Bank Commitment Relationships, Cash Flow Constraints, and Liquidity Management

Donald P. Morgan[1]
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ABSTRACT

Evidence in this paper suggests that close banking relationships--a loan commitment in particular, relax cash flow and cash management constraints on firms. Given firms' prospects (Q), the investment and cash flow correlation is substantially lower when firms have a bank loan commitment. The difference in cash flow sensitivity reflects differences in firms' cash management practices in the face of cash flow shocks. Firms with a commitment simply run down their stocks of cash (or borrow more) when their cash flow falls but their investment prospects remain strong. The different investment-cash flow sensitivities and cash management practices suggest that the firms with a bank commitment relationship are less financially constrained.

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Key words: Loan commitments, bank relationship, cash flow constraint, cash management

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[1] Research Department, Federal Reserve Bank of New York, 33 Liberty Street, NY, NY 10045. Don.Morgan@ny.frb.org. 212.720.6572. 212.720.8363 (Fax). I began this paper at the Federal Reserve Bank of Kansas City and completed it at the Federal Reserve Bank of New York. The opinions herein are my own and do not necessarily reflect those of the Federal Reserve Bank System I thank Anil Kashyap, Herb Baer, Steve Fazzari, Glen Hubbard, Simon Gilchrist, Peter Simon, Joong Shin, Clifford Smith, a referee, and seminar participants at the University of Colorado School of Business for helpful comments.

"Get to Know Your Banker"
Life's Little Instruction Book (1991)

1. Introduction

Folk wisdom and theory alike suggest something special about the relationship between banks and their borrowers. According to the theory, monitoring by a bank is supposed to smooth the informational frictions that might otherwise restrict the flow of external funds to a firm. Firms that forge close ties to their banker should find funds more cheaply and readily available than those that are unwilling or unable to maintain a close banking relationship.

Evidence to date mostly supports that bank relationships are valuable, or value-signaling. Event studies find that investors bid up share prices of firms after the firms receive a bank loan agreement (James 1987) or have their agreement renewed (Lumer and McConnel 1989). Other studies consider whether a close banking relationship--by mitigating informational frictions--tightens or loosens cash flow constraints on firms' investment spending. Fazzari et al (1988) use a positive correlation between investment and cashflow--given prospects--as a proxy for the degree of financial constraint on firms' investment spending.[2] Among Japanese firms, for example, Hoshi et al. (1991) find that those affiliated with one of the financial-industrial conglomerates--the Keiretsu--are less cash flow constrained without a Keiretsu affiliation. Banking relationship in a Japanese Keiretsu is much closer than in the U.S., however, so it is not clear whether a U.S. banking relationship has the same effect as in Japan. Indeed, the evidence here suggests that ties between banks and firms that are *too* close amount to handcuffs. Houston and James (1995) find that the investment-cash flow correlation is higher for firms that depend on a single bank for funds. Firms with multiple bank relationships, or

[2] Kaplan and Zingales (1997) challenge this interpretation. See Fazzari et al. (2000) for reply. The KZ objections are considered in more detail later in the paper

with access to bond markets, appear less cash-flow constrained by comparison. Their results suggest that an exclusive relationship between a bank and firm may enable the bank to extract monopoly informational rents from the firm. Less bank-dependent firms (with access to multiple banks or the bond market) can play lenders off of one another, thereby avoiding this holdup problem.

What we still do not know--and the question in this paper-- is whether a single banking relationship in the U.S. relaxes or tightens these cash flow constraints.[3] A bank relationship here is simply a loan commitment--a bank line of credit in other words. There is a small literature emphasizing the contractual advantages of a commitment contract over an ordinary loan the idea here is simpler than that. A commitment represents a relationship, a promise given by the bank and earned by the firm. That aspect of the relationship, to the extent it ameliorates the frictions that would otherwise arise, should free those cash flow constraints. Berger and Udell (1995) also emphasize the relationship implicit in a commitment versus a transaction-based loan from a bank.[4]

Information on firms' commitment status was collected from reading the annual reports (form 10-K) for about 150 small, traded manufacturing firms listed on Compustat. The primary finding is that investment-cash flow correlation is only about half as large when firms have a commitment. A commitment also affects the firm's cash and debt management practices. In contrast to other literature, the stock of cash and debt are treated here as endogenous variables since firms manage these stocks in response to current or future constraints. The firms without a commitment do indeed hold more cash and they also borrow less than the firms with a commitment. The firms without a commitment also manage these stocks very differently in response to fluctuations in cash flow. Holding the firm's prospects constant, the firms *with* a

[3] All the firms in the Houston and James (1995) sample had a least one bank relationship.

