The Implicit Costs of Trade Credit Borrowing by Large Firms

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Abstract

We examine a novel, but economically important, characterization of trade credit relationships in which large investment-grade buyers borrow from their smaller suppliers. Using a matched sample of large retail buyers and their much smaller suppliers, we find that slower payment terms by large retailers are associated with lower investment at the supplier level. The effects are sharpest during periods of tight bank credit and for firms which we might otherwise characterize as financially constrained. The opportunity cost of extending credit to large buyers appears to be positive and sharply increasing in the financial frictions facing a firm. (*JEL* G20, G30, G31, G32)

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As of 2009, trade payables—financing for the purchase of goods extended by suppliers to their customers—represented the second largest liability on the aggregate balance sheet of nonfinancial businesses in the United States (U.S. Flow of Funds Account 2011). Yet relative to its volume as a source of corporate funding, there has been limited research on the effects of trade credit relationships on other financial and real activities of the firm. Why is so much financing in a well-developed capital market done by nonfinancial firms? The existing literature on trade credit suggests that financial constraint may play an important role, with evidence that small, young firms lean on their larger suppliers for funding when access to traditional financial markets is limited (Meltzer 1960; Schwartz 1974; Petersen and Rajan 1997). Yet at the same time, we also observe the inverse relationship, one which is harder to reconcile with a story based on financial constraint. Large, highly rated borrowers with unfettered access to capital markets may also borrow via trade credit, often from smaller, weaker suppliers. Walmart, for example, borrows more from its considerably smaller suppliers via trade credit than it does in bank and bond markets under its AA long-term debt rating. Meanwhile, Klapper, Laeven, and Rajan (2012) show that large, creditworthy borrowers not only borrow from but also receive their most favorable trade credit terms from their smallest suppliers.

In this paper, we investigate this pattern of financing in a retail setting, where large, highly rated retailers finance themselves off the back of smaller, weaker vendors. After documenting this puzzling relationship, a number of questions arise immediately. In particular, although counterintuitive, we might ask, does the flow of financing from smaller to larger firms matter? Under a Modigliani-Miller-style irrelevance argument, absent financing frictions, who finances the buyer's inventories should not matter, even when there exist large differences in the observed costs of capital among the parties involved.[1] Yet if buyers and suppliers face differential degrees of financial constraint, then lending by the more constrained supplier destroys value. Specifically, with binding financial constraints at the supplier level, longer

[1] Although we do not make this argument formally, it is easy to see that in the limit, a supplier whose assets are 100% Walmart receivables must converge to Walmart's cost of capital. Said otherwise, the value of Walmart's debt is unchanged based on who owns it.

payment terms can generate supplier underinvestment relative to a world in which the buyer finances its own inventory. In this case, it might be Pareto improving for buyers to pay cash, finance their own inventories, and reduce prices paid to suppliers.

The extent to which trade credit crowds out investment or other profitable uses of cash for small suppliers (and is therefore potentially inefficient) is ultimately an empirical question. Thus, we begin our analysis by testing the trade-offs faced by suppliers who are asked to bear longer trade credit terms from important buyers. Using a hand-collected panel of 1,063 unique buyer-supplier relationships involving forty large investment-grade retail buyers matched to 723 of their smaller suppliers, we confirm significant borrowing demands on a set of suppliers that are, at the median, one-tenth of 1% of the size of our median buyer in terms of market capitalization and that face interest rates of more than six times a higher.

More importantly, we find that that changes in the average payment speed of important buyers strongly relate to the investment and general expenditures of their vendors. Vendors, who are sufficiently small so as to take payment terms as a given, appear to cut back on spending rather than raise new capital in traditional markets in order to finance their larger trade partners. On average, a one-month extension of the payment terms required by a significant buyer corresponds to a reduction in capital expenditures, representing 1.2% of lagged assets—roughly 13% of the estimated total cash deficit induced by such a demand. A closer look at alternative sources of financing that reasonably might be used to fill the gap caused by slower collections shows that, for the average firm, receivables growth is not funded by new debt or other sources of financing. Instead, firms partially finance their extension of trade credit via a reduction in cash holdings, with the balance coming from reductions in spending.

One interpretation of the relationship between buyer payment speed and supplier investment is that, rather than issuing in external markets, suppliers are sacrificing their own growth in order to finance their buyers. If suppliers face binding financing constraints, then the trade credit demands of large buyers may drive a wedge between optimal and realized investment levels. Evidence in support of this interpretation would clearly point to deadweight losses arising out of the payment terms imposed by large

buyers.[2] To test this, we examine suppliers' observed investment sensitivity to buyer payment speed based on variation in a priori measures of financial constraint in the cross-section of suppliers (suppliers with long-term debt ratings vs. those without), as well as the time series of credit standards (based on the Federal Reserve's Senior Loan officer Survey). In each case, we find the observed relation between trade credit terms and supplier spending is only evident when credit constraints are most likely to bind, consistent with trade credit demands crowding out other investment when access to external financing is unavailable or too costly.

Finally, we exploit the failure of a major financial institution associated with many of our suppliers (CIT) as a plausibly exogenous source of variation in financing constraints. In particular, we compare the sensitivity of investment to buyer payment speed between a sample of CIT-linked suppliers and a control sample of firms linked to the same buyers at the time of the lender's failure. We find that the CIT-linked suppliers became increasingly sensitive to average buyer payment terms following the distress of their relationship lender, suggesting again that limited access to external finance may drive the large opportunity costs of lending via trade credit.

Our final tests ask whether the forgone investments represented missed opportunities (or even required maintenance) or whether payment delays serve to discipline overinvestment by managers. Without being able to directly speak to the welfare costs (or benefits) of the forgone investment spending, as a rough approximation we consider the long-term return on beginning firm assets following changes in buyer payable policy. For credit-constrained firms, growth in buyer-payable days appears to precede a long-term reduction in profitability. Taken together, we view our findings as evidence that there may be large implied costs of downstream lending for constrained sellers.

1. Background

[2] Of course, here we have not considered the possible benefits associated with the lending relationship, which in equilibrium might offset the costs documented. A discussion of some proposed theories of why large firms borrow via trade credit from smaller suppliers will follow in the next section.

Like bank-funded lines of credit for working capital, trade credit provides bridge financing to cover the gap between the purchase of inputs and the sale of output, or in the case of a retailer-manufacturer relations, it covers the gap between inventory acquisition and final sale. The importance of vendor financing in funding buyers' working capital needs raises the following question: why is so much financial intermediation done by nonfinancial firms?

Beginning in the 1960s, a handful of papers proposed that suppliers might have better information about their buyers than do external markets, better access to collateral, or punishment mechanisms unavailable to banks to prevent defaults. As a result, trade credit might be more efficient than bank lending, in particular, for borrowers who faced acute external financing frictions. Meltzer's (1960) "substitution hypothesis" suggested that trade credit provides a backstop of sorts to traditional credit markets, whereby large suppliers accommodate their smaller buyers' working capital needs in periods of tight credit. The implied effect is to soften shocks transmitted via the bank credit channel in the broad macroeconomy, an effect confirmed by Nilsen (2002). This time-series hypothesis has found its natural extension in the cross-section by way of analogy as well. In particular, theory and evidence provided by Schwartz (1974) and Petersen and Rajan (1997), respectively, suggest that smaller firms receive trade credit when financial institutions are unavailable or too costly.

The characterization of trade credit as a second-best funding source for credit-constrained borrowers finds strong support in the data, both in published record and in basic Compustat summary statistics. Indeed, as of 2009, an examination of net trade credit borrowing days (payable days less receivable days) based on size decile suggests that the smallest firms were the largest borrowers, with the median firm paying its suppliers 62 days later than it is paid by its buyers (Table 1A documents these statistics). Beyond deciles one and two (also a net borrower at 6.6 days), the median firms in deciles three through eight are net trade credit lenders, supporting the view that as firms grow, they gain access to cheaper external financing and become less dependent on trade credit.

However, we are also faced with the largest two deciles, who, like their small counterparts, are also net trade credit borrowers as defined by the difference in their net payable days, with the median

firms in their respective deciles paying suppliers 1.3 and 6.1 days later than they are paid by buyers. Within these deciles are firms like Walmart, a highly rated and, by any standards, large buyer for whom accounts payable represent nearly all its short-term funding and approximately three-quarters of its total debt (Walmart's 2009 Annual Report). Moreover, by construction, firms in the top deciles must be borrowing from smaller firms.

This is not the first paper to document this phenomenon. A number of recent papers using cross-sectional data have found it may not be uncommon for large buyers to fund themselves off the backs of their smaller suppliers. Fabbri and Klapper (2008) show that for Chinese small- and medium-sized enterprises, firms with weak market power are more likely to extend trade credit and have a larger share of goods sold on credit. In a more recent paper that exploits buyer-supplier level trade contracts, Klapper, Laeven, and Rajan (2012) demonstrate clearly that large, creditworthy borrowers receive more favorable trade credit terms from smaller suppliers. In each case, these findings are hard to reconcile with theories of trade credit dependent on financial constraint.

A handful of papers provide some manner of economic motivation for large, unconstrained firms to leverage trade credit as a funding source. Brick and Fung (1984) and Desai, Foley, and Hines (2012) provide tax-based models that make differing predictions about the direction of trade credit lending based on marginal tax rates, regardless of firm size or credit condition. Meanwhile, a number of authors have pointed to the underlying goods serving as better collateral for suppliers than for banks, which might otherwise finance trade (Longhofer and Santos 2003; Frank and Maksimovic 2004). Finally, Long, Malitz, and Ravid (1993) hold that information asymmetry regarding product quality induces buyers to withhold payment as a quality guarantee, with the resulting financing arrangement an ancillary benefit. Among other hypotheses, Mian and Smith (1992) propose that large firms may receive favorable trade credit terms from smaller sellers in response to the Robinson-Patman Act, which prohibits manufacturers from offering price discounts to larger, more important customers.

Within the trade credit literature, however, our paper is alone in asking whether this implicit financing relationship has implications for investment and growth at the supplier level. In addressing this

question, we lean heavily on the literature concerning the costly external financing and the manner in which cash flows and investments may be related. In our context, trade credit serves to delay cash flows received by the supplier, thereby compressing current period cash with the resulting shortfall to be financed internally (via cash and/or other uses of cash; i.e., investment) or externally (debt or, perhaps, equity markets). Of course, like many other papers in the literature on costly external financing and firm investment, our paper will face the challenge of identifying variation in working capital and related cash flows that is not directly driven by unobserved growth opportunities. The next section describes these issues more deeply and outlines our attempt to address them.

