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Bank Lines of Credit as a Source of Long-Term Finance

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Abstract

Hand-collecting credit line drawdowns that firms classify as long-term debt, we first document how long-term drawdowns rise with high investment needs or weak external capital market conditions. Nearly all drawdown proceeds finance long-term investment, including M&A activity. Unrated and lower-rated firms rely more on long-term drawdowns than high or very poorly rated firms. We further find that credit lines have tighter covenants than terms loans. Drawdowns are repaid fairly quickly and often refinanced with other long-term debt. Our findings support the monitored liquidity insurance theory of credit lines and highlight that long-term drawdowns act as a valuable bridge financing mechanism.

I. Introduction

Bank lines of credit represent an important source of corporate finance in the economy.[1] Among U.S. firms with loan commitments exceeding $1 million, the average size of credit lines is 24% of total assets (Brown, Gustafson, and Ivanov

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[1]Credit lines are bank commitments to provide firms with loans over a set period at predetermined terms (Demiroglu and James (2011)). They are also called revolving facilities, loan commitments, revolving credit agreements or loans, bank lines, or revolvers.

(2021)). Berg, Saunders, and Steffen (2021) document that undrawn credit lines of U.S. public firms as a percentage of GDP have tripled over the last 2 decades. Despite the increasing importance of credit lines, how firms use them has yet to be thoroughly investigated, plausibly due to a lack of machine-readable credit line drawdown data (i.e., amounts actually borrowed under credit lines) (Campello, Giambona, Graham, and Harvey (2011)). In this study, we gather detailed U.S. firm-level information on credit line drawdowns classified as long-term debt to offer an in-depth view of credit line uses for long-term purposes. Specifically, we examine: i) what drives credit line drawdowns as a source of long-term finance, ii) how firms deploy drawdown proceeds across various uses, iii) how long firms draw down credit lines and how they repay or refinance drawdowns, and iv) how patterns of credit line use vary by credit rating classes. With this evidence, we evaluate the empirical validity of credit line theories.

To better understand credit lines as a source of long-term finance, we manually collect long-term drawdown data from U.S. Securities and Exchange Commission (SEC) 10-K filings for firms in the S&P 1500 index. Under the Statement of Financial Accounting Standards (SFAS No. 6), credit line drawdowns intended for long-term uses (i.e., over a year) need to be reported on a firm's balance sheet as long-term debt. We find that credit line use for long-term purposes is pervasive and substantial, with about 29% of firms with credit line drawdowns classified as long-term debt. In these firms, total long-term drawdowns on average amount to 10.6% of total assets and nearly 40% of total debt. These statistics highlight the importance of credit lines as an external financing source.

Before analyzing our data, we review two dominant theories of credit lines, namely liquidity insurance and monitored liquidity insurance, which highlight the valuable liquidity services credit lines offer and their contingent nature. In their seminal papers, Boot, Thakor, and Udell (1987) and Holmstrom and Tirole (1998) argue that bank loan commitments alleviate investment distortions by insulating firms from future adverse conditions in capital markets and liquidity shocks. In financing future investments, cash can also provide firms with valuable liquidity insurance, especially firms that lack collateral, cash flows, or net worth required by credit line covenants (Nikolov, Schmid, and Steri (2019)). But large cash holdings are costly. They unnecessarily consume corporate resources at the sacrifice of other productive uses, particularly when realized investment needs are low (Azar, Kagy, and Schmalz (2016), Acharya, Almeida, Amihud, and Liu (2022)). As a state-contingent instrument, credit lines provide firms with cost-effective liquidity insurance in states with unusually high investment needs. Liquidity insurance theory implies that firms can rely on prearranged credit lines to meet unexpected investment needs, especially if capital market access is uncertain or overly costly.[2]

A few empirical studies emphasize that while credit lines act as liquidity insurance, they are not unconditional guarantees. For example, Sufi (2009) documents that credit lines are contingent on several standard financial covenants, of

[2]Banks charge firms for the option to draw down a credit line (liquidity insurance). Berg, Saunders, and Steffen (2015) find that almost all credit lines contain either a commitment fee (paid on unused credit line) or a facility fee (paid on entire committed amount regardless of usage), similar to insurance contracts that require fees for coverage.

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which maintenance of cash flow is the most common and most likely to be violated. The conditional feature of credit lines makes them imperfect substitutes for cash holdings as a source of corporate liquidity, especially for firms with low cash flows (e.g., Demiroglu and James (2011), Nikolov et al. (2019)).

Acharya, Almeida, Ippolito, and Perez (2014) develop a theory of credit lines where banks provide monitored liquidity insurance to firms. In their model, a fully committed credit line creates incentives for firms to engage in liquid-to-illiquid asset transformations (i.e., using loans to undertake risky illiquid investments that raise the likelihood of firms later experiencing liquidity shocks). Hence, banks impose covenants and closely monitor firms' credit line uses to curb such illiquidity-seeking behavior. With credit line covenants, banks retain the right to reduce or revoke a firm's access to these lines if a covenant is violated, which could signal an illiquidity transformation event. Acharya, Almeida, and Campello (2013) argue that otherwise, borrowers could exploit credit lines when they face weakened financial conditions or have risky, marginally profitable projects that would be difficult to fund with new credit. As such, bank monitoring and threats of credit line revocation are crucial bank disciplinary mechanisms used to reduce illiquid asset transformations. Acharya et al. (2014) also predict that firms with greater liquidity risk (e.g., having poorer access to stock and bond markets) have stronger incentives to pursue illiquid transformations. Thus, banks monitor them more intensely, raising their expected cost of credit line revocation and causing them to switch to cash to meet their liquidity needs.

To summarize, liquidity insurance theory suggests that credit lines enable firms to meet long-term investment needs, especially when external capital market conditions are unfavorable. Monitored liquidity insurance theory emphasizes the conditional nature of credit lines and the importance of bank monitoring and debt covenants, which discourages further borrower risk-taking by threatening credit line revocation with its associated costs. This encourages firms to quickly repay drawdowns or refinance them with other long-term debt as investment uncertainty is resolved or external capital market conditions improve. Thus, credit lines provide firms with medium-term bridge loans until more reliable sources of long-term financing become available.

To empirically test major credit line theories, we begin our analysis by documenting a nonmonotonic relation between long-term credit line drawdowns and firms' credit quality. We find that firms with high credit ratings (A− or above) and very low ratings (B+ or below) have the lowest levels of long-term drawdowns among all firms. Despite having easy access to credit lines, high-rated firms are more likely to tap public debt markets and rely on credit lines mainly as a backup for their commercial paper programs (Kahl, Shivdasani, and Wang (2015)), while the contingent nature of credit lines discourages very low-rated firms from drawing down lines for long-term uses (e.g., Sufi (2009), Nikolov et al. (2019)). The most active users of long-term credit lines are unrated firms. These firms have virtually no access to bond markets, but typically are financially healthy. This partially explains why they rely heavily on credit line drawdowns for long-term finance.

Next, we study the relation between credit line drawdowns to firms' investment needs and external capital market conditions. Consistent with liquidity insurance theory, we document that firms make more drawdowns for long-term uses when

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other sources of long-term external finance become unavailable or very costly (e.g., when stock and credit market conditions deteriorate). More importantly, we find that a firm's total investment needs have a significantly positive relation to the size of *new* long-term drawdowns. Economically, a 1-standard-deviation rise in total investment is associated with 21% rise in new long-term drawdowns above its mean value. Further analysis illustrates that low-rated and unrated firms are more reliant on long-term drawdowns when they have low cash holdings or when credit market conditions deteriorate. This confirms that loan commitments are particularly valuable for firms with lower credit quality when their internal liquidity is low and alternative external credit channels dry up.

To precisely pin down how firms deploy the proceeds of long-term credit line drawdowns, we use an integrated multi-equation framework to simultaneously capture major uses of long-term drawdowns (i.e., investment, additions to cash holdings, and dividends), while controlling for other sources of financing (i.e., internal cash flow, equity, and noncredit-lines debt (other debt hereafter)). This framework explicitly accounts for interdependence in corporate policies by virtue of the cash flow identity that equates sources and uses of funds. As a result, if long-term drawdowns rise by 1 dollar, then the sum of the changes in investment, cash holdings, and dividends must rise by 1 dollar. Our multi-equation regression results reveal that financing investment is the most common use of long-term credit line drawdowns. Specifically, a 1-dollar increase in long-term drawdowns raises total investment by 95.7 cents, cash holdings by 3.9 cents, and dividends by about 0.3 cents. Further analysis shows that acquisitions account for a majority of long-term credit line use. We also find that relative to high-rated firms, unrated and lower-rated firms use a larger fraction of drawdowns for investment, especially for capital expenditures. Unrated firms use more drawdowns to finance acquisitions than rated firms.

To assess the validity of the monitored liquidity insurance theory, we collect information on financial covenant thresholds for term loans and credit lines that are categorized as long-term. Compared to term loans, long-term credit lines can subject banks to greater moral hazard risk given a credit line's much earlier origination date relative to its drawdown date. Thus, financial covenants are predicted to be tighter for credit lines than for term loans. Indeed, our analysis reveals that 2 cash flow-based covenants typically included in credit lines, namely the interest coverage and DEBT-to-EBITDA ratios, are significantly tighter in credit lines than in term loans.