[4] In their study of small firms, the firms that had a bank line of credit paid lower rates for their loans than the firms that used "transaction" based, or spot market, credit from banks.

commitment are more inclined to run down their stock of cash, or to run up their debt, when their cash flow falls. The firms without a commitment guard their stocks of cash and debt more carefully in the face of cash flow shocks. The more flexible cash and debt management by the firms with a commitment helps explain why their investment spending is less sensitive to cash flow. The firms without the commitments seem more constrained.[5]

2. Information Frictions, Commitment Contracts, and Cash flow Constraints

"Frictions" here refers to any of the asymmetric information or agency problems, such as adverse selection and moral hazard, that can gum up the flow of funds to a firm. Absent any such problems, external funds would flow freely into the firm, and the cost of the funds would be the same as the opportunity cost of internally generated funds. Admit the frictions, and external funds become more costly at the margin than internal funds, and in some cases, firms may be rationed.

Much of the recent literature on banking and intermediation considers how contracts and financial structure are designed to minimize such frictions. Debt tends to dominate equity when monitoring the return on projects is costly (Townsend 1979). Delegating this monitoring to a bank or some other intermediary dominates direct finance since savers need not all monitor the bank or its borrowers (Diamond 1983, Williamson 1987). A small branch of this literature focuses specifically on bank loan commitment.[6] Commitment contracts written in advance of some random event (e.g., a shock to cash flow) are shown to reduce the monitoring or other agency costs that would prevail under spot market lending. Lower agency costs reduce the cost of funds to firms (at the margin), and increase the maximum possible loan available to the firm.

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[5] Petersen and Rajan (1994) show that firms with a bank relationship are able to avoid more expensive trade credit.

[6] See Morgan (1992) and references therein.

Kashyap et al (1998) argue that by commitment lending and deposit taking, synergies leave banks ideally suited to the commitment business.

If commitment relationships are so valuable, why would firms ever go without them? Large firms rarely do. In Houston and James' (1995) random sample of Compustat firms, all of the firms appeared to have at least one bank relationship, and over half had multiple relationships. When it comes to smaller firms, however, banks may have a fear of commitment. Commitments can bind banks to lend unless the firm violates more or less observable adverse change clauses. These covenants give the bank an exit, but the events must be verifiable by a third party, a judge or jury in some cases. The risk of non-contractible events may be higher with smaller, lesser known firms, which could raise the cost of commitment to them. Banks may prefer to evaluate the credit risk of such firms as the need for credit arises, rather than giving them the *carte blanche* implicit in commitments.

Commitments are, in fact, less common among smaller, riskier firms. Only 27 percent of the firms in National Survey of Small Business Finance with fewer than 50 employees had a commitment; 60 percent of the larger firms had one (Elliehausen and Wolken 1990). Default rates are lower on loans made under commitment (Avery and Berger 1991), suggesting more commitment usage by relatively safer firms.

Firms with a commitment relationship may be less cash flow-constrained for several reasons. The contract itself may, for the reasons just noted, increase the availability of funds to the firm (compared to if the firm borrowed on the spot from a bank). A commitment may also buy firms access to other sources of funds. Commercial paper issuers typically need a backup credit facility from a bank (Calomiris). A commitment from a bank, and the relationship implicit, may signal a firms' creditworthiness to other investors, bond and stock holders for example. Commitments may be more important as a signal than as a source of liquidity. It is not usual for firms to arrange a new facility when they feel they have been unjustly battered

by the market.[7] Observing that larger firms may never actually take down a loan under their commitment, Fama (1980) called the fees firms pay for commitments "monitoring fees." James (1984), finding that firms' share value rises when they receive a commitment, supports this signaling interpretation.

3. Regression Strategy and Data

To test whether a commitment relationship relaxes cash flow constraints on firms' investment, we estimate a reduced form of an investment regression relating a firm's annual investment expenditures to measures of the firm's prospects and their cash flow. Absent any informational asymmetry between the firm and market, *Q* should be a sufficient statistic for investment while cash flow should be irrelevant. A finding that cash flow *does* matter, given Q, is taken as evidence of a cash flow constraint. By constraint, we mean that the drop in cash flow causes the firm to pass over, postpone, or slow its expenditures on potentially profitable investments. To test whether a bank relationship loosens the cash flow constraint, we test whether the investment-cash flow link is weaker when firms have a bank loan commitment.