2. Methodology and Data

2.1 Methodology

When large buyers pay their suppliers more slowly for goods and services provided, what effect does this have on real and other financial activities of the firm? In particular, does trade credit crowd out profitable supplier investment activities? To try to answer these questions, we exploit the variation in payment terms imposed by large, investment-grade retail buyers on a sample of smaller suppliers with whom they have substantial sales contracts (substantial enough to be reported in supplier disclosures). We then document the supplier behavior that follows changes in aggregate payment speed at the buyer level. Because each large retailer has numerous vendors, each of which individually accounts for only a tiny fraction of the retailer's total cost of goods sold, we will argue that an individual vendor is unlikely to determine the retailer's overall payment speed—rather, the vendor takes a change in the retailer's aggregate trade payable policy largely as given.

As an example, consider two identical small garden-hose manufacturers (A and B) who sell their products to Home Depot and Lowe's, respectively, each of whom is also served by a large number of other vendors. Under boilerplate purchase agreements, both manufacturers are paid in 45 days, providing the retailers an adequate window to sell the hoses to end customers before paying their suppliers.

Our paper considers the hypothetical impact of an adjustment to Home Depot's standard contract, in which Home Depot now might offer to pay suppliers in 60 days, delaying payment terms by 15 days for firm A, but not for firm B. As long as hose manufacturers are sufficiently small, such that their own growth options, operating environment, and financial characteristics are irrelevant to the overall payable policy of the retailer, firm A will take the new policy as an external shock to its own receivable days, assuming its sales to Home Depot are sufficiently large to have a meaningful impact on its overall receivable days. Meanwhile, as long as the delayed payment affects the supplier only through its growing receivable days, then the effect of the payables policy of Home Depot on supplier behavior can be interpreted as a direct effect of trade credit extension. Of course, the plausibility of this interpretation will be the subject of much of our analysis.

Note that we have chosen retail stores—specifically, large, investment-grade ones—as our buyers for a number of reasons. First, retailers buy from numerous suppliers. Thus, we can focus on a relatively small sample of homogeneous buyers and still generate a large sample of suppliers on which to test our hypotheses. Second, from an economic perspective, retail stores are by and large the end users of trade credit as they receive payment at the point of sale or within 3–5 business days at a maximum (via credit card settlement). As a result, they sit at the top of the supply chain, giving us a natural place to start an empirical study on the real effects of trade credit relationships in the economy. Finally, limiting ourselves to investment-grade buyers helps to emphasize the wedge between large buyer/small supplier costs of capital central to the paper. We discuss the selection of buyers and identification of suppliers at length in Section 2.2.

Formally, we estimate the following model where *i* indexes the firm and *j* indexes their linked buyer(s):

$$\frac{I_{i,t}}{A_{i,t-1}} = \alpha_{i,j} + \eta_t + \beta_1 BuyerPayableDays_{j,t} + \beta_2 \frac{CF_{i,t}}{A_{i,t-1}} + \beta_3 Q_{i,t-1} + \varepsilon_{i,t}, \qquad (1)$$

where $I_{i,t}$ captures investment in period t for firm i, scaled by beginning period assets. Following the literature on investment-cash flow sensitivity, $CF_{i,t}$ is a measure of cash flow or operating profit during

the same period, and $Q_{i,t-1}$ is typically measured as the market-to-book ratio of firm assets valued as of the beginning of period *t*. While this measure of *Q* is an average over all firm *i*'s assets, it serves as a proxy for marginal *Q*, which has been shown to relate linearly to firm investment under certain conditions (Hayashi 1982). Also note the inclusion of buyer-supplier fixed effects. These fixed effects sidestep issues of how suppliers match to their buyers. If, for example, growth firms prefer buyers who pay cash or if buyers are less willing to pay quickly for young, growing firms for which information asymmetry is greatest, then a cross-sectional regression of investment on trade credit terms may reflect this type of matching. Instead, we take matches as given and then examine how changing trade credit terms impact investment growth or financial policies of the supplier.

Of interest is the relationship between supplier behavior and buyer payment speed. *BuyerPayableDays* measures the average time a buyer *j* for supplier *i* takes to pay all its suppliers and is calculated based on total trade payables at *t*, divided by cost of goods sold plus any change in inventories (this reflects total buyer purchases) over the same period. The measure captures the aggregate trade payable management policies of the buyers—that is, it measures how Home Depot is adjusting its payable terms on average for all its vendors, many of whom will not appear in our sample. Note that we do not observe the buyer's payable terms to individual suppliers, to the extent that they vary. This level of detail would be of limited value, because any supplier-to-supplier variation in payment terms is almost certainly linked to other aspects of supplier behavior. Instead, by focusing on the aggregate buyer policy and assuming that small individual suppliers have limited ability to influence that policy, we sidestep supplier-specific variation in the terms of trade and focus instead on variation that the suppliers take as given. To avoid large suppliers who might materially influence average buyer payables, we focus on suppliers that are small relative to the buyers, with buyer sales less than 1% of the buyer's total cost of goods sold.

The intent of the regression previously described is to determine the extent to which the counterintuitive flow of financing has real implications for investment and growth of small suppliers. Of course, much of our discussion will concern alternative interpretations of any observed relationship

between trade terms and supplier spending. In particular, we will pay special attention to the possibility that the average payable days of their buyers are correlated with supplier growth options not captured in our controls. We use cross-sectional and time-series interactions between payment speed and measures of financial constraint to differentiate between a model of trade credit crowding out investment and alternative hypotheses. Meanwhile, we also show that for our sample of large and highly rated buyers, buyer payment speed is largely unrelated to observable measures of buyer health, inducing supplier's to adjust their investment plan for reasons unrelated to their own receivable days.

Finally, it is important to consider the source of variation in buyer payables policy used in our tests. As a representative example and our first real test in the paper, Figure 1 plots the payable days of rivals Home Depot and Lowe's. For Home Depot, although there appears to be a trend toward faster payment moving from 1985 to 2000, the bulk of the retailer's variation comes from a sharp policy change in 2001, following the promotion of Carol Tomé to CFO by new CEO, Robert Nardelli. Recognizing Home Depot's relatively quick payment speed at 25 days as an implicit source of financing for its slower paying rival, Lowe's, Tomé announced a broad-based renegotiation of payment terms to suppliers by saying ". . . we had become the National Bank of Home Depot. The bank is closed . . . " (Lloyd 2001). Five years later, we see evidence of a response by Lowe's to extend its own terms even longer, moving from 35 days to nearly 50 days between 2005 and 2010 and noting in consecutive annual reports the desire to grow working capital through slower payment terms to suppliers. Thus, although both buyers are trending toward longer payment terms, variation in our sample depends on policy changes happening in discrete adjustments spaced over time. Although we will absorb the overall trend with year fixed effects, we can think of the remaining between-retailer variation in payable days as coming from the fact that retailer A adjusts its policies in 2001, whereas retailer B might wait until 2002, thereby impacting different suppliers at different points in time. Given this, our identification is reminiscent of papers that

use the staggered implementation of a policy (slower payment) that affects all suppliers but does so at different times depending on a given buyer's implementation date.[3]

Before diving into the full sample, we can start by asking how Home Depot suppliers responded to the negotiation of slower payment terms. Table 2 reports a difference-in-differences regression exploiting the discrete policy change on a treatment group of 270 Home Depot suppliers in 2001 compared with 110 otherwise similar firms selling to Lowe's.[4] We use an 8-year estimation window, measuring investment 4 years before and after Tomé's announcement. This allows for the fact that Home Depot's adjustment appears to take at least 2 years to fully show up in its own payable days, but we end the analysis before Lowe's enacts its own change in terms. Column 1 reports the simplest formulation of the test, where in addition to cash flow and q controls, the specification includes a treatment dummy for Home Depot suppliers, a posttreatment dummy after 2001, and their interaction. Columns 2 and 3 add firm fixed effects and year fixed effects in place of the post-2001 dummy. Column 3 adds a control the for the firms' buyers' q. In each case, the slow payment appears to be strongly correlated with the level of supplier investment. Capex falls by roughly 2.5% of lagged assets relative to the control group. We will delay a discussion of the economic significance and the anticipated magnitude of the effects for the full sample, where the precision of our estimates is improved. In the Appendix (Figure A1), we present a time-series plot of capex/lagged assets for the treatment and control groups. The y-axis captures separate year dummies for the two sets of suppliers from a fixed effect regression of capex on q and cash flow and time fixed effects (the plots are recentered to be equal in 2000). No obvious pre-existing trends prior to the announcement date seem to drive the effect.

[3] In fact, this dynamic is representative of the broader sample of retailer behavior. On average, retailers are paying more slowly moving from 1985 to 2010. Figure 2 presents the median payable days for retailers in our sample, alongside the top decile of Compustat retailers (regardless of whether or not they are in our sample). The trend appears smooth, however, it is largely driven by discrete well-spaced adjustments by individual buyers, which provide our means of identification.

[4] During this period, Lowe's actually appears to have moved toward slightly faster payment terms, although no such policy announcement is evident. Nonetheless, this may amplify discernable effects between the treatment and control.

Although the above test represents a nice case study of supplier response to slower payment, the sample size is admittedly small. All the same, the experiment is useful because it allows us to identify at least the reported motivation for slower payment and rule out some alternative explanations for the investment declines. Perhaps, for example, Home Depot demanded slow payment in response to its own distress, thus driving a coincident decline in its supplier's investment. Yet neither firm faced acute distress during this period, with both solidly rated investment grades. In fact, annual equity returns in the 5 years leading to the announcement date averaged a healthy (and remarkably similar) 25% (Home Depot) and 26% (Lowe's). Meanwhile, mean analyst recommendations from I/B/E/S for the two firms as of the announcement were also nearly identical, at 1.65 (Home Depot) and 1.68 (Lowe's) (on a scale of 1 to 5), representing a "strong-buy" to "buy" rating.[5] Thus, the policy shift is difficult to attribute to differences in buyer fundamentals. Instead, it appears more consistent with sticky adjustments to payables policy along a time trend, with the timing, in this case, facilitated by a new executive's prerogative for change.

With this early evidence as a motivating example, we will proceed by discussing the construction of a broader sample with which we can examine the external validity of the effect and push harder on its interpretation.

2.2 Sample selection

Our sample is comprised of buyers first, with each buyer then matched to all suppliers reporting a material relationship with it via mandatory 10-K and 10-Q disclosures. Our sample of buyers was selected based on three criteria. First, each buyer must be reported as a major, identifiable customer in Compustat's customer segment data, thus allowing a starting point to find matched suppliers. Second, we limit our buyer sample to the retail industry (NAICS 44 and 45 or GICS group 2550). Because retailers work with a large numbers of suppliers, few of which are individually critical to the buyers' operation, we

[5] Mean recommendations are reported in I/B/E/S by numerically coding ratings from 1 to 5 (where a one represents a strong buy recommendation, and five represents sell).

can track the effect of a change to buyer payable days for any given buyer over a large number of linked firms. Third, we require each buyer to have investment-grade credit rating (an S&P Domestic Long-Term Issuer Credit Rating of BBB- or higher). Like our buyers, each seller must have a unique identifier in the customer segment data and must have at least one identifiable investment-grade-rated customer in the retail sector. We also eliminate sellers in financial services and real estate. Requiring buyers to have an investment-grade credit rating restricts our sample to the years 1985 to 2010, for which the S&P ratings are available on Compustat.