Finally, we investigate repayment and refinancing of long-term credit line drawdowns. Consistent with monitored liquidity insurance theory, our results show that firms repay long-term drawdowns relatively quickly. Among firms that initiate long-term drawdowns and have credit lines that remain outstanding for over 5 years, about 31% fully repay credit line drawdown by the following year-end and 60% fully repay credit line within 3 years. Only about 28% of firms take 5 years or more to fully repay their credit lines. In sum, a majority of firms hold long-term drawdowns for relatively short periods. Further analysis shows that in the 2 years after a large drawdown, firms issue a large amount of other long-term debt (mainly term loans and corporate bonds). These results highlight that a large fraction of long-term drawdowns is either quickly repaid or replaced by other long-term debt, indicating that credit line drawdowns serve primarily as short to medium-term bridge loans to sustain long-term investment, especially when firms face unfavorable capital market conditions or have low or no credit ratings.

Our study contributes to the literature in three ways. First, we assess the explanatory power of the alternative liquidity insurance theories by analyzing major aspects of long-term drawdowns of credit lines. While prior studies primarily rely on either the total size or the undrawn portion of credit line facilities to investigate the impact of credit lines on corporate policies (e.g., Lins, Servaes, and Tufano (2010), Acharya et al. (2014)), Campello et al. (2011) collect information on credit line drawdowns during the 2008–2009 financial crisis,[3] and document that drawdowns have more economically and statistically significant relations to corporate investments than total credit lines, which include unused lines. Thus, they call for future credit line research to focus more on drawdown activity. Our study answers this call by analyzing drawdowns intended for long-term uses for a large sample of firms over a long time frame. With this drawdown data, we can examine drawdown determinants, the use of drawdown proceeds, and drawdown repayments and refinancings. We also provide new evidence on which types of firms rely more on credit line drawdowns and discover considerable granularity in the relation between credit quality and the use of credit line drawdowns as a source of long-term financing.

Second, our article quantifies the importance of credit lines for corporate investments, thereby highlighting the real effects of credit lines. We show that firms' total investment needs are positively related to both the size of new long-term drawdowns and the likelihood of drawdown initiations and negatively related to the likelihood of drawdown terminations. Moreover, to the best of our knowledge, we are among the first to quantitatively demonstrate that funding corporate investments, and particularly financing mergers and acquisitions, is the most important long-term use of credit line drawdowns. In short, our findings confirm the major implications of the liquidity insurance theory (e.g., Holmstrom and Tirole (1998)), complement previous studies that assess the real effects of credit lines during the financial crisis (e.g., Campello et al. (2011)), and have potentially important implications for policymakers interested in boosting corporate investments through improving corporate liquidity.

Finally, our results offer broad support for the monitored liquidity insurance theory of credit lines (Acharya et al. (2014)) by showing that banks set tighter covenants on credit lines than on terms loans of the same borrowers. This is consistent with banks imposing tighter covenants to mitigate greater moral hazard problems of credit lines. A further implication of this theory is that the conditional nature of credit lines, which creates rollover risk and motivates firms to repay credit line drawdowns quickly or replace them with other long-term debt as credit market conditions improve. This implies that credit line drawdowns are mainly used for

[3]Sufi (2009) collects credit line drawdowns for a random sample of 300 firms over the period of 1996 to 2003. Berrospide and Meisenzahl (2015) gather detailed firm-level information on credit line drawdowns for 467 firms around the financial crisis (from 2005:Q4 to 2010:Q4). Demiroglu, James, and Kizilaslan (2012) collect credit line drawdowns for 2,141 privately held firms that were later acquired by public firms or completed initial public offerings (IPOs) over the period of 1996 to 2004.

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bridge financing of long-term investments. As such, our findings extend to Kahl et al. (2015), who document that commercial paper plays an important role for high-rated firms in financing corporate investments and serving as a bridge to long-term financing. For firms in other credit rating classes, particularly firms with lower or no ratings, credit line drawdowns act as an important bridge financing option, greatly facilitating long-term investments.[4]

The rest of this article is organized as follows: Section II describes data and variables and presents summary statistics. Section III analyzes the determinants of long-term credit line drawdowns. Section IV investigates how firms allocate the proceeds from credit line drawdowns. Section V studies credit line covenants and how firms repay or refinance long-term drawdowns. Section VI concludes the article.

II. Data, Variables, and Summary Statistics

A. Sample

Over the 1996–2008 sample period, we manually collect long-term credit line drawdowns from 10-K SEC filings available through EDGAR (www.sec.gov). We focus on S&P 1500 firms given the high cost of manual data collection. Our sample period starts in 1996 when annual 10-K SEC filings became available electronically (Sufi (2009)). We require firms in our sample to have outstanding lines of credit. Information on firms' outstanding lines of credit between 1996 and 2003 are taken from Sufi's (2009) data set. Tai-Yuan Chen extended Sufi's data set to 2008, when our sample period ends.

Stock prices and returns are obtained from the Center for Research in Security Prices (CRSP) files. Financial reporting data comes from the Compustat Industrial Annual files. To investigate firms' use of proceeds from long-term credit line drawdowns, we extract financial data from the Statement of Cash Flows (SCF) for the variables that make up the cash flow identity defined in Section IV. For firms with missing SCF data, we manually collect the data when possible, from SEC 10-K statements. Following common practice (e.g., Acharya et al. (2014)), we exclude utility and financial firms (SIC codes 4000–4999 and 6000–6999). In addition, we require firm observations to have annual information available on total assets, market capitalization, changes in cash holdings, capital expenditure, and external financing. In line with Almeida, Campello, and Weisbach (2004), we require firms' market value of assets and total sales to exceed $1 million, and their annual asset growth rates not to exceed 100%. The final sample is an unbalanced panel of 9,808 firm-year observations. To mitigate the impact of outliers or misrecorded data, all continuous variables are winsorized at the 0.5% level in both tails of the distribution.

[4]Kahl et al. (2015) point out that commercial paper has higher rollover risk than bank credit lines because the former is unsecured, has shorter maturity, and is more exposed to volatile investor demand. Thus, they expect that firms exposed to relatively higher rollover risk should prefer credit lines over commercial paper.

B. Measuring Long-Term Credit Line Drawdowns

Under a line of credit, one or more banks stand ready to lend a preagreed amount of funds to a borrower on demand at any time during a given contract period. In granting loan commitments, banks recoup the expected losses from defaults by charging commitment fees. The term of the credit line is typically under 5 years (e.g., Lins et al. (2010)), and is often renewed or revised before the contract period ends. Credit lines are often senior debt and sometimes secured against specific collateral (Dennis, Nandy, and Sharpe (2000)). Credit lines generally have covenants to ensure a borrower meets specific financial conditions.[5] Covenant violations can trigger tighter loan contract conditions, such as a reduced credit line, a shorter maturity, or a higher interest rate. Credit lines offer more flexibility than term loans since borrowers can withdraw funds up to the credit limit and repay it at any time within the contract period. A key attraction of credit lines is that prepaid loans generally can be reborrowed multiple times (e.g., Martin and Santomero (1997), Lins et al. (2010)).

Because of the above flexibility, the maturity of drawdowns from credit lines depends on the intended length of the credit line drawdown. More specifically, when drawdowns are used, for example, to fill a funding gap due to a temporary mismatch between cash inflows and cash outflows (such as an unexpected deficit in net working capital), they are expected to be paid off within a year and should be reported as short-term debt. On the other hand, drawdowns intended to remain outstanding for more than 1 year, are classified as long-term debt.[6]

We identify long-term drawdowns as credit line borrowings reported as long-term debt. A long-term drawdown is manually extracted from the notes to the long-term debt section of a firm's consolidated financial statements. We read the notes to the credit line to ensure that borrowings are drawn from the revolving facility of the credit line, rather than from a term loan tranche, which is more akin to installment credit. The underlying credit line supporting a drawdown must exceed 1 year for it to be categorized as long-term financing. From our reading of 10-K filings, a drawdown is typically reported as short-term debt when it is expected to be repaid within a year or the remaining maturity of an existing credit line is less than 1 year; otherwise, it is categorized as long-term debt.

Unlike long-term drowns, the information on short-term drawdowns are not readily available in 10-K filings. Specifically, firms do not often disclose the sources of short-term debt, especially when the amount is not large. Even for firms reporting short-term borrowing from banks, there is typically no disclosure on whether the short-term bank debt is credit line drawdowns or short-term loans. Because of these data constraints, we focus on long-term drawdowns in this study. Demiroglu and James (2011) report that according to Dealscan, about 21% of new credit lines have a stated maturity under 365 days during the period of 1996 to

[5]Shockley and Thakor (1997) find that committed credit lines typically contain a "material adverse change" (MAC) clause, which gives a bank-wide latitude to limit credit line borrowing if a borrower's condition deteriorates.