Kaplan and Zingales (1998) challenge the investment-cash flow tests of financing constraints. All along, researchers in this field have equated the size of the investment-cash flow correlation with the degree of frictions facing a firm. The more severe the frictions, the higher the premium on external funds, and so--it was assumed--the higher the sensitivity of investment to cash flow. It turns out that, as a theoretical matter, the investment-cash flow relationship is not necessarily a strictly increasing function of the premium. A higher increase the investment-cash flow correlation only if a firms' production technology and the function describing its cost of funds satisfy certain conditions on their second and third derivatives. We assume those conditions hold.

[7] McDonnel Douglass' corporate treasurer noted "symbolic importance" of its bank loan commitment when the market started to doubt the firms credit quality (Wall Street Journal, 10/7/91, A3). When Westinghouse tapped its credit line after the commercial paper market grew nervous about buying the companies' paper, analysts noted "banks were standing behind" the concern (WSJ, 10/14/91).

While merely assuming the necessary conditions is not completely satisfying, it is worth noting that there is considerable empirical support for this assumption. In fact, firms that are expected *a priori* to face more severe frictions--firms without a bond rating, for example, or firms that retain more of their internal funds, typically do exhibit a higher correlation between their investment and their cash flow. Given this empirical support, and lacking any feasible alternative for identifying the cash flow constraints on firm, we stick with the investment-cash flow paradigm.[8]

3.1 Data

All of the data are from *Compustat* except for Q, which comes from ValueLine, and the commitment information, which I collected from firms' annual reports (form 10K). All publicly traded firms are required by the Securities and Exchange Commission (SEC) to file these reports, and in the financial footnotes to their reports, firms are supposed to describe the terms of their loan agreements. Reporting practices were generally thorough. Firms would describe the amount available under the agreement, the fees, and the restrictions thereto. Firms would obviously not volunteer the fact that they did *not* have a commitment, since a commitment is considered desirable by the market (James 1985). Thus, if a firm did not mention a commitment in its footnotes, I inferred it did not have a commitment.[9]

The initial sample comprised the smallest 150 manufacturing firms (as measured by capital stocks) in the Compustat Industrial database over 1980-84 period. Overall sample size was determined by time and budget constraints; purchasing annual reports was expensive and collecting information from them on commitments was time consuming. Smaller firms were selected to ensure a sufficient number without a bank

[8] Euler equation methods are not feasible with the data here, given the short time-series dimension of our panel.

[9] Regulation S-X of the Code of Federal Regulation (1990, p. 222) requires firms to report the "terms… of commitments." It was usually clear when firms did or did not have a commitment. Excluding the few ambiguous cases did not change our results.

loan commitment; all firms beyond a certain size appear to have at least one bank credit commitment (James and Houston 1995). Though historic, the macroeconomic shocks over the 1980-84 period seemed to offer more exogenous variation in commitment status across firms. The monetary policy shock in 1989 (and its aftermath) and the credit controls in 1980 may have reduced the supply of commitments quite apart from any variation in the firms' demand. More about potential endogeneity problems later.

Nineteen firms had commitment some years over the sample period, but not every year. Accordingly, our observations are *firm-years:* firm *I* in year *t.* Observing at the firm-year level is probably preferable as it allows the possibility that the cash flow constraint to switch off and on.[10] For those who prefer firm observations, however, it is shown that the main results are qualitatively unchanged when the firms whose commitment status changed are excluded from the sample.

After excluding fifteen firms with missing or suspicious data, the final sample numbered 135 firms over 1980-84: 675 firm-years. Of those, 592 firm-years had a bank loan commitment and 83 did not. Summary statistics for these two sets of firm-years are in Table 1. Both medians and meaThe distributions of some variables were somewhat skewed, so the median was reported as well as mean.

While all of these firms were small (for publicly traded manufacturers), the firm-years without commitments were significantly smaller than those with a commitment. The former were smaller whether measured by market capitalization, or by median sales. Investment, the dependent variable in the regressions to follow, was not significantly different for the two sets. Investment prospects, however, seem much more promising for the firm-years without a commitment; the firm-years wihtout commitments had considerably higher *Q* and returns on sales. Cash flow was also higher at the firm-years without a commitment, and these firm-years stored more of their liquidity as stocks

[10] Kaplan and Zingles (1998) also objected to the assumption implicit in the cash flow constraint literature that firms are were either always constrained, or never constrained.

of cash and securities. The firm-years without a commitment exhibited other tell-tale signs of constraints. They borrowed less (relative to their capital stock) and retained more of their earnings.