Matching of buyers to their suppliers is done using the Compustat customer segments files, which, on an annual basis, report major customers listed in the firm's annual disclosure of significant concentrations of credit and customer risk. Examples of these disclosures are provided in the Appendix. Unfortunately, these segment data lack a unique buyer identifier and inconsistently report buyer names.[6] As such, we have manually matched reported buyer names and merged them to historical company names from CRSP (COMNAM) to obtain unique Compustat buyer identifiers (buyer GVKEY). After excluding buyers with fewer than 30 supplier-year observations, we are able to identify 1,063 unique buyer-seller pairs involving forty big retail buyers and the 723 sellers that supply them. In the Appendix, we provide a list of the forty retail buyers identified and used in our analyses. The level of observation in our data is then a unique buyer x supplier x year combination representing a period during which the two firms had a relationship. In many cases, the fiscal year-end for a given supplier may not coincide exactly with the fiscal year-end of its matched buyer. In these cases, buyer payable days are calculated as a linear interpolation of the payable days reported in the two closest reporting dates for the buyer. The same approach is used to calculate buyer q when fiscal year-ends do not match. However, all reported results are robust to using lagged q and payable days as right-hand side variables.

[6] For example, the Compustat customer segment file uses numerous aliases to report a single buyer, Walart, that is, Wal-Mart, Wal-Mart Stores, Wal Mart Stores, Wal Mart Wal Mart Store, Wal-Mart Inc., Wal Mart Strs, Wal-Mart Stor, Wal-Mart Sam's club, Sam's clubs, Sams Club, Sams clb, Sams clbs, Sams club wholesale, and Sams club whsl.

Table 1B describes characteristics of the buyer-seller pairs. The mean (median) buyer-seller relationship length in our sample is 7.79 (7) years long. Twenty-five percent of annual buyer-supplier observations are related to matches that survive 10 years or more. In terms of size, buyers dwarf the sample of sellers we identify; this is almost by construction, given that buyers were chosen for having many linked suppliers and suppliers appear only when they have a large concentration of sales to a single buyer (which may be more likely to happen for small firms). Regardless, the median supplier has a market capitalization of $29 million, compared with the median buyer's market capitalization of $23 billion (inflation adjusted 1985 dollars). The mean (median) seller accounts for only about 0.16% (0.07%) of its matched buyer's cost of goods sold. In contrast, the mean (median) buyer accounts for 25% (15%) of each matched supplier's sales. While buyers may have a large impact on their suppliers' operations, individual suppliers are unlikely to affect aggregate buyer payable policy. Buyer payable days, calculated as accounts payable (item AP) divided by purchases (cost of goods sold + change in inventory) and multiplied by 360, is a proxy for the average speed with which a buyer repays suppliers. Our mean (median) buyer pays suppliers in 39 (35) days. A seller's receivable days, calculated as trade accounts receivable (item RECTR) divided by sales and multiplied by 360, is a proxy for the average speed with which a seller receives payment. Our mean (median) seller collects payment for outstanding trade receivables in about 57 (51) days. The disparity of these two numbers may be explained by the fact that the numbers are equally weighted by firm. More importantly, our sample is not a complete pairing of all suppliers with which a buyer has relationships (or all buyers linked to our suppliers for that matter). Firms not included in the sample, but which do business with firms in the sample, are likely to drive the gap between receivable days and payable days. For example, retailers' utilities may be paid more quickly than their boilerplate purchase agreement with the typical supplier in our sample. The fact that our buyer-supplier pair list is an incomplete matching of buyer-supplier relations will only cause a problem to the extent that variation in unmatched firms' trade credit terms swamps the variation we can measure. We will test that explicitly in the next section.

We are also able to compare the debt funding costs for suppliers versus buyers by matching firms to the DealScan loan database, which tracks syndicated and bilateral loan issuance for corporate borrowers. A large fraction of our suppliers appear as issuers in DealScan during the years in which they are active in our sample (372 firms issuing 1,311 loans), with a median spread over LIBOR (all-in-spread) of 2.25%. Matching DealScan thorugh Compustat is accomplished using the link file provided in Chava and Roberts (2008). Meanwhile, among buyers, 34 buyers issued 299 loans during the period they were active in our sample at a median spread of 35 bps. The difference in funding costs can be linked to, among other things, the fact that our buyers are all investment grade (AA rated at the median), whereas suppliers are primarily unrated.

3. Results

3.1 Investment growth and trade credit demands

Before examining the relationship between suppliers' uses of cash and changes to retail buyers' average payment speed, we first need to confirm that when buyers pay more slowly (quickly), the receivable days reported by the supplier also grow (shrink). This will help establish that our matching has been successful, and that, more importantly, in our empirical setting, large buyers are indeed imposing trade credit demands on their smaller suppliers. Under the null that our smaller suppliers are paid cash by their large buyers, there should be no relationship between buyer payables policy and supplier receivables.

Column 1 of Table 3 reports these results. The effect of a buyer's payable days on its supplier's receivable days is positive and significant at the 1% level. Specifically, a 1-month payment delay by a single retailer implies a delay in the supplier's receivable days of 5.5 days (or 0.19 months, as it is reported in the tables). Whereas Column 1 only includes buyer–supplier fixed effects and time dummies, Column 2 includes controls for traditional determinants of investment, such as the supplier's *Q* and

operating cash flows. These controls are in anticipation of investment and financing regressions but also improve the fit of the current model.

In some sense, the reader may view this result from Table 3 as mechanical—a means to setting up a more economically relevant assessment of the impact of trade credit on other aspects of firm behavior. However, in the absence of this result, we might imagine that a retailer pays cash to all its small suppliers and then borrows massive amounts from a few comparably large vendors. In unreported results (see the Internet Appendix), we find that the regression in specification 2 holds up well in subsamples of the smallest and largest suppliers, suggesting that Walmart's payment policy is fairly invariant with respect to supplier size.[7]

Meanwhile, the magnitude of the effect is nearly one for one with what we might get from a back-of-the-envelope prediction in a world in which big buyers' demands for trade credit are uniform across supplier size. The coefficient of 0.19 is only slightly lower than the mean (0.25) but is above the median (0.16) share of sales attributed to the linked buyer. In a world without measurement error and 25% of sales going to linked buyers, the null hypothesis, which we would fail to reject, is a coefficient on buyer payable days of 0.25. The fact that it is lower, but not significantly so, is encouraging. First, it again seems to confirm that the larger buyers are demanding delayed payment terms from smaller suppliers—generating almost exactly the predicted effect on supplier receivables in a world where large buyers pay their smaller matched suppliers in cash would require seemingly heroic assumptions. Moreover, it suggests that factoring and receivables securitization have a limited impact on our sample. Firms that sell their receivables would not see receivable days impacted by slower payment speed from important buyers.

Finally, Table 3 shows that as buyers demand more favorable terms on payable days, they too face a trade-off in the form of prices paid to suppliers. Column 3 shows this directly by demonstrating

[7] For more details on the small supplier-large buyer lending relationship, we have hand-collected the actual receivables numbers owed by several of our largest buyers (Home Depot, Walmart, and Toys"R"Us) to individual suppliers. Although these numbers are rarely explicitly reported, for the 181 supplier X buyer annual observations for which the actual receivables are reported, receivables owed by an individual buyer represent, on average, 21% of the supplier's total receivables, consistent with the coefficients in Table 2.

that as payable days grow, so does the markup enjoyed by suppliers, where markup is defined as annual sales less cost of goods sold, as a fraction of cost of goods sold. This simply reinforces the notion developed in the introduction that buyers face a trade-off when they demand longer payment terms, in driving up the minimum price suppliers are willing to accept for their goods. Whereas in Columns 1 and 2, the predicted relationship between buyer payable days and supplier receivable days is linear, in Column 3 we can be more flexible in our specification. As a result, we replace the variable for buyer payable days with its natural logarithm.

Having established the basic relation between buyer payables policies and their direct impact on suppliers' trade credit extension, in Table 4 we begin thinking about the opportunity costs of providing that financing by examining how the growth in a supplier's receivables documented above corresponds with other sources and uses of cash. Table 4 begins by examining suppliers' capital and general expenditures in the wake of changes to payment terms.

Before presenting the results, it may be useful to think about the expected magnitude of a plausible reduction on investment based on a typical change in payables policy of one of our buyers. To help guide the analysis, let us return to the example of Home Depot payables described in Section 2 and consider Home Depot supplier Universal Forest Products ("UFP"), which describe the impact of slower payments on its cash position in its management discussion and analysis of liquidity. In its 2001 annual report, UFP states that "in recent sales negotiations with The Home Depot, we agreed to extend our payment terms by an additional 15 days" and projects an increase in resulting average accounts receivables of $20 million (and a $35 million increase at their seasonal sales peak). As a back of the envelope calculation, note that the expected effect on the firm's total receivable days is just 5 days (based on only one-third of the firm's sales coming from Home Depot). However, the firm is reporting a change

in liquidity needs representing 4.1% of lagged assets ($485 million) and 91% of the prior year's capex.[8] Thus, even a small delay in receivable days can generate a large cash shortfall relative to assets in place.

Using UFP as a guide, we can reconstruct the expected cash shortfall the typical company will need to accommodate for a 15-day delay in payment terms. Note that, by construction, a 15-day growth in receivable days from a given buyer implies required growth in receivables of 4.1% (15/365) of sales to that buyer. Meanwhile, for our sample, sales to linked buyers represent 1.1 times lagged assets. This suggests an average cash shortfall of 4.5% of lagged assets for just a 15-day delay in payment terms to an important buyer (or a 9% deficit relative to lagged assets for a one-month delay in terms). Thus, if firms can finance even three-quarters of the receivables created by a 1-month-long growth in buyer payable days, it will still imply a reduction in other uses of cash of 2.25% of lagged assets. Note that the magnitude of the effect is particularly acute for the suppliers we describe in our sample, operating with thin margins but at large volumes. As a result, these firms have large revenues relative to the size of their assets in place, amplifying the balance-sheets effect of any payment delays.