[6]Under SFAS No. 6, short-term debt obligations are classified as long-term if a firm i) intends to refinance the short-term obligation on a long-term basis, and ii) can demonstrate its ability to refinance. The latter condition is met if a line of credit extends beyond 1 year.

2009.[7] Thus, long-term drawdowns should account for a majority of all credit line drawdowns. We use LTDRAW to denote total long-term borrowing under credit lines. ΔLTDRAW is the change in LTDRAW from the previous to the present year and reflects the amount of new long-term drawdowns in a given year. These variables are all scaled by beginning-of-the-year total assets.

C. Determinants of Long-Term Credit Line Drawdowns

Credit line drawdowns can be viewed as financing or capital structure decisions, where firms weigh the costs and benefits of alternative forms of finance in choosing credit lines as its preferred financing choice. To the extent that drawdowns are classified as short- or long-term debt, they represent a debt maturity structure decision. Accordingly, we use firm characteristics shown in prior studies to affect financing decisions (e.g., Chang, Dasgupta, and Hilary (2006), Sufi (2009)) plus capital market conditions as determinants of credit line drawdown decisions.

To test whether long-term credit line drawdowns are related to firms' investment needs, we measure investment (INV) that captures all investment activities in the SCF, including net capital expenditure (CAPEX), acquisitions (ACQ), and other investments (OI).[8] We use the logarithm of the book value of assets (ln(ASSETS)) to measure firm size. Return on assets (ROA) is included as a proxy for profitability, which is an important determinant of credit line availability under typical profitability-based covenants (Sufi (2009)). We also use four credit rating indicator variables (INTERMEDIATE_RATING, LOW_RATING, VERY_LOW_RATING, and NO_RATING) based on firms' historical S&P long-term domestic issuer credit ratings discussed in Section II.D. We use net property, plant, and equipment divided by total assets (PPE) to capture asset tangibility. To account for differential financial leverage effects on long-term drawdowns, we separate long-term borrowing under credit lines (LTDRAW) from other debt (OD = TOTAL_DEBT − LTDRAW), both scaled by total assets. We measure firm growth opportunities by the market-to-book ratio (MB). To measure a firm's liquidity status and ability to pay off short-term debt, we use the cash-to-assets ratio (CASH) and current ratio (CURRENT_RATIO) defined as current assets divided by current liabilities. To measure firm stock performance, we use cumulative excess stock return (EXCESS_RETURN), calculated from the prior 12 month compounded stock return minus the prior 12 month compounded return of the CRSP value-weighted index. We measure firm risk by the standard deviation of daily stock returns in the year (STOCK_VOL).

Liquidity insurance theory implies that firms should rely more on credit lines when external capital market conditions become less favorable (e.g., Thakor

[7]Beginning in 2002, Capital IQ provides information on total credit line drawdowns, from which we estimate the fraction of long-term drawdowns in total drawdowns over the period of 2002 to 2008 to be approximately 61%.

[8]Net capital expenditure = capital expenditure − sale of property, plant, and equipment. Acquisitions reflect external investment paid in cash and exclude stock-for-stock deals. Other investments include financial investments (e.g., debt, operating leases, equity securities, and investments in other firms) and purchases of marketable securities. We exclude R&D since it is not reported in the SCF, but is an operating expense reported in the income statement.

(2005)). To test this, we use several measures of capital market and macroeconomic conditions. First, we include the cumulative annual stock market return (MARKET_RETURN) defined as the monthly returns on the CRSP value-weighted index of NYSE, NASDAQ, and AMEX traded stocks, compounded over the fiscal year. Second, to capture debt market conditions, we use the credit spread (CREDIT_SPREAD) defined as the difference between the December commercial paper annualized yield and the annualized December 3-month Treasury bill rate (multiplied by 100). A high credit spread level generally suggests tight credit market conditions and high credit market risk. Finally, we use GDP_GROWTH, the percentage rise in real GDP in year 2000 dollars (multiplied by 100), as a measure of the general state of the economy.

D. Summary Statistics

Table 1 shows that the corporate use of credit lines is widespread and credit line drawdowns are a significant source of long-term financing for firms. On average, 29% of our sample firms make long-term drawdowns in any given year. For these firms, total long-term drawdowns on average amount to 10.6% of total assets, or about 40% of total debt (untabulated). The size of a typical *new* long-term drawdown (ΔLTDRAW) (i.e., annual net change in long-term drawdowns, is substantial). Among firm years with nonzero new long-term drawdowns, drawdowns on average represent 1.4% of a firm's total assets. In comparison, average proceeds from net equity issuances (i.e., issuances minus repurchases) equals −0.2% of total assets, and average proceeds of net noncredit-lines debt issuances amount to 2.1% of total assets.

We next describe the relation between a firm's creditworthiness and its use of long-term credit lines. We use historical S&P long-term domestic issuer credit ratings to measure a firm's credit quality and partition firm years into several credit

TABLE 1

Summary Statistics of Long-Term Credit Line Drawdowns

The sample in Table 1 contains the nonfinancial and nonutility S&P 1500 firms that have access to lines of credit from 1996 to 2008. Long-term credit line drawdowns (LTDRAW) is the amount of long-term borrowing under a firm's credit lines scaled by beginning-of-the-year total assets. Table 1 presents the distribution of long-term drawdowns for the full sample. Column 1 reports the percentage of firms with a positive amount of long-term drawdowns. Column 2 reports the average value of LTDRAW when it is positive. Column 3 reports the amount of new long-term drawdowns (i.e., the annual change in long-term drawdowns) scaled by beginning-of-the-year total assets (ΔLTDRAW) when it is nonzero.

Year	*N*	% of Firms with LTDRAW > 0	LTDRAW if LTDRAW > 0 (%)	ΔLTDRAW if ΔLTDRAW ≠ 0 (%)
		1	2	3
1996	709	30.2	11.9	2.7
1997	795	31.3	12.8	3.7
1998	824	32.0	13.4	3.6
1999	853	34.6	13.5	2.4
2000	850	36.0	13.1	2.1
2001	845	28.2	11.0	−1.7
2002	863	25.1	8.7	−2.2
2003	871	23.0	6.6	−1.7
2004	662	21.6	7.7	2.1
2005	676	24.9	8.1	2.7
2006	654	26.9	7.7	1.1
2007	622	27.8	8.6	2.2
2008	584	33.7	9.2	2.5
Total	9,808	29.0	10.6	1.4

rating groups. Firms with ratings at or below B+ (highly speculative noninvestment grade) are defined as very low-rated firms. Firms with BB− to BB+ ratings (speculative noninvestment grade) are defined as low-rated. Firms with BBB− to BBB+ ratings (lower medium investment grade) are classified as intermediate-rated. Firms with ratings equal to or above A− (upper medium investment grade and above) are defined as high-rated. Unrated firms have no credit ratings and are labeled "No Rating."

Table 2 presents summary statistics on firm characteristics (Panel A) and long-term drawdowns (Panel B) for each rating category. The results suggest that the relation between firm credit ratings and credit line drawdowns is nonmonotonic. Specifically, high-rated and very low-rated firms draw down less on credit lines than other rated firms. High-rated firms have the highest profitability, the largest firm size, the highest market-to-book ratio, and the lowest earnings volatility, indicating that they have the easiest access to credit lines. Yet, they seldom draw down lines for long-term uses, and have the smallest total long-term drawdowns (5.5% of total assets). These findings are consistent with Kahl et al. (2015) who document that high-rated firms often use credit lines as a backup funding source for other types of debt they issue, especially commercial paper. On the other hand, very low-rated firms have the lowest profitability and highest leverage. They are less reliant on long-term drawdowns since credit line use is contingent on their financial

TABLE 2

Summary Statistics by Credit Ratings

Table 2 presents the summary statistics of five groups of firms classified using S&P long-term domestic issuer credit ratings. High contains firms with ratings equal to or above A−. Intermediate includes firms with ratings between BBB− and BBB+. Low consists of firms with ratings from BB− to BB+. Very Low includes firms with ratings equal to or below B+. No Rating contains firms with no credit rating. Panel A presents the mean values of firm characteristics for the rating groups. INV is the total investment, which includes net capital expenditure, acquisitions, and other investments, scaled by beginning-of-the-year total assets. ln(ASSETS) is the log of a firm's book value of total assets. ROA is EBIT scaled by total assets. PPE is net PPE scaled by total assets. LTDRAW is the amount of long-term borrowing under credit lines scaled by total assets. OD is the difference between total debt (the sum of short-term and long-term debt) and LTDRAW, divided by total assets. MB is the market value of total assets divided by the book value of total assets. CASH is the cash holdings scaled by total assets. CURRENT_RATIO is current assets/current liabilities. EXCESS_RETURN is the prior 12 month compounded stock return minus the prior 12 month compounded return of the overall stock market index. STOCK_VOL is the standard deviation of daily stock returns over the fiscal year. Panel B presents the distribution of long-term drawdowns for the rating groups in the full sample. Other variables are defined in the legend of Table 1.