The differences between returns on sales of firm-years in Table 1 raise obvious questions. Given their higher average *Q* for the firm-years with a commitment, why was their investment rate no higher than their counterparts with a commitment? Why did the firm-years with a commitment hold such large stocks of cash and securities? Did they hoard liquidity because they were without a commitment, or did plentiful liquidity obviate the need for a commitment? Clearly, the summary statistics are consistent with either story, so we need a regression equation. If firms without a commitment did not need one, or if the ties implicit in a commitment tighten cash flow constraints, firms should appear more constrained with a commitment than without.

4. Investment and Cash flow

The regression equation is

$$\frac{I_{it}}{K_{it-1}} = a_i + bQ_{it} + \frac{gCf_{it}}{K_{it-1}} + (a + \frac{dCf_{it}}{K_{it-1}})Commitment_{it} + m_{it}$$

The dependent variable, I_{it}/K_{it-1}, is investment in property, plant, and equipment (including acquisitions) by firm *I* in over year *t*, scaled by the beginning-of-year stock of plant and equipment. The average rate of investment is allowed to vary across firms and years via $_i$ and $_t$,. Instead of estimating those fixed differences, we eliminate them by "demeaning" the data.[11] The primary measure of a firm's prospects is Tobin's *Q*: the market value of its capital stock divided by the replacement value.[12] Cf_{it} is cash flow over the period, defined as income after all expenses, but before dividends and

[11] In other words, all the variables are converted to deviations from average across firms and years.

[12] More precisely, Q equals the market value of firm's shares (common and preferred) at the beginning of the year plus the book value of short-term and long-term debt minus the market value of inventories, all divided by the replacement value of firm's capital stock at the beginning of the period. See the appendix to Fazzari, Hubbard, and Petersen (1988) for details on the construction of *Q*. I thank Steve Fazzari for providing me the *Q* series to me.

depreciation. $Commitment_{it}$ is a dummy variable equal to one if firm *I* had a commitment in year *t* and equal to zero if not. The average rate of investment is allowed to vary with *Commitment*, via , but the focus is on the interaction term: *Commitment x Cash flow*. A negative coefficient on this term means investment spending is less sensitive to cash flow when firms have a commitment, which we take as evidence that a bank loan commitment loosens the cash flow constraint.

The regression results are reported in Table 2. The basic investment regression (without controlling for commitment status) yields sensible estimates (column 1). Investment is positively related to *Q*, implying that firms invest at a higher rate over the year if they start the year with better prospects. *Cash flow* matters as well, however. Given *Q*, investment increases about 0.3 for every extra dollar of cash flow, on the order of what others have found. The sensitivity of investment to cashflow, holding prospects constant, suggests that at least some of the firms in the sample are cash flow-constrained.

The cash flow-constraint appears looser when the firms have a bank loan commitment (column 2). The dummy variable *Commitment* itself enters positively, indicating higher average investment by the firm-years with a commitment. More importantly, *Cash flow X Commitment* enters negatively. The size of the coefficient indicates that investment spending by firm-years is only half as sensitive to cash flow as for the firms operating without a commitment.[13]

Researchers sometimes find differences in the investment-cash *stock* relationship across firms.[14] I do not: Investment and beginning-of-period cash and securities are

[13] The sum of coefficients on *cash flow* and *cash flow X commitment* is significantly different from zero, implying the firm-years are still somewhat constrained.

[14] Hoshi et al. (1991) found that investment by the Japanese firms that belonged to Keiretsu was less sensitive to the lagged stock of liquidity as well as the flow of cash over the period. Houston and James (1995) found a similar result in their study. Investment by the more bank dependent firms, those without bond ratings for example, was more sensitive to the current period stock of cash and securities. Kaplan and Zingales (1998) found that the cash stock-investment correlation was *not* higher among the firms they identified as the most likely to be constrained.

positively related for the sample as a whole here, but the relationship does not change significantly when firms have a bank loan commitment.[15]

Interpreting the cash stock coefficient is problematic, however, since the stock of cash and liquid assets firms hold is clearly endogenous. Cash flow happens to firms, but firms choose how much of it to stockpile. Cash and security holdings were much higher for the firm-years without a commitment (Table 1), suggesting that the liquidity decision is closely connected to whether firms have a bank line of credit.