Our hypothesis is that, under frictionless financial markets, controlling for the firm's growth options by way of profitability and q, the demand for longer trade terms or, conversely, quicker payment by buyers should have limited to no impact on the funding of profitable projects. In contrast, we find economically and statistically significant changes in spending behavior related to changes in buyer payment speed. Capital expenditures (capex), typically major purchases of equipment or long-term assets, or maintenance and repairs to capital assets are strongly negatively associated with slower payment speed by important buyers. As Column (1) of Table 4 reports, the coefficient on capex scaled by beginning of period assets is -0.012, suggesting that a 1-month delay in payment by a major buyer is linked to an average cutback in capex of 1.2% of assets in place (compared with a mean supplier capex of 6%). Unconditionally, a change in capital expenditure this large or larger occurs in less than 25% of our sample

[8] We can reconstruct the 4.1% of lagged assets by noting that sales to Home Depot represent 1.008 times lagged assets of the company. Thus, multiplying 15/365 days times 1.008 gives the resulting cash shortfall as a percentage of lagged assets.

observations. This result is robust to a host of alternative specifications and controls reported in the Appendix. We will return to a discussion of these tests and their potential interpretations in Section 2.1 (Robustness).

Similar relationships are apparent when we repeat the exercise for selling and administrative expenses ("SG&A"). Notably, SG&A includes wages, rent, research and development, advertising, and contributions to pension and medical plans. As Column (2) of Table 4 reports, a 1-month payment delay by an important buyer corresponds to a reduction in SG&A of 1.5% of lagged assets. Although this effect is consistent with the cutbacks in capex and is statistically significant, given the median SG&A to assets is 37%, a 1.5% reduction in response to a hypothetical 1-month delay in payment terms is admittedly of a smaller economic magnitude. As a result, the analysis going forward will primarily focus on the sensitivity of capital expenditures.

3.2 Financing receivable growth

How do we interpret the observed cut back in spending by firms facing larger working capital demands from important buyers? The answer depends in large part on what alternative sources and uses of cash the firm could adjust to accommodate their buyers' slower payment speed. In a frictionless marketplace for capital, one might expect firms to adjust along financial margins rather than to cut back on real investment and growth.

We begin this section by directly confirming that suppliers are unable or unwilling to finance the forgone investment documented in Table 4 using outside investors. Table 5 examines the response of supplier cash and debt issuance to trade credit balances. We focus on changes in debt and cash balances, each scaled by lagged assets. Both are flow variables, comparable to capital expenditure or selling and administrative expenses. Both are also considered "informationally insensitive" relative to other sources of funds under pecking order models of capital structure, such that smaller firms might be expected to finance investment or other uses of cash via these first.

Beginning with regressions of the firm's debt issuance activity on buyer payable days, we find no evidence that firms are able or willing to raise new debt to finance their buyers. In unreported results (see the Internet Appendix), we also see no new issuance activity in equity markets, no change to dividends, and no meaningful growth in payables due to the suppliers' own upstream firms. The only financial margin suppliers appear to adjust is their cash burn rate, defined as the change in cash over lagged assets. Column 2 reports that a 1-month delay in payment by a buyer maps into a 1.2% increase in the rate of cash burn experienced by the supplier.

Combined, the evidence might be consistent with a pecking order model in which firms respond to the funding needs of their buyers first out of cash reserves and then out of spending cuts rather than by resorting to costly external funding. At the same time, we are sensitive to alternative interpretations. In particular, if buyer payables comove with (or are driven by) unobservable measures of their suppliers' investment opportunities, then the correlation between supplier investment and buyer working capital policy might simply reflect this. Therefore, a challenge of the paper is to test the extent to which the observed correlation is indeed consistent with financing constraints allowing trade credit to "crowd out" other cash needs.

To help better understand the channel through which buyer payment terms and supplier investment are linked, we begin with the claim that, if the established relation is indeed perpetuated by some form of financing constraint, then we should expect the relation to grow stronger (or attenuate) based on variation in a priori characterizations of such constraint. If, on the other hand, investment is driven by unobservable growth opportunities that correlate with the payables policy of important buyers, then it is less obvious that there should be any variation in sensitivity across groups. We begin by comparing investment sensitivity to buyer payable days based on a coarse cross-sectional measure of constraint—whether or not a supplier had a long-term credit rating in the prior year— and continue with a time-series measure of constraint based on credit market looseness for the aggregate economy. Finally, in our sharpest tests, we'll combine time-series and cross-sectional variation in suppliers' access to external financing by benchmarking the investment behavior of a sample of suppliers linked to the failed lender

CIT against the behavior of a set of control firms linked to the same buyers, but not to CIT, leading to and after CIT's failure.

Table 6 examines the differential effects of buyer payable days on rated and unrated suppliers. Following earlier work, we focus on the presence of a rating as an indicator of the degree of credit constraint faced by a given supplier (Whited 1992; Faulkender and Petersen 2006). Our hypothesis is that, if frictions between suppliers and their sources of capital are behind the observed reduction in spending, we should see the effect diminished for rated firms, for which the wedge between the cost of internal and external financing is relatively small.

Using interaction terms between a dummy variable indicator for whether or not the supplier was rated and buyer payable days, as well as cash flow, and the supplier and buyer's *Q*, Column 1 of Table 6 suggests that the reduction in capital expenditures is indeed larger for unrated firms. In fact, rated firms' investment is almost exactly unchanged in response to delayed payment. Column 2 provides evidence as to why this might be the case. Immediately, we note that, as before, unrated firms are unable or unwilling to issue new debt to finance receivable growth. Rated firms, on the other hand, show significant growth in new debt issuance in response to buyers' extended payment terms. The result is not only consistent with frictions between firms and external sources of capital driving the relation between investment and trade terms but it also seems to weaken alternative explanations that rely on changes in buyer payable days coinciding with shocks to the suppliers' unobservable growth opportunities to the extent that those shocks impact both rated and unrated suppliers.

Meanwhile, time-series variation in the degree of financing constraint that suppliers are likely to face provides a (possibly independent) means of testing the drivers of supplier investment decisions. In Table 7, we repeat a specification similar to that in Table 6, this time replacing the ratings dummy with a time-series measure of credit market tightness provided by the Federal Reserve Board (FRB)—the percentage of senior loan officers responding to their quarterly survey and reporting tightening credit standards. Because our observations are annual, we average the quarterly FRB measure over the fiscal year to which a supplier observation is linked. We also recenter the measure on its value in 2004 (the

loosest period of credit in the time series according to the measure) so that the coefficient on the uninteracted buyer payable days can be interpreted as suppliers' sensitivity during a period of limited financial constraint.

The interaction between credit tightening and the severity of supplier response is strong and negative. Whereas in the loosest periods of credit, capital expenditure is unrelated to buyer payable days (the coefficient on the uninteracted buyer payable days is close to zero), if we plug in values for the severe credit tightening experienced in 2008, the interaction effect implies suppliers would have reduced their capital expenditure by 2.1% for a hypothetical 1-month delay in payment by important buyers. Column 2 suggests the mechanism driving this interaction. A regression of debt issuance on payable days interacted with credit market tightness shows firms are less able to finance receivables via external debt issuance in periods of tight credit.

Combined, these results seem to support the interpretation that the observed relationship between supplier investment and the working capital policies of key customers is driven by costly external financing frictions facing suppliers—frictions that vary in the cross-section and the time series. Yet there are important caveats to this interpretation. The decision to seek a long-term debt rating, for example, may be driven by a host of unobservable firm characteristics, just as the time series of credit tightness is correlated with broader macroeconomic conditions. We cannot fully rule out that those other unobserved characteristics/conditions may also make firms more or less sensitive to some underlying shocks, which simultaneously drive suppliers' investment decisions and their matched buyers' payables. To help sharpen the analysis, we would like sources of variation in supplier constraint that are independent of the tests above and as close to exogenous as possible.

To that end, we take advantage of the failure of a major lender to small- and medium-sized manufacturers during the financial crisis to examine how a shock to financing constraints interacts with the demand for longer payment terms by a significant buyer. In 2007, following large losses in subprime mortgage and education lending markets simultaneous with acute liquidity needs, CIT began efforts at significant deleveraging, reducing its new loan portfolio and selling existing assets. Eventually, CIT

succumbed to Chapter 11 reorganization, but not before scaling back its lending volume by 36% from 2007–2009.

Similar to studies that exploit firms' links to Lehman Brothers at the point of its failure (Ivashina and Scharfstein (2009) and Chitru, May, and Megginson (2012)), we use CIT's failure as a shock to the capital access of its borrowers. As long as bank-borrower relationships are both valuable and difficult to replace (a seemingly well-established fact receiving a great deal of study over the past 20 years, including those by Slovin et al. 1993, Peek and Rosengren 1997, 2000, Khwaja and Mian 2008, Chava and Purnanandam 2011), and a number of others since the crisis), then losing access to a relationship lender will limit a firm's ability to easily finance receivable growth. In the words of the American Bankers Association's Center for Commercial Lending and Business Banking, ". . . the market over time will fill the void. The challenge for CIT borrowers would be finding new lenders in a time frame that works for them . . ." (Choi 2009).

Meanwhile, it is useful to note that CIT's failure was largely driven by factors outside of the commercial lending unit that would have served our sample of suppliers. CIT's 2007 letter to shareholder cites "the downturn in the housing market, the legislative changes surrounding education lending and the tightening of the capital markets" as the cause of its distress, while claiming that the core commercial lending franchise was generating "double digit returns on equity" (CIT's 2007 Annual Report). Thus, it may be reasonable to interpret the bank's failure as an exogenous shock to the firms in its commercial lending portfolio, as opposed to a reflection of portfolio company risk.

We match our sample of suppliers to the DealScan loan database, through which we can identify firms with which CIT had a lender relationship prior to 2007, after which point the lender began facing significant financial difficulties. Within our full sample of firms, we find forty-four suppliers that can be linked to CIT via at least one DealScan loan facility.[9] Because we are interested in a "CIT effect," and not

[9] Although we only observe commercial lending relationships, CIT was among the most active firm factoring manufacturing receivables prior to its bankruptcy. If commercial lending relationship proxy for factoring relationships, the interpretation of our tests is largely unchanged: firms that lost the ability to sell receivables because of CIT distress will be more sensitive to their buyers' payable policy.

a "DealScan effect," we construct a matched control group out of suppliers, which although not linked to CIT, are linked to non-CIT lenders via DealScan—that is, we exclude from the analysis any firms which did not appear in the DealScan loan database.[10] As a robustness check, we further limit the control group to suppliers matched to the same buyers as the treatment group. This allows us to compare the responses of suppliers with and without CIT relationships to changing payment terms from the same buyer.

We establish the period of CIT distress as beginning in June 2007 based on the observable contraction in lending beginning then and coincident with a sharp decline in the price of CIT's equity. A time-series plot of the percentage of DealScan loans in which CIT was a lender, either as the sole bank or as part of a syndicate is presented in the Appendix in Figure A2, alongside a monthly time series of CIT share prices. From June 2007 through the end of 2008, CIT went from being active in roughly 6% of all DealScan loans to less than 1%. During the same time period, share prices dropped by 95%. Meanwhile, it is credible to think the decline in lending could materially impact CIT-linked borrowers adversely, with CIT taking an average 50% share of the loans in which it participates. Finally, to keep a relatively tight estimation period, we limit the time period for our analysis to 10 years, from 2000 to 2009.