Rating Groups	High	Intermediate	Low	Very Low	No Rating	
Rating Ranges	[A−, AAA]	[BBB−,BBB+]	[BB−,BB+]	≤ B+	–	All
Panel A. Mean Values of Firm Characteristics						
INV	0.097	0.099	0.126	0.121	0.138	0.122
ln(ASSETS)	9.096	8.435	7.579	7.068	6.042	7.222
ROA	0.138	0.099	0.082	0.039	0.094	0.098
PPE	0.338	0.351	0.348	0.349	0.287	0.318
LTDRAW	0.004	0.025	0.046	0.020	0.038	0.031
OD	0.236	0.248	0.293	0.371	0.123	0.198
MB	2.409	1.659	1.510	1.507	2.099	1.960
CASH	0.070	0.064	0.083	0.132	0.141	0.107
CURRENT_RATIO	1.554	1.615	2.008	2.201	2.688	2.196
EXCESS_RETURN	0.014	0.023	0.072	0.099	0.086	0.062
STOCK_VOL	0.019	0.022	0.028	0.037	0.033	0.028
No. of obs.	1,550	1,802	1,355	434	4,667	9,808
Panel B. Long-Term Drawdowns for the Rating Groups						
% of firms with LTDRAW > 0	7.0	29.9	42.1	23.3	32.6	29.0
LTDRAW if LTDRAW > 0	0.055	0.083	0.103	0.080	0.121	0.106
ΔLTDRAW if ΔLTDRAW $\neq$ 0	0.010	0.008	0.006	0.002	0.021	0.014

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health and limited by their profitability and collateral under credit line covenants (e.g., Sufi (2009), Nikolov et al. (2019)).

Interestingly, among all credit rating groups, unrated firms are the heaviest users of credit lines for long-term financing (12.1% of total assets) and draw down credit lines more than other rating categories (2.1% of total assets). Panel A of Table 2 shows that unrated firms are almost as profitable as intermediate-rated firms, and their market-to-book ratio is only surpassed by high-rated firms. Unrated firms have the highest earnings volatility, lowest asset tangibility, and lowest leverage ratio (i.e., based on LTDRAW + OD). These findings suggest that unrated firms are financially healthy, but are subject to high uncertainty and information asymmetry, which can severely limit access to public debt markets (Faulkender and Petersen (2006)). As a result, these firms rely more on preapproved credit lines for long-term financing. Overall, our findings support several recent studies (Acharya and Steffen (2020), Halling, Yu, and Zechner (2020), and Li, Strahan, and Zhang (2020)), which find that compared to investment-grade firms, noninvestment-grade and unrated firms draw more heavily on credit lines in the early stages of the COVID-19 pandemic.

III. Determinants of Long-Term Credit Line Drawdowns

A. Determinants of the Amount, Initiation, and Termination of Long-Term Drawdowns

We now investigate the determinants of credit line uses for long-term financing in a multivariate framework. Specifically, we focus on whether long-term drawdowns are driven by firms' investment needs and whether firms rely on such drawdowns when external finance becomes more costly. Liquidity insurance theory suggests that a major use of credit lines is investment spending, but a lack of machine-readable data on credit line drawdowns has limited empirical research evaluating the importance of credit lines for corporate investments. Lins et al. (2010) survey corporate chief financial officers (CFOs) in 29 countries and find credit lines are used not only as precautionary savings against negative profitability shocks, but to fund future investments. CFOs state that certainty in funding acquisition opportunities is a major factor in making credit line decisions. Almeida, Campello, and Hackbarth (2011) show that credit lines offer firms flexibility in financing acquisition opportunities. A few studies investigate credit line uses in financial crises (e.g., Campello, Graham, and Harvey (2010), Ivashina and Scharfstein (2010), and Acharya and Steffen (2020)) and report that firms proactively draw down credit lines for precautionary reasons in the 2008–2009 financial crisis and the COVID-19 pandemic.[9] But whether these drawdowns are used for investment is unclear.

[9]Other COVID-19 credit line studies include Almeida's (2021) analysis of firms' financing policies in response to the negative COVID-19 shock and the role of the U.S. Government injections of liquidity into the debt markets, and Campello, Kankanhalli, and Muthukrishnan's (2021) examination of the impact of COVID-19 on corporate hiring.

In contrast, Campello et al. (2011) find that credit line drawdowns are associated with greater investment spending in the 2008–2009 financial crisis.[10]

We study the effects of firm characteristics (X_{it-1}) and macroeconomic and capital market conditions ($MACRO_t$) on long-term credit line drawdowns by estimating the prediction equation:

$$\text{DEP}_{it} = \alpha + \beta \text{X}_{it-1} + \gamma \text{MACRO}_t + \text{IND}_i + \varepsilon_{it}, \tag{1}$$

where the dependent variables (DEP) are the amount of new long-term credit line drawdowns (ΔLTDRAW) and the likelihoods of long-term drawdown initiations (STARTD) and of terminations (ENDD). The amount of new long-term credit line drawdowns (ΔLTDRAW) is the change in total long-term drawdowns from the prior year scaled by beginning-of-the-year total assets. STARTD equals 1 if the firm starts to use long-term credit line drawdowns in the current year but has no long-term drawdowns in the previous year, and 0 otherwise. ENDD equals 1 if a firm has long-term drawdowns in the prior year, but has no long-term drawdowns in the current year, and 0 otherwise. The determinants (X and MACRO) of credit line drawdowns are defined in Section II.C. Following Sufi (2009) and Acharya et al. (2014), we include 2-digit SIC industry-fixed effects (IND) to control for time-invariant industry determinants of our dependent variables.[11]

Table 3 presents our results on the factors affecting long-term drawdowns. The first column reports results from an OLS model where the dependent variable is the amount of new long-term drawdowns (ΔLTDRAW), while columns 2 and 3 report logit model estimates of the determinants of long-term drawdown initiations (STARTD) and terminations (ENDD).[12]

The INV_{t-1} coefficients suggest that firms with higher investment levels borrow more in long-term drawdowns and are more (less) likely to initiate (terminate) long-term drawdowns. The relation of investment to long-term drawdowns is economically significant. A 1-standard-deviation (0.198) rise in a firm's investment is associated with an increase in new long-term drawdowns (as a fraction of total assets) of 0.3% (=0.198 × 0.015), which is around 21% of the sample mean value of ΔLTDRAW (1.4%). Moreover, a 1-standard-deviation rise in INV_{t-1} corresponds to a 0.57 (1.25) percentage point increase (decrease) in the probability of long-term

[10]Berrospide and Meisenzahl (2015) find a positive relation between credit line drawdowns and capital expenditures in the 2008–2009 financial crisis, especially in small, financially constrained firms. May (2014) reports similar results on Lehman's collapse.

[11]Our regressions involve macro-level determinants of credit line drawdowns, which do not vary across firms. Thus, we exclude year-fixed effects, which would weaken the explanatory power of the macro-level variables. Since the dependent variables, STARTD and ENDD, are binary, we exclude firm fixed effects in the main specifications to avoid an incidental parameter bias in estimating these nonlinear (logit) models (Greene (2004)). We observe similar results when estimating a linear probability model with firm fixed effects, as reported in the Supplementary Material.

[12]Note that for the regression model of long-term drawdown initiations (STARTD), the number of observations in column 2 falls to 6,983 after excluding firm years with long-term drawdowns in the previous year. LTDRAW is by definition equal to 0 and thus is dropped from this regression. The regression model examining long-term drawdown terminations (ENDD) in column 3 has only 2,784 observations due to the exclusion of firms with no long-term drawdowns in the prior year.

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TABLE 3

Determinants of Long-Term Drawdown Amounts, Initiations, and Terminations

In Table 3, ΔLTDRAW is the change in total long-term drawdowns from the prior year scaled by beginning-of-the-year total assets. STARTD equals 1 if the firm starts a long-term drawdown in the current year and has no long-term drawdown in the prior year, and 0 otherwise. ENDD equals 1 if a firm has long-term drawdowns in the prior year and no long-term drawdown in the current year, and 0 otherwise. All firm-specific explanatory variables are defined in Table 2 and measured at the beginning of the year. Intercept terms are included in all the regressions, but are not reported. The *t*-statistics in parentheses are calculated from the Huber/White/Sandwich heteroskedastic-consistent errors, which are also corrected for correlation across observations for a given firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variables		
	OLS	Logit Regressions	
	ΔLTDRAW	STARTD	ENDD
	1	2	3
INV	0.015***	0.506**	−0.417
	(2.96)	(2.51)	(−1.42)
ln(ASSETS)	−0.003***	−0.224***	−0.068
	(−5.19)	(−4.01)	(−1.16)
ROA	0.024***	2.667***	−1.520
	(3.48)	(3.91)	(−1.46)
PPE	0.005	−0.038	−0.035
	(1.05)	(−0.11)	(−0.10)
LTDRAW	−0.259***		−6.531***
	(−13.13)		(−8.22)
OD	0.006	0.213	−0.275
	(1.13)	(0.56)	(−0.60)
MB	0.000	−0.098*	0.166*
	(0.84)	(−1.71)	(1.89)
CASH	−0.032***	−4.536***	1.308
	(−4.81)	(−6.47)	(1.60)
CURRENT_RATIO	0.000	−0.027	0.028
	(−0.45)	(−0.47)	(0.50)
EXCESS_RETURN	0.000	0.015	−0.140
	(−0.10)	(0.17)	(−1.34)
STOCK_VOL	−0.328***	−19.783***	17.080***
	(−6.42)	(−3.73)	(3.52)
INTERMEDIATE_RATING	0.006***	1.486***	−0.206
	(3.92)	(6.30)	(−0.76)
LOW_RATING	0.011***	2.130***	−0.186
	(4.90)	(8.11)	(−0.69)
VERY_LOW_RATING	0.004	1.575***	0.057
	(1.44)	(4.59)	(0.15)
NO_RATING	0.013***	1.746***	−0.414
	(5.91)	(6.43)	(−1.50)
GDP_GROWTH	0.003***	0.034	−0.117**
	(5.17)	(0.80)	(−2.50)
MARKET_RETURN	−0.010**	−0.961***	0.316
	(−2.45)	(−2.95)	(0.97)
CREDIT_SPREAD	0.014***	0.440***	−0.766***
	(8.28)	(3.32)	(−4.49)
Industry FE	Yes	Yes	Yes
No. of obs.	9,808	6,983	2,784
Adj. R^2 or Pseudo-R^2	0.09	0.12	0.09