5. Commitments and Liquidity Management

To investigate how a commitment affects firms' cash management practices, I put the change in cash and securities on the right side of the equation instead of the left (Table 3).

In place of capital investment, the dependent variable in the first two columns is the *change* in cash and securities over the year. Think of this variable as liquidity investment over the period. For the sample as a whole (column 1), liquidity investment depends strongly, and negatively, on the lagged value of liquidity. This negative relationship is consistent with a stock-adjustment model of liquidity management: firm-years that start the year with lower than average liquidity invest more heavily in liquidity over the course of the year. Given lagged liquidity, investment in liquidity depends positively on *cash flow* over the period. *Q* also enters positively, but the coefficient is insignificant.

The firm-years without a commitment seem to manage their liquidity positions more zealously. Liquidity investment by these firm-years is independent of their *cash flow*, suggesting that they leave nothing to chance. This result helps explain why capital investment is *more* sensitive to cash flow for the firms without a commitment. If their cash flow drops off, they cut back their capital investment rather than liquidity stocks. Liquidity investment depends on cash flow only for the firms *with* a loan commitment.

[15] Controlling for liquid assets does not alter the investment cash-flow relationships just noted.

When their cash flow falls, firm-years with a commitment can disinvest in liquidity in order to maintain their capital investment. If their cash flow rises, but their investment prospects have not changed, these firm-years simply store most of the extra cash flow.

Liquidity investment and Q are related only for the firm-years *without* a commitment.[16] The causality between these variables could go either way. Firm-years may seize upon an improvement in market prospects as an opportunity to stock up on liquidity. Alternatively, if these firms are recognized as liquidity constrained, the market may see liquidity investment as a good sign.

Borrowing by the two groups of firms also differs (Table 3, column 3-4). The dependent variable in these regressions is the total stock of debt at the end of the period, scaled by the beginning-of-period capital stock. For the full sample of firm-years (column 3), end-of-period borrowing is an increasing function of *Q* and a decreasing function of *cash flow*. Both of these relationships make sense. If the prospects for these firms improve without an accompanying increase in cash flow, they fund the marginal investment with debt (or some other source of external funds). Conversely, if their cash flow falls without an accompanying decline in prospects, firms should borrow more in order to maintain their investment. If cash flow increases but prospects have *not* improved, the firms simply pay off some debt. The final column in Table 3 shows that these relationships are driven entirely by the firm-years with a commitment. For the firm-years without a commitment, end-of-period debt is unrelated to either their prospects or their cash flow. These firm-years do not substitute debt when their cash flow drops but their prospects are undiminished, nor do they borrow more when their prospects improve, but their cash flow has not changed. The firm-years without a commitment behave like they are credit-constrained.

6. Objections and Defenses

[16] The sum of coefficients on *Q* and *QxCommitment* is not significantly different from zero

Interpreting the investment-cash flow correlation as evidence of a constraint is valid only if *Q* is properly controlling for the firms' investment opportunities. If not, i.e. if *Q* is not a good measure of prospects, then the response of investment to cash flow may simply reflect that firms are responding to improved prospects, not that firms are constrained by the availability of cash flow.

The first defense against the "cash-flow is measuring prospects" objection is to note that while Q may indeed be a noisy measure of prospects, the error in *Q* would have to vary systematically to explain the *differential* cash flow sensitivity by the firm-years with a commitment. In particular, the error in *Q* would have to be higher when firms did not have a commitment to explain why *cash flow* matters more for the firm-years without a commitment. That particular pattern of errors does not seem especially plausible.

The second defense against measurement error in *Q* is to add other variables to the regression equation that might help proxy for investment prospects. Testing three other variables, lagged sales, growth in sales, and return on sales, I discovered that all three variables entered significantly and raised the R^2 substantially. Moreover, the coefficient on *cash flow* falls when these variables are included in the investment equation, suggesting that cash flow may indeed be making up for the errors in *Q*. However, the key result does not change: investment spending is significantly less sensitive to cash flow when firms have a bank loan commitment. *Q* is a noisy a measure of prospects, but the noise does not explain why *cash flow* matters more for the firm-years without a commitment.[17]

6.1 Endogenous Commitments?

[17] While the former is arguably a good measure of the firm's prospects, it is less clear why investment should respond to the rate of sales, or the growth rate of sales. Nevertheless, sales (or sales growth) have been shown to be the highly correlated with investment spending, so we included it as an alternative measure of prospects.