Our identification strategy is premised on the idea that, even in the event that overall buyer payment speed is endogenously linked to the supplier's investment opportunity set, the observed correlations between investment and payable days should not depend on shocks to financing constraints unless access to financing is a key mechanism in the observed relationship. Thus, if we can accept CIT's decline as an exogenous shock to some firms' access to financial capital, then the change in sensitivity of investment to buyer payable days for CIT-linked firms, compared with a control sample may help galvanize our interpretation of the prior tables. In practice, we accomplish this by estimating a difference-

[10] This is important because firms that we can successfully match to DealScan are likely to be different from other suppliers along several dimensions. In particular, they have demonstrated banking relationships, which may impact their sensitivity to payment speed. DealScan-linked suppliers have similar receivable days to non-DealScan linked suppliers (1.9 vs. 2 months) but smaller capex requirements (0.05 vs. 0.07), lower q (1.9 vs. 1.6) and higher cash flows (0.11 vs. 0.025) than the unmatched firms. Generally, we might worry that the selection of a sample of banked firms may limit the power of our tests. Specifically if our sample of firms are less sensitive to payment speed because of their access to banking relationships, then there may not be a differential effect among suppliers. Having said that, our tests will be centered on the financial crisis, when even firms with strong bank relationships are likely to have felt the effects of credit constraints.

in-difference-in-differences regression, with particular interest on the interaction between *BuyerPayableDays*, a dummy for firms linked to CIT, and a dummy for observations in the post-2007 period. By comparing the change in sensitivity to payment speed for CIT-linked firms to that in non-CIT linked firms, we allow for the fact that all firms may have become more sensitive to payment terms in the crisis. The coefficient on the triple interaction, however, isolates the differential effect experienced by those facing the most acute credit constraints.[11]

Table 8 presents the results from the tests described above. Column 1 estimates a triple-differenced regression measuring the sensitivity of CIT-linked suppliers to the payment speed of their buyers before and after CIT's failure, compared with a matched sample of firms banked by non-CIT lenders. In particular, we are interested in the triple interaction *BuyerPayableDays X CIT linked X post2007*. The coefficient is negative and significant at the 1% level. To get a sense of the magnitudes, the coefficient of -0.016 tells us that, in the period following CIT's collapse, for a hypothetical 1-month delay in payment by an important buyer, CIT linked suppliers cut back capex to lagged assets by 1.6% more than their control group. Note that, even the control group exhibits additional sensitivity to payment speed in the post-2007 period, consistent with the findings from Table 7.

Column 2 adds supplier X buyer fixed effects as in earlier tables. Focusing on within-firm variation in payment speed and investment does not have a material impact on the results or interpretation. Finally, Column 3 benchmarks the CIT-linked suppliers in the treatment group to a matched control of suppliers working with the same buyers. Thus, we can compare the sensitivity to payment terms of two sets of Walmart suppliers—those with and without CIT relationships. The results from the more closely matched control group reaffirm our earlier findings. The triple interaction coefficient suggests that, following CIT's failure, the CIT-linked suppliers would cut back

[11] That our CIT tests coincide with the financial crisis obviously has its drawbacks. Most notably, we might worry that during the crisis, lots of other factors are at work that could drown out any predicted effects. However, it is also very important for the tests that the "experiment" occurs during a period in which financial constraints are heightened. If, in contrast, CIT's failure had occurred during the credit binge a few years earlier, perhaps even CIT-linked firms would be able to find substitute financing for new receivables, thus making any differential sensitivity impossible to detect.

investment/lagged assets by 1.1% more than non-CIT linked firms in response to a 1-month payment delay.

In referring to a hypothetical payment delay by important buyers above, it is perhaps interesting to note, that in response to the broader crisis surrounding CIT's failure, on average, retailers in our sample appear to have responded by paying suppliers somewhat more quickly. By way of example, Walmart adjusted its payable days from 39 days to 35 days from 2007 to 2008. Although we will not speculate as to the motivation for this change, suppliers' response to the welcome additional liquidity suggests a symmetric effect: constrained suppliers not only cut back when they are faced with cash shortfalls linked to slower payment but constrained firms receiving faster payment also appear to quickly make use of the liquidity to invest and grow.

Up to this point, we have relied on the implicit assumption that adjustment along real margins, such as investment spending and the resulting forgone growth, implies a loss in profitability and firm value. Yet this is only true to the extent that suppliers have a tendency not to overinvest when paid cash on delivery. For example, if managers enjoying faster payment terms tend to overspend on pet projects, then the real costs of extending trade credit are less clear.

To get a very rough sense of the long run costs of slowed spending, we consider the effect of payment delays on suppliers' future profitability. Table 9 measures the effect of buyer payable days on operating profits, defined as annual operating income divided by lagged total assets, for the current period, as well as four leading periods ($t+1$ through $t+4$). In each case, operating income is scaled by the assets in place at the beginning of period t and then standardized to have zero mean and a standard deviation of one.[12]

In the years during and immediately following changes to payable days, there is no change in profitability. If anything, in fact, operating income appears to grow, consistent with higher margins linked

[12] In this particular regression, we measure buyer payable days in logs. Although the results are qualitatively similar in levels (as used throughout the rest of the paper), there is considerably better fit under the reported specification. The interpretation of using logs is more natural here—that the effect of a change in payment speed on profitability depends on the payment speed initially enjoyed by the supplier.

to slower payment, although not significantly so. However, as Columns 4 and 5 report, by the fourth and fifth years, we find that profitability significantly decreases. Controlling for other determinants of operating income, a doubling of buyer payable days decreases operating income in years 4 and 5 (scaled by the fourth and fifth lag of assets) by 0.24 and 0.28 standard deviations, respectively. Overall, doubling the buyer's payable days reduces the 5-year sum of operating profit of suppliers 0.20 standard deviations.

3.3 Robustness

The obvious alternative interpretation of the documented link between trade credit demands of large buyers and the investment of their suppliers, requires a time-varying unobservable buyer characteristic, which jointly drives payables policy and supplier investment (and to which exogenously constrained firms are more sensitive). In particular, we might worry that the demand for prolonged payables days signals adverse news about a buyer's growth or financial strength. Firms in distress, for example, are often known to "stretch their payables" as a last resort source of financing. To the extent that suppliers depend on the continued health of their major customers, any signal of current buyer weakness might reasonably induce cut backs in capital expenditures and SG&A. Ideally, buyer distress would be captured by the buyer's *Q*, or perhaps the supplier's own *Q*, but we acknowledge that, in practice, these controls provide an incomplete measure of the buyers' prospects.

Although, by definition, the correlation between unobservable buyer characteristics and payment speed is impossible to test, it would not be unreasonable to assume that any such relationship strong enough to drive supplier investment should also be reflected in the correlation between observable measures of buyer strength and payable days. In other words, if buyer payable days is a proxy for buyer health, we should be able to observe that in any number of observable health proxies.

Yet within our sample of investment-grade buyers, specifically screened as some of the largest and most creditworthy firms in the Compustat sample, the relationship between payable days and first-order measures of profitability and valuation in equity and debt markets turn up little to no relationship.

Specifically, panel regressions of buyer payable days on levels and differences of q, current and lagged net income as a percentage of assets, yield no significant coefficients, either economically or statistically. These regressions are reported in various forms in Table A1 of the Appendix. For a subsample of buyers, beginning in 2001, we even have quotations for 5-year CDS contracts. CDS spreads also appear unrelated to the year-to-year variation in payment speed used in our analysis.

Note that the absence of a relationship between working capital policy and other measures of financial condition for our sample of buyers should not be interpreted as a general result. It's not uncommon for firms in distress to use working capital as a short-term source of capital. However, our buyers were chosen specifically to limit any such relationship—the regressions in Table A1 of the appendix suggest this aspect of the experiment design may have been successful.

Another sensible test of this alternative hypothesis would exploit the timing of supplier investment cuts around changes in payable days. Whereas changes in payables policy tend to be pronounced, changes in perceptions of buyer health are constantly evolving. As a result, suppliers responding to unobservable shocks to buyer health are likely to anticipate policy changes which are also driven by those shocks, adjusting their investment in advance of actual changes to their buyers' payables policy. Appendix Table A2 presents first-differenced investment regressions with various leads and lags of buyer payable days. We find the response of capex to buyer payable days is immediate, short-lived and, importantly, not anticipatory.

Finally, we exploit the fact that many of our retailers have close rivals within the sample—buyers which purchase from manufacturers of similar products. For example, just as Table 2 compared Home Depot with Lowe's and their respective suppliers, we can generalize that to compare Macy's and Dillards, Staples and OfficeMax, so on and so forth. Given that these pairs of buyers and their suppliers face similar industry conditions at the same time, we can purge the effects of time varying industry shocks from the regression by controlling for retail subindustry x time fixed effects. Column 4 of Table A2 includes yearly fixed effects for eleven 3-digit buyer NAICS buyer categories in our sample (for example, food and beverage, clothing and clothing accessories, and health and personal care). These fixed effects

capture time series shocks across different parts of the retail sector and allow us to directly compare a change in Home Depot policy relative to Lowe's policy while netting out any sectoral shock to suppliers serving the home improvement market. Even with these extensive additional controls, the response of supplier capex to buyer payable days is unmoved from -1.2%. This seems to weaken support for a class of interpretations of the result that rely on suppliers to a given buyer facing a simultaneous industry shock that impacts their investment path in the same way.

In summary, we think the set of possible mechanisms that can explain our results and that are consistent with the robustness tests above is a fairly narrow one. Specifically, any buyer shocks which jointly drive buyer payable days and supplier investment must be unobservable and uncorrelated with observable measures of buyer health, must match the timing of adjustment to payables policy exactly, and should be unrelated to industry dynamics. Meanwhile, only the investment opportunity sets of suppliers facing binding financial constraints should be sensitive to these shocks.

4. Concluding remarks

The evidence presented suggests an alternative characterization of the trade credit relationship in which firms that appear to be constrained in their ability to raise external financing provide credit to firms for which financing frictions should be limited. Our contribution is to show that, smaller constrained firms tend to adjust their investment following changes to large buyers' payables policies. The effect appears consistent with underinvestment being driven by trade credit lenders with high opportunity cost of financial capital lending to firms with a low opportunity cost.

Taken alone, the implied deadweight losses costs of large firms' trade credit borrowings would appear to deepen the puzzle of why buyers with low external cost of funds borrow using trade credit at all. Absent other frictions, constrained firms could avoid the implicit costs of trade credit lending by offering lower prices in exchange for cash payment.

