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Financial Constraints and U.S. Recessions: How Constrained Firms Invest Differently

Timothy J. Haase[1]

[1] Anisfield School of Business, Ramapo College of New Jersey, Mahwah, New Jersey, USA

Correspondence: Timothy J. Haase, Anisfield School of Business, Ramapo College of New Jersey, Mahwah, New Jersey 07430-1680, USA. E-mail: thaase@ramapo.edu

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Abstract

In this study I utilize existing literature to identify financially constrained firms based on asset size and measure their investment behavior over the course of six U.S. recessions. I utilize a time measurement method to separate the distinct time periods that lead into a recession, contain the NBER (Note 1) peak, as well as the year after. I find that constrained firms have a significantly larger negative change in their fixed investment during the year leading into a NBER Peak as well as the year that contains the NBER Peak. I separate the most recent Great Recession to capture any unique differences in how firms responded to the economic downturn of 2007. I find that constrained firms had no significantly different investment behavior during the recession of 2007 compared to unconstrained firms, but the sample as a whole increased investment spending while coming out of the recession when compared to the previous five. There is nothing uniquely different with how constrained firms behaved during the year prior to, during the peak, and the year following the peak of 2007.

Keywords: financial constraints, fixed investment, recession, financial crisis

1. Introduction

It is understood recessions have adverse effects on numerous economic variables, aggregate demand being an important one for growth. However, until recent decades, little investigation has been made regarding the heterogeneity in which these recessions impact pieces to the economic puzzle. Particularly, studies have shown that there exists a lack of uniformity regarding firms' access to capital. These constraints reverberate through firms' financing endeavors, which is intricate to economic growth. Chirinko (1993) explains that a situation where capital investment is too low causes long run economic growth to significantly fall.

Numerous studies look into the impact of such constraints on inventory investment and how constraints make firms more sensitive to cash flows. Fazzari et al. (1988) determine that investment spending varies with available internal funds and Almeida et al. (2004) show that constrained firms retain more of their cash inflows than unconstrained firms. Gertler and Gilchrist (1994) find that constrained firms sell off inventories while unconstrained firms borrow and purchase inventories when in periods of tight credit; Guariglia (1999) finds constrained firms' inventory investment is more positively influenced by a firm's net worth during recessions; and Kashyap et al. find that constrained firms' inventory investment is similarly more positively influenced by sales. However, there is little empirical work investigating the behavior of firms over the course of recessions with regards to other forms of investment, particularly fixed capital. That is what I investigate.

I find that firms considered being financially constrained exhibit significantly lower fixed investment growth during the year leading to a NBER recession as well as the year during a recession peak. Both results suggest a disproportionate decrease in aggregate demand from firms with unequal access to capital which may be useful for smoothing out operations during times of economic turmoil.

I extend my analysis to incorporate a specific designation to the most recent recession of 2007. With sluggish growth during its recovery and persistently high unemployment, I hypothesize that this recession was unique as compared to past recessions. I find that for the 2007 financial crisis, all firms spend a higher amount on fixed investment during the period following the NBER peak in 2007. In one specification, all firms decrease their capital investment more the year before the 2007 peak. Otherwise there is no other unique difference between the Great Recession of 2007 and any of the prior five.

The rest of this paper is as follows: I outline some existing literature in section 2, I detail my methods in section 3, I explain my data sample in section 4, provide and analyze results in section 5, and section 6 concludes.

2. Literature Review

There is an existing large body of literature linking financial constraints and its impact on firm behavior. The forefather on this is Fazzari, Hubbard and Petersen (1988) who emphasize firm's investment sensitivities to cash flows when all internal funds are exhausted. The argument they create is that firms most likely to face constraints retain more of their income compared to firms who are not constrained. This is represented in data by noting firms with very low, or non-existent, dividend policies. Kaplan and Zingales (1997) re-evaluated Fazzari et al.'s (1988) findings with a linearized likelihood of facing such constraints. Even though this was met with much criticism, I incorporate this due to its popularity in the literature.

Since then numerous studies have come out addressing inventory investment due to its liquid and adjustable nature. Kashyap, Lamont and Stein (1994) discuss how firms with no bond market access are severely liquidity constrained when it comes to inventory investment. Gertler and Gilchrist (1994) find that firms with smaller asset amounts sell off significantly more inventories during bad economic periods. A bulk of the focus has been on periods of tight credit, yet little is shown for the whole picture of a recession: that being the before, middle, and after.