A firm's commitment status is at least partially endogenous since the manager of a firm must decide whether to approach a bank for a commitment.[18] Endogeneity raises the potential for bias; the reduced sensitivity of investment to cash flow by the firm-years without a commitment could reflect some other differences about those firm-years, and those differences in turn be correlated with factors that make cash flow less informative about their investment prospects, so that cash flow matters less for those firm-years.

The most obvious endogeneity bias seems to work against the results here. To the extent the managers that were operating their firm without a commitment did so because they were unconcerned about a cash flow constraint, the investment cash flow relationship will be *lower* when firms do not have a commitment. The fact that the correlation is higher suggests that these firms also have more limited access to a bank loan commitment, and that they are more constrained as a result.

While endogeneity seems to work against the results here, I also estimated separate investment regressions that excluded the set of firms whose commitment status changed over the sample period. To the extent the commitment decision is endogenous, the resulting endogeneity bias should be most pronounced for the set of firms whose commitment status changed. Nineteen firms fit this criteria. Of those 95 firm-years, 61 firm-years had a commitment and 34 did not. The second regression included the other set of firms: those that always had a commitment over the five-years sample period, and those that never had one over the sample period. Of these, 111 firms always had a commitment while five firms never had one. Those regressions are reported in Table 3. While the results are somewhat stronger for the firms that sometimes had a commitment, but they are qualitatively similar in the regression that excludes those firms. For both

[18] Splitting the sample by endogenous variables is common in this literature. Fazzari et al. (1988) split their sample of firms by their dividend-payout ratio. Whited (1992) splits her sample by whether the firms have a bond rating. The decision to issue dividends (or debt) are, of course, both endogenous. Houson and James (1995) divide firms by the number of bank relationships they had, which is just another version of the split here.

sets of firms, investment is only a third to one half as sensitive to cash flow when they have a commitment. The insignificance of the difference when we exclude the firms that sometimes had a commitment most likely reflects the reduced sample size and the lack of variation in the *Commitment* dummy.

6.2 Underinvestment or *Over*investment*?*

The positive investment-cash flow correlation is usually interpreted as evidence of underinvestment; when cash flow falls, firms pass up positive present value projects that cannot be financed internally. Jensen's (1986) free cash flow hypothesis suggests an alternative *over*investment interpretation. Rather than distribute free cash flow (in excess of that needed to fund all positive NPV projects), managers may simply invest in low return projects that benefit them personally through new offices, corporate jet, etc. Overinvestment could account for both of the primary findings here: the positive investment-cash flow correlation and--if bank monitoring reduces overinvestment--the lower correlation for the firm-years with a commitment. In some sense, the difference in the stories is not relevant to the main point, which is that a bank relationship reduces the agency problems between the firm and outside investors. However, we are still concerned wtih how the reduction in agency problems leads to more positive NPV investment (i.e., less underinvestment) or less negative NPV investment (i.e., less overinvestment).

Hoshi et. al. (1994) suggest a regression test to distinguish between the underinvestment and overinvestment hypothesis. First, divide the sample into two groups of firm: firms with better than average prospects (high average Q) and firms with below average prospects (below average *Q)*. Then, estimate the investment-cash flow regressions separately for the two groups, while controlling for their commitment status. If investment-cash flow correlation reflects overinvestment, the correlation should be more positive for the low *Q* firms (since such firms are more prone to overinvest). In addition, if overinvesting is more difficult when firms have a commitment (because the

bank is monitoring), the impact of *Commitment* on *cash flow* should be more negative among the low Q firms.

The regression results in table 4 run against the overinvestment hypothesis. Look at row 2; for the firms in each group without a commitment, *Cash flow* actually matters more for the high *Q* firms than for the low *Q* firms. Moreover, when the firms in each group do have a commitment (row 3), the coefficient on cash flow falls only for high *Q* firms. These results suggest that a commitment allows these firms to invest in good projects they might have passed up.

6.3 Industry effects?

A final concern is that differences across industries might also explain the results in table 2. The firms without commitments may operate in industries in which cash flow is a better indicator of firm's prospects. However, Table 5 shows that roughly equal fractions of each group of firm-years falls into the broad industrial categories shown there. Controlling for the firms industrial group does not alter the results in Table 2.

7. Conclusion

Firms' investment spending is less sensitive to cash flow when they have a loan commitment relationship from a bank. The difference in cash flow sensitivity reflects differences in the cash management practices; firm-years with a commitment let their stock of cash fluctuate with shocks to cash flow; firm-years without a commitment guard the cash stocks more zealously. The latter firms adjust their physical investment when their cash flow fluctuates. We conclude from these findings that the relationship implicit in a bank loan commitment, by mitigating agency frictions between firms and their financiers, relaxes the flow of funds to firms. It pays to know your banker, in other words.