Yet other authors have suggested that trade credit from small, young firms to their larger buyers may serve as a performance bond on unknown product quality or resolve moral hazard problems along the production chain (Lee and Stowe 1993; Long, Malitz, and Ravid 1993; Klapper, Laeven, and Rajan 2011; Kim and Shin 2012). Thus, the counterintuitive pattern of financing observed may be a necessary evil in a world in which product market frictions outweigh financial market frictions. The intersection of these two observations may point to interesting questions for future work. In particular, if firms with established products are also known quantities in financial markets, then, on one hand, they can be paid cash by the buyers, but, on the other hand, this is of little value because external financing is available. At the same time, new, young firms without product market reputations are also likely to be the same firms facing costly external financing, in which case trade credit demands by buyers will simultaneously be most critical and most costly.

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Table 1. Summary statistics

Panel A: Trade credit usage by firm size

Size decile (assets)	Smallest 1	2	3	4	5	6	7	8	9	Largest 10
Median net trade credit days (payable days - receivable days)	61.51	6.60	0.00	-6.84	-3.07	-2.75	-2.13	-1.55	1.34	6.10

Using the full Compustat sample (excluding financials) as of 2009, median net trade credit days, defined as payable days minus receivable days, are presented for ten size deciles, as measured by total assets. The sample period is from 1985 to 2009 and consists of 1,063 unique buyer-seller pairs involving forty unique retail buyers and 723 unique sellers. The distributions for various summary statistics from our sample are reported below. Payable days for buyers are calculated as accounts payable (item AP) divided by purchases (cost of goods sold + change in inventory) and multiplied by 360. Receivable days for sellers are calculated as trade accounts receivable (item RECTR or RECT if RECTR is missing) divided by sales and multiplied by 360. With the exception of Columns 10 and 11, the distributions are reported for annual observations occurring at the level of a buyer/supplier pair. Dollar values are reported in inflation adjusted (1985) dollars and are left unwinsorized. All-in-loan spreads comes from a sample of loans taken from the DealScan database in which the issuer is a buyer or a supplier in our sample.

Panel B: Sample description

	(1) Relationship length (years)	(2) Buyer-payable days	(3) Supplier-receivable days	(4) Buyer-Mkt. Cap. (millions)	(5) Supplier-Mkt. Cap. (millions)	(6) Supplier-buyer sales/buyer COGS (%)	(7) Supplier-buyer sales/supplier Sales (%)	(8) Supplier CAPX/lagged assets	(9) Supplier SG&A/lagged assets
Mean	7.79	39.37	56.95	44,276	352	0.16	25.12	0.06	0.93
SD	4.92	16.97	60.84	48,778	1291	0.21	18.36	0.56	3.51
10%	3	25.98	24.03	3,555	3	0.00	7.65	0.01	0.16
25%	4	31.09	35.79	6,487	9	0.02	10.96	0.02	0.25
Median	7	35.21	50.79	22,659	29	0.07	14.95	0.03	0.37
75%	10	41.17	68.27	87,485	141	0.20	23.00	0.06	0.59
90%	16	60.97	90.93	116,340	641	0.48	38.00	0.10	0.88

	(10) Buyer all-in-loan spread (DealScan)	(11) Supplier all-in-loan spread (DealScan)	(12) Buyer rating	(13) Supplier rating
Mean	0.55%	2.23%	–	–
SD	0.65%	1.43%	–	–
10%	0.17%	0.45%	AA	BB-
25%	0.25%	1.25%	AA	unrated
Median	0.35%	2.25%	AA	unrated
75%	0.55%	3.00%	A	unrated
90%	1.12%	4.00%	BBB+	unrated

Table 2. Small sample evidence on the effects of trade terms

Columns 1–3 report the results from a difference-in-differences regressions. We compare the investment activity of Home Depot suppliers to that of Lowe's matched suppliers around Home Depot's 2001 decision to delay payment terms by 15 days going forward for its vendors. We use a symmetric window of observation between 1997 and 2004. Columns 2 and 3 add supplier and year fixed-effects. Standard errors are clustered at the supplier level. See Figure A1 for an analysis of parallel trends in the investment activity of treatment and control groups. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Capital expenditure	(2) Capital expenditure	(3) Capital expenditure
Home Depot supplier	0.030*	0.015	0.017
	(0.017)	(0.011)	(0.011)
Home Depot supplier X post-2001	-0.032*	-0.025*	-0.026**
	(0.016)	(0.014)	(0.013)
Post-2001	0.003		
	(0.014)		
Cash flow	0.081	-0.015	-0.014
	(0.049)	(0.064)	(0.065)
q	0.014**	0.015*	0.015*
	(0.007)	(0.008)	(0.008)
Buyer q			-0.001
			(0.003)
Supplier fixed effects	no	yes	yes
Year fixed effects	no	yes	yes
Observations	281	281	281
R^2	0.133	0.152	0.152

Table 3: Buyer payable days and supplier receivable days

Columns 1 and 2 estimate the effect of average payable days outstanding of large retailers on their suppliers' receivables. The model is estimated assuming buyer-supplier fixed effects,

$$\boldsymbol{SupplierReceivableDays_{i,t} = \alpha_t + \alpha_{i,j} + \beta_1 BuyerPayableDays_{j,t} + \beta_{2-k} X_{i,j,t} + \varepsilon_{i,j,t}},$$

where subscript *i* indexes suppliers and subscript *j* indexes buyers. *BuyerPayableDays* (reported in months) are calculated as the accounts payable of the buyer divided by cost of goods sold, times 30, whereas *SupplierReceivableDays* are calculated as trade receivables divided by net sales, times 30. Cash flow is operating income before depreciation divided by last period's assets, and q is calculated as the market value of equity plus book value of assets, less shareholders equity and deferred taxes, divided by assets. Q is measured at the beginning of each period for the buyer and the supplier. In addition to the controls reported, regressions include buyer-supplier pair fixed effects and time fixed effects. Column (3) reports the relation between the supplier's markup, defined as (sales-cost of goods sold)/cost of goods sold, and the log of buyer payable days. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Receivable days (in months)	(2) Receivable days (in months)	(3) Supplier markup
Buyer payable days (in months)	0.185**	0.184***	
	(0.088)	(0.067)	
ln(Buyer payable days)			0.061*
			(0.032)
Buyer q		0.005	
		(0.021)	
Cash flow		-0.044	
		(0.119)	
q		0.007	
		(0.039)	
Supplier X buyer fixed effects	yes	yes	yes
Year fixed effects	yes	yes	yes
Observations	5,352	4,280	5,354
R^2	0.03	0.04	0.001

Table 4. Working capital and investment

Columns 1 and 2 estimates the effect of buyer payment speed on supplier expenditures,

$$\boldsymbol{SupplierInvestment_{i,t} = \alpha_t + \alpha_{i,j} + \beta_1 BuyerPayableDays_{j,t} + \beta_{2-k} X_{i,j,t} + \varepsilon_{i,j,t}},$$

where subscript *i* indexes suppliers and subscript *j* indexes buyers, and investment represents capital expenditure ($CAPX/AT_{t-1}$) or alternatively selling, general, and administrative expenditures ($XSGA/AT_{t-1}$), hereafter SG&A. To avoid the mechanical impact of SG&A expenditures in operating income, Column 2 measures supplier cash flow as gross profit, defined as net sales less cost of goods sold but before SG&A. In addition to the controls reported, regressions include buyer-supplier pair fixed effects and time fixed effects. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Capital expenditure	(2) SG&A expenditure
Buyer payable days (in months)	-0.012***	-0.015**
	(0.003)	(0.007)
Buyer q	-0.002	-0.004
	(0.001)	(0.005)
Cash flow	0.038***	0.597***
	(0.010)	(0.028)
q	0.012***	0.031***
	(0.002)	(0.006)
Supplier X buyer fixed effects	yes	yes
Year fixed effects	yes	yes
Observations	4,278	4,199
R^2	0.14	0.67

Table 5. Financing receivable growth

Table 5 estimates the effect of the average payable days of buyers on net debt issuance and change in cash, each scaled by lagged assets. In addition to the controls reported, regressions include buyer-supplier pair fixed effects and time fixed effects. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Δ Debt	(2) Δ Cash
Buyer payable days (in months)	-0.004	-0.012*
	(0.012)	(0.006)
Buyer q	-0.011*	-0.000
	(0.006)	(0.002)
Cash flow	0.165**	0.111***
	(0.072)	(0.042)
q	0.020***	0.008
	(0.006)	(0.006)
Supplier X buyer fixed effects	yes	yes
Year fixed effects	yes	yes
Fiscal quarter dummies	yes	yes
Observations	4,283	4,282
R^2	0.04	0.04

Table 6. Credit availability and supplier sensitivity to payment delays, part 1.

Table 6 estimates the interaction between whether or not a supplier was rated in the prior period and the effects of buyer payable days on supplier investment and debt issuance. In addition to the controls reported, regressions include buyer-supplier pair fixed effects and time fixed effects, a dummy for whether or not the supplier was rated, and separate interactions between the ratings dummy and supplier cash flow and q, as well as buyer q. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Capital expenditure	(2) Δ Debt
Buyer payable days (in months)	-0.012***	-0.008
	(0.003)	(0.016)
Buyer payable days X ratings dummy	0.010*	0.082***
	(0.006)	(0.021)
Buyer q	-0.002*	-0.016**
	(0.001)	(0.008)
Cash flow	0.037***	0.153**
	(0.010)	(0.072)
q	0.012***	0.019***
	(0.002)	(0.006)
Supplier X buyer fixed effects	yes	yes
Other interactions	yes	yes
Year fixed effects	yes	yes
Ratings dummy	yes	yes
Observations	4,278	4,283
R^2	0.14	0.05

Table 7. Credit availability and supplier sensitivity to payment delays, part 2

Table 7 estimates the interaction between tightness in the bank market (captured by the percentage of loan officers reporting tightening credit standards in a given year) and the effects of buyer payable days on supplier investment. In addition to the controls reported, regressions include buyer-supplier pair fixed effects, time fixed effects, and separate interactions between credit tightening and supplier cash flow and q, as well as buyer q. The measure of credit tightening has been recentered at the minimum value of credit tightening (that is, the loosest period of credit, achieved during 2004), such that the coefficient on (uninteracted) buyer payable days can be interpreted as the impact of payment speed on investment and debt issuance during periods of loose credit. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Capital expenditure	(2) Δ Debt
Buyer payable days (in months)	-0.003	0.016
	(0.003)	(0.019)
Buyer payable days X credit tightening	-0.023***	-0.036*
(FRB Senior Loan Officer Survey)	(0.007)	(0.021)
Buyer q	-0.002	0.001
	(0.002)	(0.008)
Cash flow	0.063***	0.170*
	(0.017)	(0.102)
q	0.016***	0.007
	(0.003)	(0.012)
Supplier X buyer fixed effects	yes	yes
Other interactions	yes	yes
Year fixed effects	yes	yes
Observations	3,981	3,985
R^2	0.16	0.05