drawdown initiations (terminations).[13] These results indicate that size and probability of long-term drawdowns are positively related to firm investment levels.

[13]Given that the percentage of firms initiating (terminating) long-term drawdowns is about 9.3% (21.7%) per year, this change represents a 6.1% (5.8%) gain (decline) relative to the credit line initiations (terminations) probability.

Turning to other firm-level determinants of credit line usage, we find that firm size is negatively related to long-term drawdowns, consistent with the notion that smaller firms are more dependent on monitored finance from banks because of greater information asymmetry and limited access to public debt markets (e.g., Barclay and Smith (1995)). Consistent with Sufi (2009), we document that more profitable (i.e., higher ROA) firms use more lines of credit since they are less likely to violate covenants. Firms draw less on unused credit lines when they have more long-term drawdowns outstanding, suggesting that they seek to preserve future borrowing capacity by limiting their current use of available credit lines (Campello Graham, and Harvey (2010)). Also, these firms are less likely to completely terminate long-term credit line drawdowns, perhaps because alternative financing is more costly or difficult to obtain and is less flexible. On the other hand, other debt (OD) has no significant effect on long-term drawdowns.

In line with evidence that firms with high market-to-book ratios use less debt generally (Hovakimian, Opler, and Titman (2001)), we document a negative (positive) correlation between the market-to-book ratio and the probability of long-term drawdown initiations (terminations). Furthermore, there is a significantly negative (positive) relation between cash holdings and the likelihood of credit line initiations (terminations), consistent with firms using cash holdings and credit lines as substitutes to manage liquidity (e.g., Sufi (2009), Campello et al. (2011)).

The STOCK_VOL coefficients indicate that riskier firms access credit lines less often, presumably due to tighter bank monitoring (e.g., Jiménez, Lopez, and Saurina (2009)). The coefficients of four credit rating indicator variables (INTERMEDIATE_RATING, LOW_RATING, VERY_LOW_RATING, and NO_RATING) capture credit line drawdowns of the four credit rating groups relative to high-rated firms, which is captured by the intercept. Column 1 shows that compared to high-rated firms, unrated firms rely most heavily on credit line drawdowns, followed by low and intermediate-rated firms. The findings are further evidence that long-term credit line drawdowns vary nonmonotonicly by credit categories, consistent with Table 2 summary statistics.

Finally, our results indicate significant relations between macroeconomic conditions and long-term credit line drawdowns. GDP_GROWTH is associated positively with the size of long-term drawdowns and negatively with the likelihood of credit line terminations, suggesting that GDP growth reflects aggregate demand for external capital and investment, which is not captured by firm-level investment (INV), and positively impacts credit line drawdowns. The MARKET_RETURN and CREDIT_SPREAD coefficients capture the effects of equity and debt market conditions respectively on new credit line drawdowns for long-term uses. The amount and likelihood of new long-term drawdowns are higher when overall equity market conditions are less favorable. In terms of economic significance, a 1-standard-deviation (0.20) fall in stock market returns is associated with a 0.002 rise in ΔLTDRAW and a 1.1 percentage point rise in the probability of initiating long-term drawdowns. A 1-standard-deviation (0.31) rise in CREDIT_SPREAD, which indicates deteriorating general credit markets conditions, is associated with a 0.004 rise in the size of new long-term drawdowns, a 0.8 percentage point increase in the probability of credit line initiations, and a 3.7 percentage point decrease in the probability of credit line terminations.[14] These findings indicate that firms increasingly draw on credit lines when external capital market conditions become less favorable (e.g., Thakor (2005), Acharya et al. (2013)), that is, when other long-term external financing options are unavailable or too costly.

B. Heterogeneity in the Relation Between Credit Quality and Long-Term Drawdowns

We next briefly explore firm-level heterogeneity by examining how the relation between credit quality and long-term drawdowns varies across firms and over time. First, given that both cash and credit lines are widely used by firms to manage their liquidity needs, we examine how cash holdings affect the relation between credit quality and long-term drawdowns. We augment equation (1) by adding interaction terms for credit rating indicators and CASH. Although all the explanatory variables in equation (1) are included in the new tests, for brevity, we only report key variable coefficients in Panel A of Table 4. The results show that low-rated and unrated firms rely less on long-term drawdowns when their cash holdings are high, suggesting that these firms preserve liquidity capacity in unused credit lines when they have available cash to spend.

Second, we investigate how the relation between credit quality and long-term drawdowns responds to changes in credit market conditions. To this end, we augment equation (1) with interaction terms of the credit rating indicators with CREDIT_SPREAD. The results are reported in Panel B of Table 4. We find that compared to highly rated firms, unrated, intermediate-rated, and low-rated firms draw down more of their credit lines as credit market conditions deteriorate. These results suggest that in times when traditional credit channels dry up, loan commitments are particularly valuable to firms with lower credit quality. Becker and Ivashina (2014) observe that large firms tend to disproportionally obtain credit from bond markets (as opposed to banks) in recessions and times of financial stress, while Leary (2009) finds similar effects during the 1966 credit crunch. Thus, high-credit quality firms continue to enjoy access to bond markets, making them less dependent on loan commitment drawdowns.[15] But very poor-quality firms have limited or uncertain access to credit lines and so they cannot rely on long-term drawdowns under worsening credit market conditions. Overall, the results show that firms tend to use credit lines more as a source of long-term finance when internal liquidity dries up or capital market conditions deteriorate.

IV. How Do Firms Use the Proceeds from Long-Term Credit Line Drawdowns?

In Section III, we document that long-term credit line drawdowns are positively associated with firms' investment needs. Nevertheless, this finding does not

[14] These changes are economically significant given that the average value of ΔLTDRAW is 0.014, and the percentage of firms initiating (terminating) long-term drawdowns is about 9.3% (21.7%) in a given year.

[15] Kahl et al. (2015) find that the highest-rated CP issuers refinance their CP borrowing with bond issuance in response to a dramatic drop in demand for CP in 2009.

TABLE 4

Heterogeneity in the Relation Between Credit Quality and Long-Term Drawdowns

Table 4 presents the impacts of cash holdings (Panel A) and credit market conditions (Panel B) on the relation between credit quality and long-term drawdowns. The dependent variables are the amount of new long-term drawdowns outstanding scaled by lagged book assets (ΔLTDRAW) and the likelihood of long-term drawdown initiation (STARTD) and termination (ENDD). Other explanatory variables are the same as in Table 3, but their coefficients are not reported. Intercept terms are included in all the regressions, but are unreported. The *t*-statistics in parentheses are calculated from the Huber/White/Sandwich heteroskedastic-consistent errors, which are also corrected for correlation across observations for a given firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variables		
	OLS	Logit Regressions	
	ΔLTDRAW	STARTD	ENDD
	1	2	3
Panel A. The Effect of Cash Holdings on the Relation Between Credit Quality and Long-Term Drawdowns			
INTERMEDIATE_RATING	0.008***	1.584***	−0.653*
	(3.86)	(5.70)	(−1.78)
LOW_RATING	0.014***	2.465***	−0.722*
	(4.94)	(8.00)	(−1.95)
VERY_LOW_RATING	0.004	1.837***	−0.674
	(1.06)	(4.23)	(−1.42)
NO_RATING	0.018***	1.987***	−1.046***
	(7.18)	(6.44)	(−2.86)
CASH	0.019**	−0.660	−11.685*
	(2.23)	(−0.35)	(−1.68)
INTERMEDIATE × CASH	−0.019	−1.694	9.464
	(−1.57)	(−0.70)	(1.28)
LOW × CASH	−0.050***	−5.344**	11.506
	(−3.64)	(−2.25)	(1.53)
VERY_LOW × CASH	−0.031**	−4.308	16.377**
	(−2.00)	(−1.55)	(2.05)
NO_RATING × CASH	−0.061***	−4.098**	14.004**
	(−6.68)	(−2.10)	(2.01)
Other controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
No. of obs.	9,808	6,983	2,784
Adj. R^2 or Pseudo-R^2	0.10	0.13	0.09
Panel B. The Effect of Credit Spread on the Relation Between Credit Quality and Long-Term Drawdowns			
INTERMEDIATE_RATING	0.003	1.687***	0.108
	(1.35)	(3.93)	(0.25)
LOW_RATING	0.002	2.657***	0.187
	(0.78)	(6.06)	(0.43)
VERY_LOW_RATING	0.003	2.057***	0.727
	(0.66)	(3.91)	(1.26)
NO_RATING	0.008***	2.255***	−0.159
	(3.10)	(5.16)	(−0.38)
CREDIT_SPREAD	0.004*	1.190**	−0.185
	(1.67)	(2.18)	(−0.28)
INTERMEDIATE × CREDIT_SPREAD	0.007**	−0.332	−0.602
	(2.22)	(−0.54)	(−0.79)
LOW × CREDIT_SPREAD	0.019***	−0.986	−0.747
	(3.55)	(−1.60)	(−0.96)
VERY_LOW × CREDIT_SPREAD	0.003	−0.875	−1.355
	(0.54)	(−1.22)	(−1.34)
NO_RATING × CREDIT_SPREAD	0.012***	−0.939	−0.469
	(3.30)	(−1.63)	(−0.67)
Other controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
No. of obs.	9,808	6,983	2,784
Adj. R^2 or Pseudo-R^2	0.09	0.13	0.09