In another study, Rajan and Zingales (1998) discuss how industrial sectors that rely on external finance develop faster when financial markets are developed. I consider this by using one country with a highly developed financial market in order to see if there exist differences in the recovery stage after a recession. In a similar study, Braun and Larrain (2005) show that growth in production is lower for industries that depend on outside financing.

Laeven, Klingebiel and Kroszner (2002) investigate how financial crises impact industry growth. They use multiple countries in their analysis, but focus on industries that are more dependent on outside capital. I utilize their methodology by looking into the pre-crisis, during crisis, and post-crisis time periods. However, I narrow my view down to firm level, not at industry levels. Their findings show that industries reliant on outside capital contract in their value added. They do not separate firms within industries to account for whether constraints exist at the firm level. That is what I investigate.

I also explore what differences exist regarding fixed investment between the financial crisis of 2007 and other recessions. This is motivated by Reinhart and Rogoff (2008). They outline certain measures that are indicative of financial crises and how the United States differed during the 2007 episode. Particularly, they noted that countries experiencing a crisis exhibit certain trends: housing prices increase rapidly in years prior to the onset of a financial crisis but decline immediately prior to the crisis occurring; equity prices (measured by using a benchmark index) fall prior to a crisis; and the current account (as a percentage of GDP) remains steadily negative. They provide evidence that the United States did follow these trends, however more severely. The run-up in housing prices was much higher and steadily increased up until the crisis hit in 2007, real equity prices (measured by the S&P 500) consistently increased instead of declining, and the current account accounted for a much larger, negative percentage of GDP. Reinhart and Rogoff's (2008) study did come out very early on in the crisis so the comparison between various crises is limited; however their work suggests that the financial crisis of 2007 may in fact be uniquely different.

I combine pieces of this literature to investigate, at the firm level, how firms classified as financially constrained behave in their investment spending. I use the time frames outlined by Laeven et al (2002) as motivation to construct an intervention analysis (see Enders, 1995) while accounting for firms being financial constrained or not based on their asset size.

3. Method

I employ a time study regression motivated my Laeven, Klingebiel and Kroszer (2002) to measure the difference in investment behavior of firms that are heterogeneous in their access to outside capital. The primary difference between my study and theirs is that they look at the impact of industry, country and financial measures on growth in value whereas I look to measure how capital expenditures differ over the course of business cycles. I combine this with measures of financial constraints that are outlined in Gertler and Gilchrist (1994), Almeida, Campello and Weisbach (2004) and Kaplan and Zingales (1997). These authors have shown that financially constrained firms contract in inventories during recessions, are sensitive to their cash flows regarding their cash holdings and develop a likelihood measure of facing such constraints. I employ these proxies as established classifications of such firms that face constraints.

Laeven et al. (2002) develop a model where they show that sectors that are dependent on external finance experience a contraction in value added as provided by the Industrial Statistical Yearbook. I take an alternate route and focus on not value added but spending behavior that translates towards aggregate demand, particularly fixed investment. They measure growth throughout a crisis period by defining the pre-crisis period, crisis period, and post-crisis period. Specifically, they estimate their model for three time periods (Note 2) surrounding a crisis for countries having experienced a crisis. I expand this idea into a continuous stream of periods incorporating multiple recessions which results in three periods: the pre-recession peak (year prior to a NBER peak), recession peak (year of a NBER peak), and post-recession peak (year after a NBER peak). I also only focus on the United States for continuity in the data.

My time study is an expansion of intervention analysis as outlined by Enders (1995). I take into consideration every U.S. recession since November 1973: a total of six recessions. Upon compiling my data, I result in combining these recessions by focusing on the year of a defined NBER recession peak, the year before, and the year after in order to capture the timeframe of leading into a recession and immediately after.

I first estimate the following model with:

$$Gr(Capx)= \beta_0+\beta_1 PreRec+\beta_2 PostRec+\beta_3 FCPreRec+\beta_4 FCRec+\beta_5 FCPostRec+\varepsilon \quad (1)$$

where *Gr(CAPx)* is the growth in capital expenditures for each firm (calculated as the log difference between years) scaled by the producer price index for non-residential fixed investment. The timing I employ differs from the format used by Laeven et al. (2002). In their setup they incorporate periods of time before, during, and after a recession that would overlap into other recessions for the US data I am testing. The method in which I define the indicators is as such: *PreRec* is year prior to an NBER recession peak, *PostRec* is the year following a recession peak (leaving the constant as the base dummy variable for the actual recession year). *FCPreRec* is the interaction variable for the year leading into a recession for financially constrained firms, *FCRec* is a similar interaction term for constrained firms during the year of the NBER peak, and *FCPostRec* the interaction term for constrained firms following the peak. This captures the behavior leading into an economic downturn and the immediate before/after.

