(-5.05)	(6.17)
Market Leverage	-0.0248***	-0.0170***	-0.0242***	-0.0177***
	(-40.03)	(-17.00)	(-38.56)	(-16.33)
Log Assets	0.0557***	0.0406***	0.0468***	0.0415***
	(87.01)	(55.41)	(65.95)	(33.72)
PC*Sales/TA	0.0346***	0.0552***	0.0242***	0.0249**
	(5.80)	(5.63)	(4.03)	(2.39)
PC*Tobin's Q	0.00700***	0.00727***	0.00879***	0.0121***
	(8.81)	(5.64)	(10.93)	(8.70)
PC*Net Income/TA	0.300***	0.296***	0.307***	0.215***
	(17.29)	(10.43)	(17.56)	(7.10)
PC*Market Leverage	-0.0274***	-0.0109***	-0.0274***	-0.00684***
	(-19.41)	(-4.60)	(-19.30)	(-2.78)
LM test($Chi^2(1)$)	6.1e+06***	2.5e+05***		
Hausman test ($Chi^2(113)$)			1358.96***	943.42***
Firm & Time Fixed Effects	Yes	Yes	Yes	Yes
N	366842	366842	366842	366842

This table reports random and fixed effect regressions for the period 1990Q1-2015Q4. Variables are winsorized at 1 and 99 percent. Errors are clustered by firm.

* Statistical significance at the 10% level

** Statistical significance at the 5% level

*** Statistical significance at the 1% level

6 Conclusions

In this paper, I have analyzed the behavior of U.S. non-financial corporates after the great recession. The literature has explored the impact of monetary policy in response to the financial crisis and it's aftermath on asset prices and on financing constraints of the real sector. However there is little evidence on how firms have reacted to the post-crisis environment. This paper aims to fill this gap and evaluates a number of firm outcomes. I first provide evidence on the increase in real value of balance sheet debt post-crisis and correspondingly firm leverage.

Next, I show that this increase in debt has not translated into higher capital expenditures or growth in PP&E. I provide evidence that firms have rather opted to modify their capital structure via payouts to equity holders. I also find a negative correlation between growth in cash holdings and the long-term debt to asset ratio post-crisis. Finally, the likelihood of a positive net share repurchase is higher for firms with a larger share of long-term debt on their balance sheet after the crisis. Also, firms with greater investment opportunities have chosen higher payouts. This has been primarily driven by net share repurchases post-crisis.

Overall, the results indicate a significant shift in firm behavior after the great recession. An increase in leverage not mirrored by an increase in investment but rather an increase in payouts raises concerns about future earnings and firm solvency in the event of monetary policy tightening. I leave this question of interest rate risk on corporate balance sheets as a result of the increase in long-term debt to future research.

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A Appendix

Table A.1 reports the marginal effects from a fixed effects logit estimation. The effects are consistent with our finding that a higher long-term debt to asset ratio post-crisis increases the likelihood of share repurchases.

Table A.1: Fixed Effects logit regression

	(1) Dividends	(2) Net Share Repurchases
LTD/TA	-0.006***	-0.344***
	(-0.001)	(0.016)
PC*LTD/TA	-0.001**	0.089***
	(0.006)	(0.018)
Sales/TA	0.0003	-0.053***
	(0.000)	(0.012)
Tobin's Q	-0.0002***	-0.032***
	(0.000)	(0.002)
Net income/TA	0.018***	0.319***
	(0.003)	(0.030)
Market Leverage	-0.002***	-0.034***
	(0.000)	(0.002)
Log Assets	0.004***	0.069***
	(0.001)	(0.002)
PC*Sales/TA	-0.008*	0.026*
	(0.000)	(0.015)
PC*Tobin's Q	0.001***	0.019***
	(0.000)	(0.002)
PC*Net Income/TA	0.011***	0.153***
	(0.003)	(0.057)
PC*Market Leverage	-0.002***	-0.006
	(0.000)	(0.004)
Firm & Time Fixed Effects	Yes	Yes
N	138671	334669

This table reports the marginal effects for the fixed effects logit estimation for the period 1990Q1-2015Q4. Standard errors calculated using the delta method. Variables are winsorized at 1 and 99 percent. Errors are clustered by firm.

* Statistical significance at the 10% level

** Statistical significance at the 5% level

*** Statistical significance at the 1% level