necessarily mean that firms use credit line drawdown proceeds to fund investments. For example, firms could use long-term credit line drawdowns to increase cash holdings, while internally generated cash flow is used to finance investment. Thus, a positive relation between credit line drawdowns and investments would still be observed. Hence, to uncover what firms do with credit line drawdown proceeds, we simultaneously control for other sources and uses of funds in the analysis (e.g., Tobin (1988), McLean (2011)). To this end, we employ an integrated regression framework, which requires that firms' investment, cash holdings, dividend, and external financing decisions are interrelated by the following accounting identity:

$$\text{INV} + \Delta\text{CASH} + \text{DIV} = \Delta\text{D} + \Delta\text{E} + \text{CF}, \tag{2}$$

where the left-hand side of equation (2) represents the three primary uses of funds, namely investment (INV), cash savings measured by the change in cash holdings (ΔCASH), and cash dividends (DIV). The right-hand side of equation (2) represents the three primary sources of funds, namely internally generated cash flow (CF) and the two sources of external financing: net debt and equity issuances (ΔD and ΔE, respectively).[16] Variables in equation (2) are all taken from the Statement of Cash Flows (SCF) to ensure the validity of equation (2). Appendix A shows Compustat data items of each SCF variable.

As ΔD represents net increases in all forms of debt financing that give rise to cash inflows to a firm, we further decompose it into long-term credit line drawdowns (ΔLTDRAW) and proceeds from other net debt issuances (ΔOD). Equation (2) then can be rewritten as follows:

$$\text{INV} + \Delta\text{CASH} + \text{DIV} = \Delta\text{LTDRAW} + \Delta\text{OD} + \Delta\text{E} + \text{CF}. \tag{3}$$

We refer to equation (3) as the cash flow identity. Consistent with the corporate decision-making practice, we assume that firms make investment and financial decisions jointly. To quantify how firms allocate long-term credit line drawdowns across their primary uses, we employ a system of equations, in which we regress each primary use of funds on all the sources of funds, firm-specific control variables, firm fixed effects (f_i), and year fixed-effects (y_t). The 3-equation regression framework is shown in equations (4)–(6):

$$\text{INV}_{it} = \alpha^1 + \beta^1 \Delta\text{LTDRAW}_{it} + \gamma^1 \Delta\text{OD}_{it} + \delta^1 \Delta\text{E}_{it} + \lambda^1 \text{CF}_{it} + \rho^1 \text{Y}_{it-1} + f_i^1 + y_t^1 + \varepsilon_{it}^1, \tag{4}$$

$$\begin{aligned} \Delta\text{CASH}_{it} = {} & \alpha^2 + \beta^2 \Delta\text{LTDRAW}_{it} + \gamma^2 \Delta\text{OD}_{it} + \delta^2 \Delta\text{E}_{it} \\ & + \lambda^2 \text{CF}_{it} + \rho^2 \text{Y}_{it-1} + f_i^2 + y_t^2 + \varepsilon_{it}^2, \end{aligned} \tag{5}$$

[16] ΔD = long-term debt issuance − long-term debt reduction + changes in current debt. ΔE = sale of common and preferred stock − repurchases of common and preferred stock. Following recent studies on cash flow (CF) sensitivities (e.g., Gatchev, Pulvino, and Tarhan (2010), Chang, Dasgupta, Wong, and Yao (2014)), we define CF as operating cash flow net of the change in working capital.

$$(6)\quad \mathrm{DIV}_{it} = \alpha^3 + \beta^3 \Delta\mathrm{LTDRAW}_{it} + \gamma^3 \Delta\mathrm{OD}_{it} + \delta^3 \Delta\mathrm{E}_{it} + \lambda^3 \mathrm{CF}_{it} + \rho^3 \mathrm{Y}_{it-1} + f_i^3 + y_t^3 + \varepsilon_{it}^3,$$

where the subscripts i and t index firms and years, respectively, and the superscripts denote different equations. Firm fixed effects control for the effects of unobservable time-invariant firm characteristics, and year fixed-effects account for the aggregate time variation in the uses of funds. For control variables (Y), we follow prior studies (e.g., Chang et al. (2014)) and include market-to-book ratio (MB), ln(ASSETS), annual sales growth rate (SALESG), PPE, long-term drawdowns (LTDRAW), and other debt (OD), all of which are measured in year $t-1$.

The coefficients (β, γ, δ, and λ) in equations (4)–(6) capture the allocation of various sources of funds to different uses. Specifically, the β coefficients capture the allocation of new long-term drawdowns across their three primary uses. γ, δ, and λ reflect the allocation of other net debt issue proceeds, equity issue proceeds, and internally generated cash flow, respectively. In addition, given that all sources and uses of funds are interrelated by virtue of equation (3), the coefficients of a particular source of funds across three equations must add up to unity. That is, the coefficient estimates in equations (4)–(6) must satisfy the following add-up conditions:

$$(7)\qquad \sum_{j=1}^{3} \beta^j = 1; \quad \sum_{j=1}^{3} \gamma^j = 1; \quad \sum_{j=1}^{3} \delta^j = 1; \quad \sum_{j=1}^{3} \lambda^j = 1.$$

Constraints (7) reflect a complete view of how firms allocate various sources of funds across major alternative uses. For example, $\sum_{j=1}^{3} \beta^j = 1$ suggests that a 1-dollar increase in long-term drawdowns must be fully used to increase investment, increase cash holdings, or pay cash dividends. If the allocation of proceeds to a particular use (e.g., investment) changes, then the allocation to all other uses must adjust correspondingly to ensure that constraints (7) continue to hold. Given that all the variables in equation (2) are measured using the SCF, our data closely conform to the cash flow identity. As such, the constraints (7) should hold automatically and needs not to be imposed explicitly in the estimation. Furthermore, because all three equations include the same set of explanatory variables, the equation-by-equation OLS estimates are the same as those estimated simultaneously using the seemingly unrelated regressions (SUR) method (Greene (2012), Chang et al. (2014)). Thus, we estimate equations (4)–(6) individually using OLS regressions without imposing constraints (7) explicitly.

Columns 1–3 in Panel A of Table 5 report the baseline results obtained by estimating equations (4)–(6).[17] The coefficients of ΔLTDRAW show that long-term credit line drawdowns are primarily used to finance investments. Specifically, a 1-dollar increase in long-term credit line drawdowns increases investment by 95.7 cents, increases cash holdings by 3.9 cents, and increases dividends by about 0.3 cents. A 1-dollar increase in other net debt issuances (ΔOD) increases investment, cash holdings, and dividends by 84.4 cents, 15.2 cents, and 0.4 cents,

[17]We dropped 486 firm-year observations from this analysis due to missing values for any of the six dependent variables (i.e., INV, (ΔCASH, DIV, CAPEX, ACQ, OI), CF, or when the absolute value of the difference between the left and right sides of equation (2) exceeds 1% of total assets.