The structural difference is that I use growth in investment year over year whereas the previous authors used growth as the change between the pre-crisis to crisis, and crisis to post-crisis periods. This creates a continuous series that encompasses multiple recessions. Fazzari and Petersen (1993) discuss in detail how firms can offset shocks to investment by smoothing investment through adjusting net working capital. I conduct this test to identify if, even knowing this investment smoothing is possible, firms in general as well as constrained still have significant differences in their fixed investment. I further incorporate variables distinguishing the 2007 NBER peak to identify any unique results different from other past recessions for both the constrained and unconstrained firm sample.

4. Data

The firm data I use follows the methodology outlined in Almeida, Campello and Weisbach (2004). I gather all data for manufacturing firms of SIC (Note 3) codes 2000–3999 from 1/1970 to 1/2012 from Compustat. I split my sample into its recession periods. This includes 1972–1974 (1973 NBER Peak); 1979–1981 (1980 NBER Peak); 1980–1982 (1981 NBER Peak); 1989–1991 (1990 NBER Peak); 2000–2002 (2001 NBER Peak); and 2006–2008 (2007 NBER Peak). This separates the recessions along with their prior and post years from other time periods between recessions.

I remove observations with asset growth over 100% to account for merger activity when cash holdings are greater than assets to account for reporting anomalies (motivated my Almeida, Campello, & Weisbach, 2004). I then separate my firm data using asset size as described by Almeida, Campello and Weisbach (2004). For each year prior to a NBER peak, I rank firms by taking the natural log of assets. I use the bottom three deciles for each period as my sample of constrained firms. The reasoning is that firms with different asset sizes may be subject to economies of scale where larger firms can more easily engage in financing due to their net worth (see Gertler & Gilchrist, 1994). The top three deciles are designated as the unconstrained firms. I classify firms as constrained or unconstrained based on their asset size for the year prior to a recession only. I then use their investment data for the NBER peak period as well as the year following. Ultimately I attempt to consider how the behavior of firms progresses through this three year time window so no firm is allowed to change their label as constrained or unconstrained during a recession. The resulting number of firm observations for all pre-recession periods is 7,736. This does not imply that there are 7,736 unique firms; it means that when all six recessions are taken into account, the number of firms in both categories for each recession summed equals this amount. Firms are

allowed to be considered in multiple recessions. One limitation is that during these time periods some firms go bankrupt or are purchased by surviving firms. It is impossible to identify this from the data. A second limitation is that this method omits any new firms that enter during the recession periods. I only focus on existing firms immediately before a peak.

Table 1 reveals a few distinct characteristics of the data. First, the total sample size is 21,673 firm-years indicating that some firms do disappear throughout these recessions. There are a total of 10,484 financially constrained firm-year observations and 11,189 unconstrained firm-year observations. The difference in the sample sizes suggest that more constrained firms failed or were acquired during these recession periods. If each of the originating 7,736 pre-recession observations existed across the three year window, there should be 23,208 total observations. This implies that 1,535 observations disappeared across the six recessions.

Table 1. Summary statistics

Firm Gr(Capital Expenditures)	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Financially Constrained	10484	-0.0425524	1.208038	-6.319903	6.680754
Financially Unconstrained	11189	-0.0190872	0.5070605	-8.938555	8.041196
Firm Gr(Pre-Recession)					
Financially Constrained	3868	-0.0131518	1.231115	-5.769069	6.590231
Financially Unconstrained	3868	0.0597385	0.4764485	-2.654752	5.501918

Note. The Pre-Recession summary statistics are for growth rates in fixed investment during the year prior to a NBER peak.

Second, the average growth rate for constrained firms is noticeably lower than unconstrained firms and negative. This would normally cause alarm because firms cannot sustain negative growth rates; however, I am only considering the three year windows surrounding NBER peaks which are considerably worse times for most firms. The constrained sample has an average growth rate of -4.255% per year and the unconstrained sample is closer to 0 at -1.909% per year. I also look at the averages for the pre-recession year. For the year leading into a NBER peak, constrained firms are decreasing their capital expenditures at -1.32% where unconstrained firms are still increasing their investment at 5.97%.