This interpretation is robust to the usual criticisms of the investment-cash flow tests, including mis-measurement of prospects and industry effects. As with virtually of the investment-cash flow tests, however, the criterion use to divide the sample here

(whether firms have a commitment) is potentially endogenous. Controlling for the other differences we observed between the firm-years with a commitment and those without does not overturn our results. The result also holds when we exclude the firms whose commitment status changes over the course of the observation period. The possibility remains, however, that the differences we observed are correlated with *un*observed differences, and the latter may explain why firms depend less on cash flow when they have a loan commitment.

These results extend the conclusions from other related work. Hoshi et. al. (1995) show that having banks hold both debt and equity in a firm, as in Japan, can ameliorate agency problems and thereby loosen liquidity constraints. Our results show that the looser relationships in the U.S. can also mitigate agency problems through monitoring. Our finding that firms with a loan commitment are less constrained may seem at odds with Houston and James (1995), but our results and theirs actually dovetail. The findings in their paper suggest that as firms graduate from a single bank relationship, to multiple relationships, and then to bond markets, the firms rely less on internal funds. Our results operate at the other end of the financial hierarchy, since we started with a sample of much smaller firms: mean assets in our sample in 1980 was less than one tenth the size of the average firm in their sample ($1784 million in assets). Interestingly, the firms without a bank loan commitment in 1980 in our sample were nearly the same size as the firms in with a single bank relationship in their sample: $126 million and $124 million. That asset size appears to be the cusp at which firms waver between no bank relationship, or at most, a single relationship. We can actually splice our results together to complete the hierarchy: multiple relationships are better than one, and one is better than none.

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Table 1. Descriptive Statistics

Firm-year observations (a given firm in a given year) for panel of 135 of smallest manufacturers listed in Compustat data base over 1980-84. Firm-years with a bank credit commitment reported separately from those without a commitment. St. dev. calculated within each firm. Commitment status determined from firms' annual reports (form 10K)

	Firm-years with commitment			Firm-years without commitment		
	Mean	*Median*	*St. dev.*	*Mean*	*Median*	*St. dev.*
Capital ($millions)[a]	92.54**	77.98**	8.07	72.67	63.50	3.72
Investment[b]/K	0.11	0.09	0.06	0.11	0.10	0.05
Tobin's Q	1.20**	0.064**	0.87	2.68	1.73	1.26
Cash flow/K	0.17**	0.14**	0.10	0.31	0.32	0.05
Cash and securities/K	0.14**	0.07**	0.13	0.35	0.30	0.17
Sales ($millions)	207.59	173.76**	59.85	207.04	141.91	50.35
Sales growth (annual %)	5.95	7.46	21.16	1.95	7.26	27.96
Return on sales (income/sales %)	2.89**	3.70**	4.07	11.32	8.26	24.64
Debt/K	0.40	0.31**	0.17	0.36	0.17	0.19
Retained earnings/ income	7.70	4.50*	50.50	5.58	5.44	4.01

** Differs from the mean or median for firm-years without commitment at 5 percent significance level.

* Differs from the mean or median for firm-years without commitment at 10 percent significance level.

[a] Market valuation.

[b] Investment in physical plant and equipment, including acquisitions.

[c] Market value of capital stock divided by replacement value of capital stock.

Table 2

Investment Regression Equations Controlling for Firm's Bank Commitment Status

Fixed effect regression coefficients. T-statistics, corrected for heteroskedasticity, in parenthesis. Estimated using sample of 675 firm-years comprising 135 of the smallest, manufacturing firms listed on Compustat over 1980-84. The dependent variable is investment in physical plant and equipment (including acquisitions), divided by the beginning-of-period capital stock (K_{t-1}). *Q* equals firm's market value divided by the replacement value of its capital stock. *Commitment* equals one if firm i had a bank loan commitment in year t, zero if not.