Table 8. Credit availability and supplier sensitivity to payment delays, part 3

Table 8 estimates the differential impact of buyer payable days on investment between suppliers linked to CIT Group and those with non-CIT lending relationships, before and after 2007. Lender relationships are identified by matching the supplier sample with DealScan prior to 2007—suppliers with no DealScan transactions are excluded from the sample. We limit the sample period to the final 10 years of data, beginning in 2000. The variable post-2007 is a dummy for any observation reported after June 2007. Of interest is the interacted coefficient of **BuyerPayableDays X CIT X post-2007**, which captures the change in CIT-linked suppliers' sensitivity to buyer payment speed following CIT's financial difficulty, benchmarked against the change in sensitivity for non-CIT linked suppliers. Interaction terms are formed after demeaning Buyer Payable Days, so the coefficients can be interpreted as the marginal effect at the mean. In addition to the controls reported, regressions include buyer-supplier pair fixed effects (Column 2 only), time fixed effects, and a dummy variable for rated suppliers. Column 3 limits the control sample of non-CIT linked firms to suppliers serving the same group of buyers as the treated firms. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Capital expenditure	(2) Capital expenditure	(3) Capital expenditure
Buyer payable days (in months)	0.002	-0.003	-0.002
	(0.005)	(0.004)	(0.003)
Buyer q	-0.000	-0.001	-0.001
	(0.002)	(0.001)	(0.002)
Cash flow	0.080***	0.045***	0.046***
	(0.012)	(0.014)	(0.014)
q	0.008***	0.009***	0.010***
	(0.002)	(0.002)	(0.002)
CIT linked	-0.001		
	(0.007)		
CIT linked x post-2007	-0.004	-0.000	0.001
	(0.003)	(0.007)	(0.003)
Buyer payable days x post-2007	-0.012*	0.003	0.005
	(0.006)	(0.002)	(0.005)
Buyer payable days x CIT linked	-0.003	0.008	0.007
	(0.005)	(0.010)	(0.009)
Buyer payable days x CIT linked x post-2007	-0.016***	-0.010**	-0.011**
	(0.004)	(0.005)	(0.005)
Supplier X buyer fixed effects	no	yes	yes
Year fixed effects/post-2007	yes	yes	yes
Ratings dummy	yes	yes	yes
Observations	1,972	1,900	1,717
R^2	0.18	0.18	0.18

Table 9. Trade credit, investment, and subsequent performance

Table 9 estimates the effect of payment speed on subsequent performance for affected suppliers. Performance is measured by operating profitability, defined as annual operating income, measured in the current period and in four leading periods (t+1 through t+4), scaled by assets in place at the beginning of period t (e.g., Operating Profits (t+3)=Operating Income (t+3)/Assets(t-1)). Each lead of operating profit is then standardized (demeaned and divided by its standard deviation) for ease of interpretation. Columns 1–5 report estimates of buyer days' effect on current and future returns to current period assets, whereas Column 6 reports the effect on aggregate 5-year operating profit. In addition to the controls reported, regressions include buyer-supplier pair fixed effects and time fixed effects. Standard errors are double clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	(1) Operating profit (t)	(2) Operating profit (t+1)	(3) Operating profit (t+2)	(4) Operating profit (t+3)	(5) Operating profit (t+4)	(6) Five-year operating profit
ln(Buyer payable days) (in months)	0.008	0.042	-0.079	-0.242**	-0.284*	-0.201**
	(0.061)	(0.070)	(0.101)	(0.100)	(0.169)	(0.091)
Buyer q	0.012	0.019	0.031	0.013	-0.007	0.018
	(0.021)	(0.016)	(0.029)	(0.020)	(0.013)	(0.018)
q	0.004	-0.016	0.028	0.027	0.049	0.023
	(0.025)	(0.035)	(0.047)	(0.042)	(0.035)	(0.036)
Supplier X buyer fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Observations	4,288	3,912	3,584	3,180	2,779	2,757
R^2	0.03	0.02	0.03	0.03	0.04	0.04

Figure 1. Payable days examples

Figure 1 plots the payable days for two major retailers in the sample. In 2001, Home Depot announced it would pay its suppliers roughly 15 days more slowly than it had previously. In 2006, Lowe's began reporting a deliberate attempt to grow its payable days through longer trade terms with suppliers.

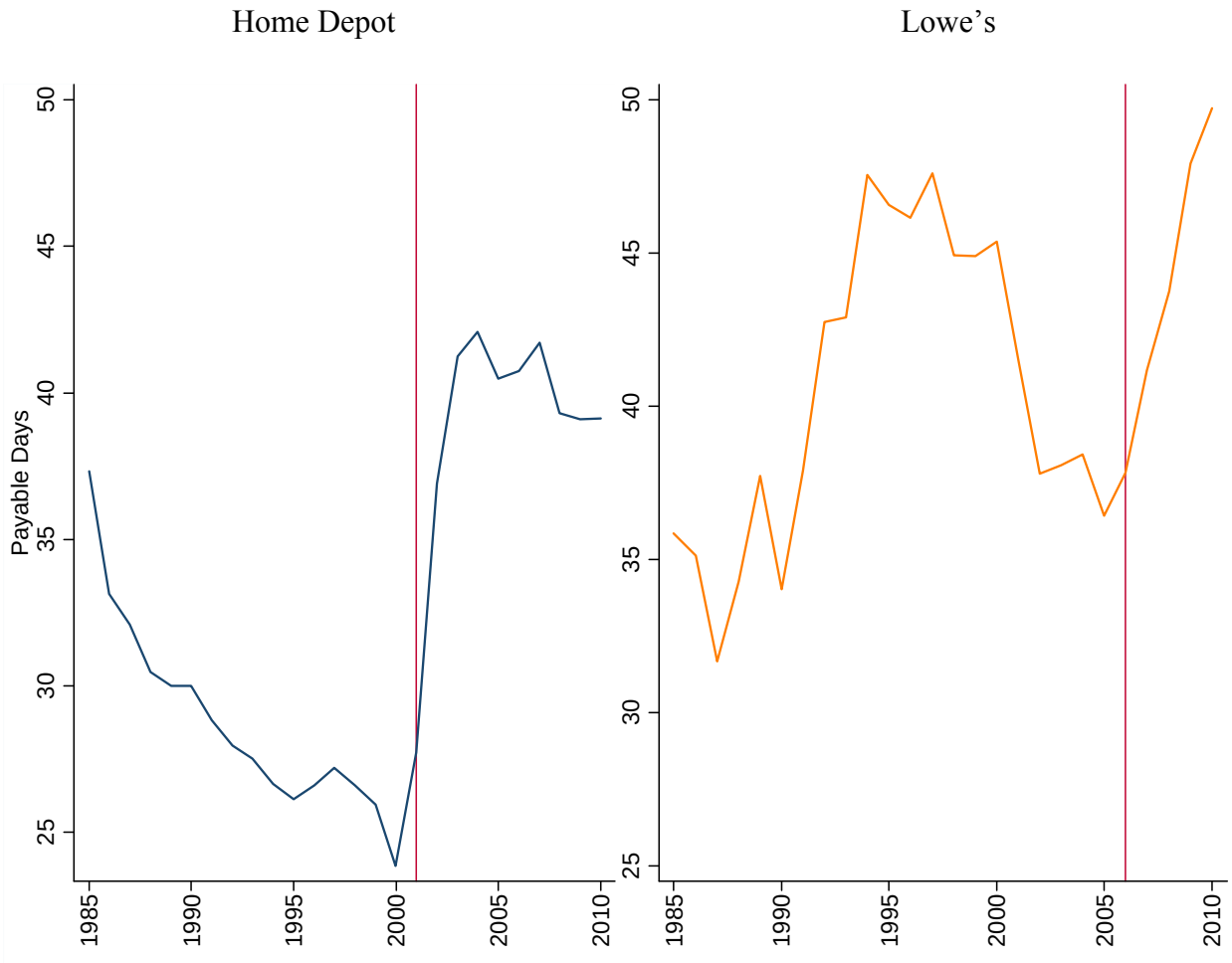
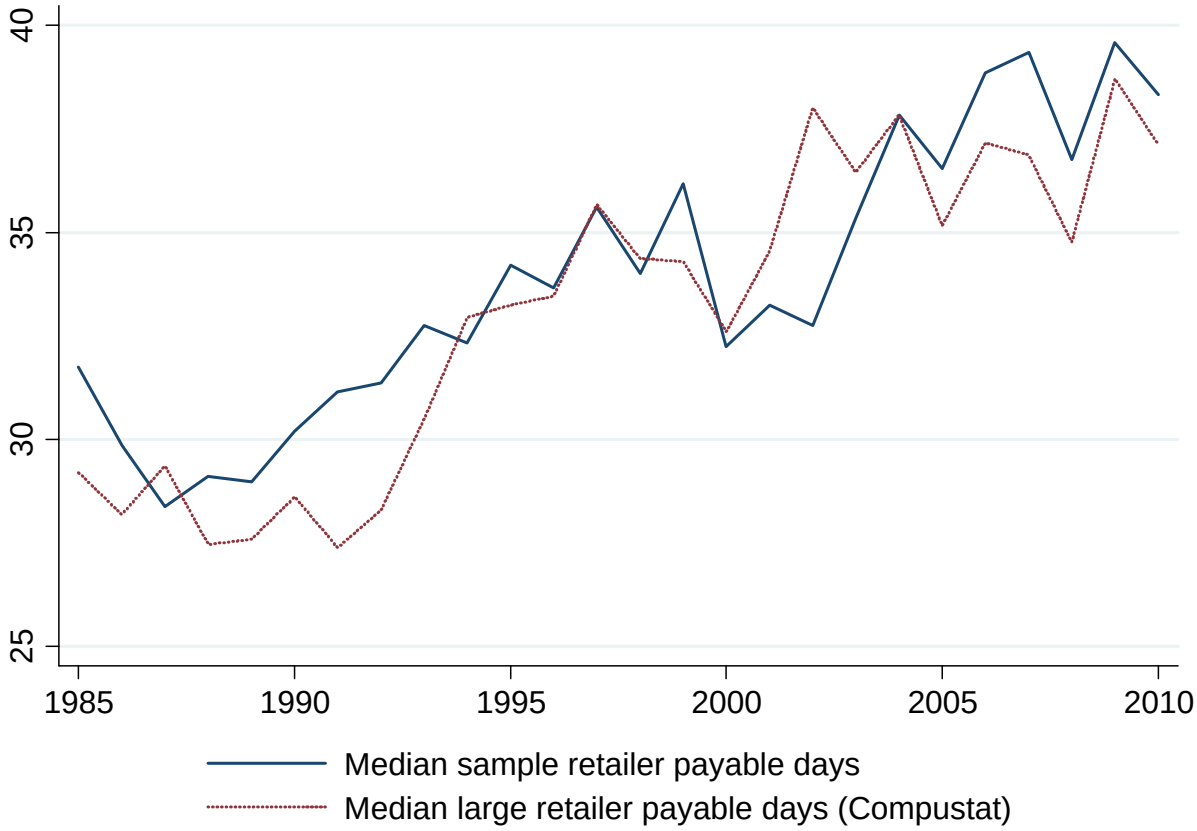


Figure 2. Payable days examples (continued)

Below, we plot the median payable days by fiscal year for the retailers in our sample, alongside the median payable days for the top size decile (by assets) of Compustat retailers, defined based on GIC group classification (2550) and with size deciles recalculated each year.