Third, the standard deviation in growth rates is larger for the constrained firms at 1.208 (1.231 for pre-recession years) where the unconstrained firms have a standard deviation of 0.507 (0.476 for pre-recession years). I hypothesize that firms facing constraints may be more sensitive to economic fluctuations and I expect their variation to be larger in their business activities.

5. Discussion of Results

I first estimate the equation as outlined in section 3 which considers all six recessions without separating the latest 2007 recession. Table 2 shows the results (coefficients), however many of the coefficients require additional steps for interpretation. The constant represents the recession year for large firms so each coefficient is relative to this value. Constrained firms require an additional modification relative to the coefficients of the unconstrained firms. These modified coefficients are presented in Table 3 (interpreted change in capital expenditure growth). The coefficients for the unconstrained firms are significant only for the pre-recession years and the post-recession years. Unconstrained firms have a coefficient of 0.0516 for their capital expenditures in the year prior to a peak. This is significant at the 1% level. When adjusted for the reference period, the unconstrained firms increase their capital expenditures by 5.38% before the recession peak. These firms do not significantly alter their investment planning during the year of a recession peak; they continue to invest as they did before the peak. However, the year following the recession peak constrained firms' capital expenditures have a coefficient of -0.1215 which is a 11.93% decrease in investment spending which is significant at the 1% level.

The financially constrained firms differ in that they exhibit negative growth both in the year leading into a recession and during. They do not significantly differ in the year following a recession implying a consistent downward trend. Constrained firms have a coefficient for the pre-recession year of -0.0645 which is significant at the 1% level indicating that they decrease their overall fixed investment expenditures by -1.07%. This ultimately leaves them in a shrinking mode. During the year of a NBER peak, constrained firms further decrease their investment by -3.24% compared to unconstrained firms. The coefficient is -0.0346 and considering that unconstrained firms do not significantly change during the recession peak year this indicates that constrained firms are decreasing their investments even more during this time period. This coefficient is significant at the 10% level.

Equation (2) differs such that I remove the financially constrained firms' identification but instead considers separately identifying the 2007 recession. The coefficients for the pre-recession years except for 2007 and the post-recession years except for 2007 are significant. The entire sample exhibits a growth in capital expenditures during the pre-recession year of 2.87% (coefficient is 0.0464) and is significant at the 1% level. The whole sample decreases their investment spending at a rate of -11.13% during the year following a recession peak (coefficient is -0.0953) and is also significant at the 1% level. There is no significant change in investment spending during a recession peak year or during any of the years surrounding the Great Recession of 2007. This equation does not indicate any differences for constrained or unconstrained firms.

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Table 2. Regression results

Gr(Capital Expenditures)	(1)	(2)	(3)	(4)
PreRec	0.0516***	0.0464***	0.0703***	0.0719***
	(0.019)	(0.016)	(0.022)	(0.022)
	0.006	0.004	0.001	0.001
PostRec	-0.1215***	-0.0953***	-0.1304***	-0.1288***
	(0.019)	(0.016)	(0.022)	(0.023)
	0.000	0.000	0.000	0.000
FCPreRec	-0.0645***		-0.0789***	-0.0789***
	(0.021)		(0.022)	(0.022)
	0.002		0.000	0.000
FCRec	-0.0346*		-0.0322*	-0.0289
	(0.018)		(0.019)	(0.023)
	0.058		0.098	0.207
FCPostRec	0.0286		0.0419*	0.0419*
	(0.023)		(0.024)	(0.024)
	0.206		0.077	0.077
Pre2007		-0.0474	-0.0707**	-0.0734
		(0.033)	(0.036)	(0.046)
		0.145	0.047	0.110
Rec2007		0.0277	0.0278	0.0136
		(0.034)	(0.034)	(0.047)
		0.413	0.412	0.773
Post2007		0.0339	0.0681*	0.0998**
		(0.035)	(0.038)	(0.048)
		0.336	0.073	0.037
FCPre2007				0.0020
				(0.065)
				0.975
FC2007				0.0291
				(0.068)
				0.667
FCPost2007				-0.0729
				(0.071)
				0.301
Constant	0.0022	-0.0177	-0.0021	-0.0037
	(0.014)	(0.011)	(0.015)	(0.016)

	0.872	0.123	0.887	0.817
Observations	21,673	21,673	21,673	21,673
R-squared	0.004	0.004	0.005	0.005
F	18.59	16.52	12.66	9.332

Note. Standard errors in parentheses, p-values below: *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Interpretation of coefficients