Q_t	0.011	0.010	0.008	0.008
	(2.658)	(3.623)	(2.622)	(2.612)
$Cash\ flow_t/K_{t-1-1}$	0.154	0.311	0.299	0.326
	(5.266)	(3.843)	(3.716)	(3.871)
$Cash\ flow_t\ X\ Commitment_t\ /K_{t-1}$	-	-0.160	-0.156	-0.185
		(-2.055)	(-2.020)	(-2.260)
$Commitment_t$	-	0.060	0.057	0.053
		(2.471)	(2.371)	(2.196)
$Cash_{t-1}/K_{t-1}$	-	-	0.062	0.027
			(2.914)	(0.719)
$Cash_{t-1}\ X\ Commitment/K_{t-1}$	-	-	-	0.046
				(1.082)
Within R^2	.136	.146	.159	.161

Table 3
Liquidity, Debt Management, and Commitments: Regression Equations

Fixed effect regression coefficients and T-statistics (in parenthesis). *Q* equals firm's market value divided by the replacement value of its capital stock. *Commitment* equals one if firm I had a bank loan commitment in year t, zero if not. *Cash* includes liquid securities as well. Sample equals 675 firm-years comprising 135 of the smallest, manufacturing firms listed on Compustat over 1980-84.T-statistics are corrected for heteroskedasticity.

	Dependent Variable: Change in cash over period		*Dependent Variable:* End-of-period $debt_t/K_t$	
Q_t	0.007	0.051	0.022	-0.015
	(0.694)	(2.470)	(1.846)	(-0.924)
Cash flow$_t/K_{t-1-1}$	0.411	-0.085	-0.378	0.579
	(4.328)	(-0.342)	(-2.336)	(1.186)
$Cash_{t-1}/K_{t-1}$	0.691	-0.689	0.008	-0.009
	(-7.302)	(-7.686)	(0.050)	(-0.061)
Commitment$_t$	-	0.035	-	0.295
		(0.746)		(1.887)
Q_t *X Commitment*$_t$	-	-0.053	-	0.045
		(2.483)		(1.973)
Cash flow$_t$*X Commitment*$/K_{t-1}$	-	0.521	-	-0.993
		(2.081)		(-2.000)
Within R^2 (%)	33.5	36.0	4.7	7.9

Table 4

Fixed effect regression coefficients and T-statistics (in parenthesis). Estimated by OLS using annual observations over 1980-84 on 135 of the smallest, manufacturing firms listed in Standard and Poors' Compustat database. The dependent variable is investment in physical plant and equipment (including acquisitions), divided by the beginning-of-period capital stock. *Q* equals firm's market value divided by the replacement value of its capital stock. *Commitment* equals one if firm I had a commitment in year t, zero if not.

	Firms that sometimes had a commitment	***Excluding firms that sometimes had commitment***
Q	-.00	0.01
	(-.42)	(2.35)
Cash flow	0.61	0.26
	(4.73)	(2.53)
Cash flow X Commitment	-0.21	-0.12
	(-2.23)	(-1.14)
Commitment	0.06	0.06
	(2.62)	(2.34)
Firm-years	95	580
Within R^2 (%)	22	13

Table 5
Investment Regressions Testing for Overinvestment vs. Underinvestment

Fixed effects regression coefficients and T-statistics (in parenthesis). The dependent variable is investment in physical plant and equipment (including acquisitions), divided by the beginning-of-period capital stock. *Q* equals firm's market value divided by the replacement value of its capital stock. *Commitment* equals one if firm I had a commitment in year t, zero if not. The sample comprises 135 of the smallest, manufacturing firms listed in Standard and Poors' Compustat data base over 1980-84. The sample of firms is divided by their average *Q* over the period to test if bank monitoring reduces *over*investment of free cash flow by firms with poor prospects. T-statistics are corrected for heterorskedasticity.

	Low Q firms	***High Q firms***
Q	0.02	0.01
	(2.54)	(2.22)
Cash flow	0.14	0.33
	(1.25)	(4.11)
Cash flow X Commitment	0.03	-0.19
	(0.29)	(-2.32)
Commitment	0.05	0.07
	(1.51)	(2.24)
Number of firm-year	338	337
R^2 (%)	15	18

Table 6
The number and percent of all firm-years (in parenthesis) by industrial group

	Firm-years without a commitment	**Firm-years with a commitment**
Food, textiles, apparel, lumber, furniture, paper, and printing	11 (13%)	124 (21%)
Chemical, petroleum, rubber, clay, stone, glass, and concrete	17 (21%)	108 (18%)
Primary metals and fabricated metal products	10 (12%)	40 (7%)
Machinery, computer equipment, and electrical equipment	23 (27%)	182 (31%)
Transportation and precision equipment	15 (18%)	80 (14%)
Miscellaneous	7 (8%)	58 (10%)
All industries	83 (100%)	591 (100%)