Appendix A. Examples of 10-K Disclosures

PARADISE INC, 2010

(Notes)

NOTE 11: MAJOR CUSTOMERS

During 2010, the Company derived approximately 18% and 10% of its consolidated revenues from Wal-Mart Stores, Inc. and Aqua Cal, Inc., respectively. During 2009, the Company derived 17% of its consolidated revenue from Wal-Mart Stores, Inc. As of December 31, 2010 and 2009, Wal-Mart Stores, Inc.'s accounts receivable balance represents 83% and 77% of total accounts receivable, respectively, and Aqua Cal, Inc.'s accounts receivable balance represented 14% of total accounts receivable at December 31, 2010.

NOTE 12: CONCENTRATION OF CREDIT RISK

Financial instruments which potentially subject the Company to concentration of credit risk consist principally of cash, cash equivalents and unsecured trade receivables. The Company's cash and cash equivalents are maintained at one financial institution located in Florida. Accounts at this institution are secured by the Federal Deposit Insurance Corporation up to $250,000. Uninsured balances aggregate to $4,522,056 at December 31, 2010. The Company grants credit to customers, substantially all of whom are located in the United States. The Company's ability to collect these receivables is dependent upon economic conditions in the United States and the financial condition of its customers.

UNIVERSAL FOREST PRODUCTS, 2002

(Management Discussion and Analysis)

Cash flows from operating activities decreased by over $61 million in 2002 compared to 2001. This decrease was primarily due to:

- An increase in our inventory levels relative to sales. In November and December 2002, our purchasing managers took advantage of the historically low level of the Lumber Market and increased inventory levels. The product purchased during this period is expected to be sold in the first quarter of 2003. In addition, inventory levels increased in 2002 as a result of both inclement weather reducing sales in November and December and additional inventory purchased to utilize capacity created with our treating services agreement with Quality (see Business Combinations).

- An increase in our accounts receivable as a result of extending our payment terms with The Home Depot by an additional 15 days.

Due to the seasonality of our business and the effects of the Lumber Market, we believe our cash cycle (days sales outstanding plus days supply of inventory less days payables outstanding) is a good indicator of our working capital management. Our cash cycle increased to 47 days in 2002 from 44 days in 2001. This increase was primarily due to a longer receivables cycle resulting

from extended payment terms with The Home Depot. This was offset slightly by an extension in our payables cycle.

HOME DEPOT, 2001

LIQUIDITY AND CAPITAL RESOURCES

Cash flow generated from operations provides us with a significant source of liquidity. For fiscal 2001, cash provided by operations increased to $6.0 billion from $2.8 billion in fiscal 2000. The increase was primarily due to significant growth in days payable outstanding from 23 days at the end of fiscal 2000 to 34 days at the end of fiscal 2001, a 12.7% decrease in average inventory per store as of the end of fiscal 2001 and increased operating income. The growth in days payable and decrease in average inventory per store are the result of our efforts to improve our working capital position by extending our payment terms to industry standards and enhancing inventory assortments.

Appendix B. Buyer List

7-ELEVEN INC
ALBERTSON'S INC
ALLIED STORES
AMERICAN STORES CO
AUTOZONE INC
BEST BUY CO INC
BROWN SHOE CO
CAREMARK RX INC
COSTCO WHOLESALE CORP
CVS CAREMARK CORP
DELHAIZE AMERICA INC
DILLARDS INC
FOOT LOCKER INC
HOME DEPOT INC
KOHL'S CORP
KROGER CO
LIMITED BRANDS INC
LOWE'S COMPANIES INC
MACY'S INC
MAY DEPARTMENT STORES CO
NORDSTROM INC
OFFICE DEPOT INC
OFFICEMAX INC
PENNEY (J C) CO
PETRIE STORES
RADIOSHACK CORP
REVCO D.S. INC
RITE AID CORP
SAFEWAY INC
SEARS
STAPLES INC
STOP & SHOP COS
SUPERVALU INC
TARGET CORP
TIFFANY & CO
TJX COMPANIES INC
TOYS R US INC
WAL-MART STORES INC
WALGREEN CO
WINN-DIXIE STORES INC

Appendix (cont)

Table A1. Buyer health and payment speed

We report panel regressions of buyer payable days on buyer q, profits (scaled by lagged assets), and CDS spreads. CDS spreads are the monthly average spread as of the reporting date for buyers, when available, from 2001—2009. Regressions include buyer and time fixed effects. Standard errors are clustered at the level of the buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

Buyer payable days (in months)	(1)	(2)	(3)	(4)	(5)	(6)
Buyer q_t	-0.003					
	(0.032)					
ΔBuyer q_t		0.000				
		(0.000)				
Buyer $Profits_t$			-0.161			
			(0.498)			
ΔBuyer $Profits_t$				-0.126		
				(0.177)		
Buyer $Profits_{t+1}$					-0.288	
					(0.318)	
Buyer CDS Spreads						-0.002
						(0.004)
Buyer fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Observations	757	747	783	783	743	186
R^2	0.05	0.05	0.05	0.05	0.06	0.06

Table A2. Robustness

Columns 1–3 replace fixed effects estimation with first differences with leads and lags. Column 4 returns to buyer-supplier fixed effects and adds fixed effects for retail sub-industry X year. Using three-digit buyer NAICS, this divides the sample into eleven groups of buyers (examples include food and beverage, health and personal care, electronics and appliances, and clothing and clothing accessories) and adds year dummies for each group. Standard errors are clustered at the level of supplier and buyer, are robust to heteroscedasticity, and are reported in parentheses. ***, **, and * signify results significant at the 1%, 5%, and 10% levels, respectively.

	First differences			
	(1) Capital expenditure	(2) Capital expenditure	(3) Capital expenditure	(4) Capital expenditure
Buyer Payable Days (in months)$_{t+1}$			0.000	
			(0.004)	
Buyer Payable Days (in months)	-0.014***	-0.018***	-0.011***	-0.012***
	(0.004)	(0.004)	(0.004)	(0.003)
Buyer Payable Days (in months)$_{t-1}$		-0.007		
		(0.006)		
Buyer q_t	-0.002*	-0.006***	-0.004*	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)
Cash flow	0.026***	0.036***	0.034***	0.037***
	(0.008)	(0.009)	(0.011)	(0.011)
q	0.012***	0.012***	0.011***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)
Supplier X buyer fixed effects	no	no	no	yes
Retailer NAIC (three-digit) X year fixed effects	no	no	no	yes
Year fixed effects	yes	yes	yes	yes
Observations	3,267	2,534	2,391	4,278
R^2	0.09	0.09	0.08	0.19

Figure A1. Home Depot versus Lowe's

Capex to lagged assets are reported for Home Depot and Lowe's suppliers around the time of 2001 policy change in which Home Depot began slower payment to suppliers. More specifically, we plot separate year fixed effects for the two supplier groups from a regression of capex/lagged assets on supplier cash flow, supplier q, and supplier fixed effects (as in Table 2, Column 2). The year 2000 dummy variable is omitted for both groups, such that the two lines represent investment deviations around the last year before the policy change, which were not attributable to cash flow, q, or firm fixed effects.

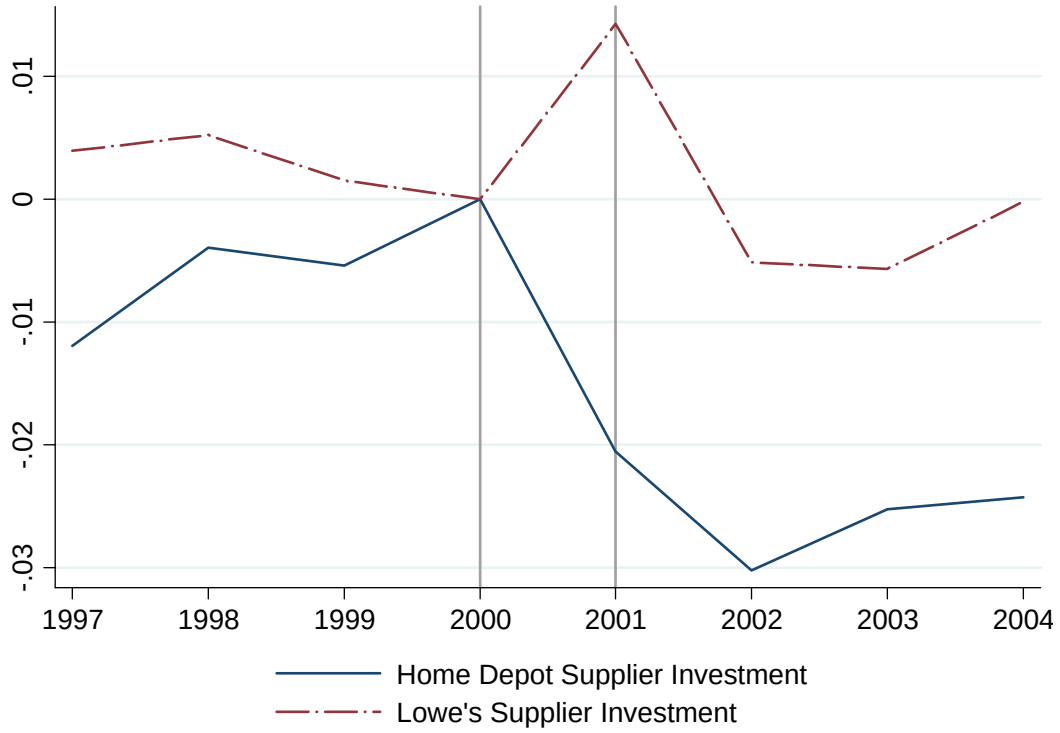


Figure A2. Timing of CIT distress

Figure A2 plots a three-month moving average of the percentage of DealScan loans, in which CIT served as a lender (as the sole bank or as part of a syndicate) on the left vertical axis. On the right vertical axis is the monthly share price of CIT equity (we plot the monthly low). We use the steep decline in lending activity and equity valuation around the second half of 2007 to define the period of relative financing constraint for CIT-linked borrowers.