		Growth in Capital Expenditures		
		Pre-Peak	Peak	Post-Peak
All cycles	**Big firms**	0.0538***	0.0022	-0.1193***
	Small firms	-0.0107***	-0.0324*	-0.0907
All firms	**Not-2007**	0.0287***	-0.0177	-0.113***
	2007	0.0761	0.01	-0.0791
Not 2007	**Big firms**	0.0682***	-0.0037	-0.1325***
	Small firms	-0.0107***	-0.0359*	-0.0906*
2007	**Big firms**	-0.0598	0.0136	0.1134
	Small firms	-0.0578	0.0427	0.0405

Note. The values presented here are the combined effects of the coefficients from Table 2. The time period of comparison is the NBER peak year as represented by the constant. These values are calculated by combining the coefficients from regression (1), (2), and (4) with their appropriate references (e.g. All Cycles for Small firms is the coefficient from FCPreRec + PreRec + Constant from equation (1)).

The financially constrained firms differ in that they exhibit negative growth both in the year leading into a recession and during. They do not significantly differ in the year following a recession implying a consistent downward trend. Constrained firms have a coefficient for the pre-recession year of -0.0645 which is significant at the 1% level indicating that they decrease their overall fixed investment expenditures by -1.07%. This ultimately leaves them in a shrinking mode. During the year of a NBER peak, constrained firms further decrease their investment by -3.24% compared to unconstrained firms. The coefficient is -0.0346 and considering that unconstrained firms do not significantly change during the recession peak year this indicates that constrained firms are decreasing their investments even more during this time period. This coefficient is significant at the 10% level.

Equation (2) differs such that I remove the financially constrained firms' identification but instead considers separately identifying the 2007 recession. The coefficients for the pre-recession years except for 2007 and the post-recession years except for 2007 are significant. The entire sample exhibits a growth in capital expenditures during the pre-recession year of 2.87% (coefficient is 0.0464) and is significant at the 1% level. The whole sample decreases their investment spending at a rate of -11.13% during the year following a recession peak (coefficient is -0.0953) and is also significant at the 1% level. There is no significant change in investment spending during a recession peak year or during any of the years surrounding the Great Recession of 2007. This equation does not indicate any differences for constrained or unconstrained firms.

Equation (3) is a combination of separating constrained firms from unconstrained firms for the five recessions prior to the NBER peak of 2007, separate the recession of 2007, and distinguish how unconstrained firms behaved differently when compared to the unconstrained firms. First, the unconstrained firms exhibit similar movements in their investment spending during pre-recession and post-recession years prior to 2007. The coefficient for pre-recession years is 0.0719 and is significant at the 1% level indicating a growth in capital expenditures of 6.82% leading into a NBER peak year. Again, there is no significant investment change during a peak year. They do decrease their investments by -13.25% (coefficient is -0.1288) during the year following a NBER peak and this is also significant at the 1% level.

The financially constrained firms exhibit behavior similar in regression (1) for the pre-recession year excluding the 2007 recession. The coefficients for pre-recession and post-recession years are -0.0789 and 0.0419, respectively. They are both significant- pre-recession at the 1% level and post-recession at 10%. They decrease spending into a recession at -1.07% more than unconstrained firms and further decrease their fixed investment

-9.06% faster following a peak. This slowdown after the peak is smaller in magnitude than the unconstrained firms. They do not have any significant change in capital expenditures during a peak year implying that they maintain the -1.07% decrease from the pre-recession year through the recession peak year.

The coefficients for all considerable years involving the great recession of 2007 become insignificant for all but one; this includes the three variables for the 2007 recession by itself as well as the three variables for the 2007 recession separating the constrained firms from the unconstrained firms. The only significant coefficient is for the post-2007 recession for the unconstrained firm sample with a value of .0998. This is significant at the 5% level. Even though the coefficient is positive, it is relative to the post-recession coefficient for recessions other than 2007. This implies that firms' investment decreased at a rate of -3.27% following the 2007 peak compared to the past five recessions. Based on magnitude, this is still negative growth for unconstrained firms but not as severe as the post-recession behavior from other recessions. This indicates that the investment slowdown following the 2007 recession was not as large in comparison. The lack of significance in all the other 2007 coefficients suggests that unconstrained firms did not behave differently leading into the 2007 recession or during it. It also shows that financially constrained firms do not behave any differently around the 2007 peak compared to the unconstrained firms. Since constrained firms have exhibited different behavior when addressing other recessions, this leads me to believe that the Great Recession of 2007 is not entirely unique from past recessions regarding firms' capital expenditures.