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TABLE 5

Allocation of the Proceeds from Long-Term Credit Line Drawdowns

Panel A of Table 5 presents the regression analyses on the uses of the proceeds from long-term drawdowns. Panel B reports the results obtained using the long-difference procedure with the differencing length $k = 3$ years, which is estimated with the iterated 2SLS approach. Panel C examines how the uses of long-term drawdowns vary across firms with different credit quality. In Panels A and C, the dependent variables are investment (INV), the change in cash holdings (ΔCASH), and cash dividends (DIV). The key explanatory variables are long-term credit line drawdowns (ΔLTDRAW), the proceeds from other net debt issuances (ΔOD), the proceeds from net equity issuances (ΔE), and internally generated cash flows (CF). MB is the market value of assets divided by the book value of assets. ln(ASSETS) is the natural log of the book value of total assets. SALESG is the change in net sales scaled by lagged net sales. LTDRAW is the amount of long-term borrowing under credit lines scaled by total assets. OD is other debt divided by total assets. PPE is the net PPE over total assets. In columns 4–6, INV is decomposed into net capital expenditure (CAPEX), acquisitions (ACQ), and other investments (OI). Intercept terms are included in all the regressions but are not reported. The *t*-statistics in parentheses are calculated from the Huber/White/Sandwich heteroskedastic-consistent errors, which are also corrected for correlation across observations for a given firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. The Uses of the Proceeds from Long-Term Drawdowns

	Dependent Variables					
	INV	ΔCASH	DIV	CAPEX	ACQ	OI
	1	2	3	4	5	6
ΔLTDRAW	0.957***	0.039**	0.003**	0.151***	0.625***	0.181***
	(51.20)	(2.08)	(2.11)	(7.92)	(18.23)	(7.95)
ΔOD	0.844***	0.152***	0.004***	0.092***	0.536***	0.215***
	(41.37)	(7.47)	(3.51)	(8.64)	(16.51)	(8.03)
ΔE	0.617***	0.387***	−0.003***	0.058***	0.171***	0.388***
	(14.06)	(8.86)	(−2.77)	(4.45)	(4.55)	(8.40)
CF	0.613***	0.381***	0.006***	0.115***	0.214***	0.284***
	(26.65)	(16.53)	(3.32)	(9.18)	(9.89)	(9.41)
MB	0.005***	−0.006***	0.001***	0.008***	−0.003*	−0.001
	(2.91)	(−3.44)	(4.72)	(6.15)	(−1.73)	(−0.32)
ln(ASSET)	−0.001	0.001	0.000	−0.006**	−0.002	0.007*
	(−0.38)	(0.45)	(−0.37)	(−2.45)	(−0.58)	(1.92)
SALESG	0.005	−0.003	−0.002***	0.010***	−0.006	0.001
	(1.10)	(−0.67)	(−5.43)	(2.71)	(−0.99)	(0.11)
LTDRAW	0.031	−0.021	−0.011***	−0.024	0.090***	−0.034*
	(1.60)	(−1.08)	(−3.13)	(−1.30)	(3.71)	(−1.66)
OD	0.002	0.009	−0.011***	−0.056***	0.062***	−0.004
	(0.12)	(0.70)	(−4.91)	(−5.03)	(3.53)	(−0.26)
PPE	−0.097***	0.093***	0.004	−0.012	−0.085***	0.000
	(−5.28)	(5.15)	(1.34)	(−0.79)	(−4.99)	(−0.01)
Firm and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,322	9,322	9,322	9,322	9,322	9,322
Adj. R^2	0.78	0.34	0.78	0.70	0.46	0.37

Panel B. The Uses of Long-Term Drawdowns Based on the Long-Difference Approach

	Dependent Variables					
	$\Delta INV_{[t,t-3]}$	$\Delta(\Delta CASH)_{[t,t-3]}$	$\Delta DIV_{[t,t-3]}$	$\Delta CAPEX_{[t,t-3]}$	$\Delta ACQ_{[t,t-3]}$	$\Delta OI_{[t,t-3]}$
	1	2	3	4	5	6
$\Delta(\Delta LTDRAW)_{[t,t-3]}$	0.921***	0.071**	0.008**	0.094***	0.570***	0.254***
	(32.12)	(2.48)	(2.36)	(5.64)	(17.89)	(8.17)
$\Delta(\Delta OD)_{[t,t-3]}$	0.896***	0.098***	0.006***	0.090***	0.586***	0.219***
	(53.29)	(5.82)	(2.97)	(9.11)	(31.16)	(11.91)
$\Delta(\Delta E)_{[t,t-3]}$	0.638***	0.360***	0.004	0.059***	0.155***	0.416***
	(24.94)	(14.11)	(1.49)	(4.00)	(5.48)	(15.11)
$\Delta CF_{[t,t-3]}$	0.636***	0.355***	0.009***	0.136***	0.251***	0.249***
	(38.09)	(21.33)	(4.36)	(13.99)	(13.51)	(13.74)
$\Delta MB_{[t-1,t-4]}$	0.002	−0.002	0.000	0.000	0.001	0.000
	(1.17)	(−1.17)	(0.76)	(0.58)	(0.46)	(−0.05)
$\Delta \ln(ASSET)_{[t-1,t-4]}$	−0.004	0.003	0.001	−0.011***	−0.006	0.012**
	(−0.84)	(0.71)	(1.26)	(−3.95)	(−1.03)	(2.29)
$\Delta SALESG_{[t-1,t-4]}$	−0.005	0.005	0.000	−0.005**	0.000	0.000
	(−1.18)	(1.19)	(−0.27)	(−2.08)	(0.01)	(0.10)
$\Delta LTDRAW_{[t-1,t-4]}$	−0.082***	0.083***	−0.003	−0.069***	0.013	−0.021
	(−3.18)	(3.23)	(−0.87)	(−4.63)	(0.45)	(−0.73)
$\Delta OD_{[t-1,t-4]}$	−0.013	0.014	−0.003	0.000	0.047**	−0.054***
	(−0.76)	(0.81)	(−1.63)	(−0.03)	(2.35)	(−2.78)
$\Delta PPE_{[t-1,t-4]}$	−0.138***	0.137***	0.001	−0.098***	−0.007	−0.030
	(−6.61)	(6.57)	(0.36)	(−8.16)	(−0.32)	(−1.34)

(continued on next page)

TABLE 5 (continued)

Allocation of the Proceeds from Long-Term Credit Line Drawdowns

Panel B. The Uses of Long-Term Drawdowns Based on the Long-Difference Approach (continued)

	Dependent Variables					
	$\Delta INV_{[t,t-3]}$	$\Delta(\Delta CASH)_{[t,t-3]}$	$\Delta DIV_{[t,t-3]}$	$\Delta CAPEX_{[t,t-3]}$	$\Delta ACQ_{[t,t-3]}$	$\Delta OI_{[t,t-3]}$
	1	2	3	4	5	6
$\Delta INV_{[t-1,t-4]}$	0.009	−0.008	−0.002			
	(0.67)	(−0.60)	(−1.20)			
$\Delta CAPEX_{[t-1,t-4]}$				0.419***	−0.245***	−0.145***
				(24.25)	(−4.78)	(−2.94)
$\Delta ACQ_{[t-1,t-4]}$				−0.043***	0.060***	−0.005
				(−3.58)	(3.31)	(−0.24)
$\Delta OI_{[t-1,t-4]}$				−0.024**	0.038*	−0.018
				(−2.20)	(1.84)	(−0.98)
$\Delta(\Delta CASH)_{[t-1,t-4]}$	0.151***	−0.142***	−0.004*	0.001	0.029	0.114***
	(8.30)	(−7.85)	(−1.80)	(0.05)	(1.31)	(5.39)
$\Delta DIV_{[t-1,t-4]}$	−1.207**	0.549	0.518***	−0.193	0.115	−0.883*
	(−2.51)	(1.18)	(29.40)	(−0.69)	(0.22)	(−1.70)
Firm and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	3,240	3,240	3,240	3,240	3,240	3,240

Panel C. The Uses of Long-Term Drawdowns Across Firms with Different Credit Quality