6. Conclusion

In time periods surrounding economic downturns, firms considered to be financially constrained have a significantly lower amount of growth in their fixed investment. I find that when looking at the time period leading into a NBER peak, firms that are constrained do have significantly lower levels of fixed investment growth when compared to unconstrained counterparts. It is known that production and investment fall during recessions, but this evidence shows that throughout the recessions constrained firms lose more in investment. When expanding the time horizon to incorporate the year following a NBER peak, constrained firms have unique differences such that they decrease their investment by a smaller magnitude compared to unconstrained firms. This is still negative growth; however a smaller loss compared to unconstrained firms.

The incorporation of the Great Recession of 2007 shows one unique result in investment spending. This is that large firms exhibit a less harsh economic slowdown following the recession peak of 2007 compared to past recessions. Constrained firms, however, show no difference in their capital expenditures compared to unconstrained firms.

Past analyses have incorporated conclusions regarding the quality of financial institutions and their impact on constrained industries. This is not an issue with this study because I focus on firms within the manufacturing sector of one well established financial system. The sample looked at firm behavior separated by their individual asset values. By focusing only on the U.S., I have controlled for well defined financial institutions and can look at the behavior of firms around business cycle peaks. Ultimately, I add to the literature of financial constraints by measuring the difference in ways in which firms influence aggregate demand, and ultimately business cycles.

References

Almeida, H., Murillo, C., & Michael, S. W. (2004). The Cash Flow Sensitivity of Cash. *Journal of Finance, 59*(4), 1777–1804. http://dx.doi.org/10.1111/j.1540-6261.2004.00679.x

Braun, M., & Borja, L. (2005). Finance and the Business Cycle: International, Inter-Industry Evidence. *Journal of Finance, 60*(3), 1097–1127.

Chirinko, R. S. (1993). Business Fixed Investment Spending: Modeling Strategies, Empirical Results, and Policy Implications. *Journal of Economic Literature, 31*(4), 1875–1911.

Enders, W. (1995). *Applied Econometric Time Series*. John Wiley & Sons, Inc.

Fazzari, S. R., Glenn, H., & Bruce, P. (1988). Financing Constraints and Corporate Investment. *Brookings Papers on Economic Activity*, 141–205. http://dx.doi.org/10.2307/2534426

Fink, J. (2011). Industry Sector Seasonality: Protect Yourself from the Summer Swoon. Retrieved from http://www.investingdaily.com/11247

Gertler, M., & Simon, G. (1994). Monetary Policy, Business Cycles and the Behavior of Small Manufacturing Firms. *Quarterly Journal of Economics, 109*(2), 309–340. http://dx.doi.org/10.2307/2118465

Guariglia, A. (1999). The Effects of Financial Constraints on Inventory Investment: Evidence from a Panel of UK Firms. *Economica, 66*(261). http://dx.doi.org/10.1111/1468-0335.00155

Kaplan, S., & Luigi, Z. (1997). Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints? *Quarterly Journal of Economics, 112*, 169–215. http://dx.doi.org/10.1162/003355397555163

Kashyap, A., Owen, L., & Jeremy, S. (1994). Credit Conditions and the Cyclical Behavior of Inventories. *Quarterly Journal of Economics, 109*, 565–592. http://dx.doi.org/10.2307/2118414

Laeven, L., Daniela, K., & Randy, K. (2002). *Financial Crises, Financial Dependence, and Industry Growth*. World Bank Policy Research Working Paper 2855.

Lamont, O., Christopher, P., & Jesus, S. R. (n.d.). Financial Constraints and Stock Returns. *Review of Financial Studies, 14*(2), 529–554. http://dx.doi.org/10.1093/rfs/14.2.529

Oliner, S. D., & Glennm D. R. (1996). Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance: Comment. *American Economic Review, 86*(1), 300–309.

Reinhart, C. M., & Kenneth, S. R. (2008). Is the 2007 US Subprime Financial Crisis so Different? An International Historical Comparison. *American Economic Review, 98*(2), 339–344. http://dx.doi.org/10.1257/aer.98.2.339

Notes

Note 1. National Bureau of Economic Research.

Note 2. Time period T reflects the onset of a crisis. Laeven et al (2002) define the pre-crisis, crisis, and post-crisis periods as [T-8:T-4],[T-1:T+1], and [T+4: T+8] respectively.

Note 3. Standard Industry Classification.