	Dependent Variables					
	INV	ΔCASH	DIV	CAPEX	ACQ	OI
	1	2	3	4	5	6
ΔLTDRAW	0.831***	0.161***	0.004	0.009	0.528***	0.293***
	(14.25)	(3.25)	(0.18)	(0.20)	(6.89)	(3.27)
INTERMEDIATE × ΔLTDRAW	0.116*	−0.113**	0.000	0.143***	0.087	−0.113
	(1.81)	(−1.99)	0.00	(2.68)	(0.90)	(−1.16)
LOW × ΔLTDRAW	0.108*	−0.104*	−0.002	0.184***	−0.006	−0.070
	(1.75)	(−1.93)	(−0.09)	(3.49)	(−0.07)	(−0.75)
VERY_LOW × ΔLTDRAW	0.059	−0.062	0.008	0.180*	−0.103	−0.018
	(0.73)	(−0.83)	(0.32)	(1.73)	(−0.78)	(−0.16)
NO_RATING × ΔLTDRAW	0.137**	−0.132**	−0.002	0.128***	0.136*	−0.126
	(2.30)	(−2.57)	(−0.08)	(2.65)	(1.66)	(−1.39)
INTERMEDIATE_RATING	−0.007*	0.011***	−0.004***	0.002	−0.001	−0.008
	(−1.65)	(3.01)	(−2.99)	(0.59)	(−0.15)	(−1.41)
LOW_RATING	−0.003	0.010**	−0.007***	−0.004	0.004	−0.003
	(−0.55)	(2.14)	(−4.51)	(−0.93)	(0.62)	(−0.45)
VERY_LOW_RATING	0.002	0.007	−0.009***	−0.007	0.008	0.001
	(0.28)	(0.98)	(−4.92)	(−1.08)	(0.90)	(0.13)
NO_RATING	0.003	0.003	−0.006***	0.004	0.009	−0.011
	(0.49)	(0.64)	(−3.41)	(0.86)	(1.17)	(−1.49)
ΔOD	0.843***	0.153***	0.004***	0.092***	0.535***	0.215***
	(41.36)	(7.54)	(3.19)	(8.65)	(16.51)	(8.05)
ΔE	0.617***	0.386***	−0.003***	0.057***	0.172***	0.388***
	(14.06)	(8.84)	(−2.92)	(4.46)	(4.58)	(8.38)
CF	0.614***	0.380***	0.006***	0.114***	0.216***	0.284***
	(26.63)	(16.48)	(3.04)	(9.15)	(10.00)	(9.42)
MB	0.005***	−0.006***	0.001***	0.008***	−0.003*	−0.001
	(2.90)	(−3.41)	(4.70)	(6.17)	(−1.72)	(−0.35)
ln(ASSET)	0.000	0.001	−0.001	−0.006**	−0.001	0.006*
	(−0.08)	(0.26)	(−1.15)	(−2.33)	(−0.21)	(1.73)
SALESG	0.005	−0.003	−0.002***	0.010***	−0.006	0.001
	(1.07)	(−0.64)	(−5.39)	(2.67)	(−1.02)	(0.15)
LTDRAW	0.030	−0.020	−0.010***	−0.026	0.086***	−0.031
	(1.53)	(−1.03)	(−3.04)	(−1.37)	(3.60)	(−1.50)
OD	0.003	0.006	−0.009***	−0.051***	0.063***	−0.009
	(0.19)	(0.45)	(−4.05)	(−4.91)	(3.46)	(−0.54)
PPE	−0.098***	0.095***	0.003	−0.013	−0.086***	0.000
	(−5.32)	(5.26)	(1.07)	(−0.86)	(−5.01)	(0.02)
Firm and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,322	9,322	9,322	9,322	9,322	9,322
Adj. R^2	0.78	0.34	0.78	0.71	0.46	0.37

respectively. In contrast, the coefficients of CF and ΔE suggest that in response to an incremental dollar increase in cash flow or the proceeds from net equity issuances, firms, on average, spend about 60 cents on investment and use roughly 40 cents to increase their cash holdings. Also, the add-up constraints (equation (7)) are satisfied since the dependent variables are linked implicitly through the cash flow identity (equation (3)), which closely holds in the flow-of-funds data. More importantly, these results imply that the fraction of proceeds in long-term credit line drawdowns used for investments is larger than those of other sources of funds.

Heavy use of credit lines to sustain investment as reported above provides support for the liquidity insurance hypothesis (e.g., Holmstrom and Tirole (1998)). Consistent with the Lins et al. (2010) survey evidence, our allocation analysis shows that firms use credit lines to fund corporate investments and raise cash holdings. More importantly, our findings reveal that relative to heavy use of credit lines for investment, the rise in cash holdings for precautionary motives is modest.

In columns 4–6, we decompose total investments into capital expenditures (CAPEX), acquisitions (ACQ), and other investments (OI) and regress separately the three investment components on the explanatory variables in equation (4). By definition, the sum of the coefficients of ΔLTDRAW in columns 4–6 equals the coefficient of ΔLTDRAW in column 1. For the 95.7 cents increase in investment resulting from a 1-dollar increase in long-term credit line drawdowns, 15.1, 62.5, and 18.1 cents are used to finance capital expenditure, acquisitions, and other investments, respectively. The use of drawdowns predominantly for external investments through acquisitions is a striking finding that we further explore below.

Berrospide and Meisenzahl (2015) document that firms' capital expenditures increase with credit line drawdowns, suggesting that firms use drawdowns to sustain their capital expenditure programs. In contrast, our analysis jointly examines various investment forms and discovers that the most important investment use of drawdowns is to finance mergers and acquisitions rather than capital expenditure. As credit lines allow firms to access precommitted debt capacity quickly at low transaction costs (e.g., Holmstrom and Tirole (1998)), they can be well suited for funding acquisition bids, which are opportunities that often occur at short notice, face competing bids, and have significant completion risk. In comparison, using other long-term debt (e.g., corporate bonds) to finance these bids can be more costly if a large deal completion risk exists, since other debt takes longer to arrange and entails issuance costs. Moreover, in unsuccessful bids, unneeded funds raised have to be repaid, which may incur call premiums or bond refunding costs (Kahl et al. (2015)). Thus, using credit line drawdowns to quickly finance an acquisition bid and subsequently refinance a successful bid with other long-term debt can be a cost-effective financing strategy. We explore this possibility further in Section V.B.

One caveat with our multiple-equation framework (equations (4)–(6)) takes the proceeds from all funds sources as given and examines how firms allocate them jointly and simultaneously across various uses. In doing so, our approach is similar in spirit to those of Kim and Weisbach (2008) and McLean (2011). However, to the extent that the proceeds from long-term credit line drawdowns are endogenously determined, the estimated β coefficients may suffer from simultaneity bias arising from bidirectional causality between sources and uses of funds. To mitigate this concern, we employ Hahn, Hausman, and Kuersteiner's (2007) long-difference technique, which takes into account omitted variables, reverse causality, and persistent endogenous variables. Specifically, we take multi-year (i.e., k-year) differences of equations (4)–(6) and estimate the following three equation system:

$$\begin{aligned}(8)\quad \Delta\mathrm{INV}_{i[t,t-k]} = {} & \beta^1\Delta(\Delta\mathrm{LTDRAW})_{i[t,t-k]} + \gamma^1\Delta(\Delta\mathrm{OD})_{i[t,t-k]} + \delta^1\Delta(\Delta\mathrm{E})_{i[t,t-k]} \\ & + \lambda^1\Delta\mathrm{CF}_{i[t,t-k]} + \rho^1\Delta\mathrm{Y}_{i[t-1,t-k-1]} + \zeta^1\Delta\mathrm{INV}_{i[t-1,t-k-1]} \\ & + \varphi^1\Delta(\Delta\mathrm{CASH})_{i[t-1,t-k-1]} + \theta^1\Delta\mathrm{DIV}_{i[t-1,t-k-1]} + \eta^1_{i[t,t-k]},\end{aligned}$$

$$\begin{aligned}(9)\quad \Delta(\Delta\mathrm{CASH})_{i[t,t-k]} = {} & \beta^2\Delta(\Delta\mathrm{LTDRAW})_{i[t,t-k]} + \gamma^2\Delta(\Delta\mathrm{OD})_{i[t,t-k]} \\ & + \delta^2\Delta(\Delta\mathrm{E})_{i[t,t-k]} + \lambda^2\Delta\mathrm{CF}_{i[t,t-k]} + \rho^2\Delta\mathrm{Y}_{i[t-1,t-k-1]} \\ & + \zeta^2\Delta\mathrm{INV}_{i[t-1,t-k-1]} + \varphi^2\Delta(\Delta\mathrm{CASH})_{i[t-1,t-k-1]} \\ & + \theta^2\Delta\mathrm{DIV}_{i[t-1,t-k-1]} + \eta^2_{i[t,t-k]},\end{aligned}$$

$$\begin{aligned}(10)\quad \Delta\mathrm{DIV}_{i[t,t-k]} = {} & \beta^3\Delta(\Delta\mathrm{LTDRAW})_{i[t,t-k]} + \gamma^3\Delta(\Delta\mathrm{OD})_{i[t,t-k]} + \delta^3\Delta(\Delta\mathrm{E})_{i[t,t-k]} \\ & + \lambda^3\Delta\mathrm{CF}_{i[t,t-k]} + \rho^3\Delta\mathrm{Y}_{i[t-1,t-k-1]} + \zeta^3\Delta\mathrm{INV}_{i[t-1,t-k-1]} \\ & + \varphi^3\Delta(\Delta\mathrm{CASH})_{i[t-1,t-k-1]} + \theta^3\Delta\mathrm{DIV}_{i[t-1,t-k-1]} + \eta^3_{i[t,t-k]}.\end{aligned}$$

This approach views all sources of funds as endogenous variables and explicitly controls for lagged differences of the dependent variables (i.e., $\Delta\mathrm{INV}_{i[t-1,t-k-1]}$, $\Delta(\Delta\mathrm{CASH})_{i[t-1,t-k-1]}$, and $\Delta\mathrm{DIV}_{i[t-1,t-k-1]}$) to account for reverse causality running from uses to sources of funds. Hahn et al. (2007) and Chang and Zhang (2015) show that the long-difference estimator, which relies on a small set of moment conditions, is less biased than mean-differencing or system GMM estimators when the data-generating process exhibits reverse causality, unobserved heterogeneity or highly persistent endogenous variables.

To estimate equations (8)–(10), we take an iterated 2-stage least squares (2SLS) approach, which uses the distantly lagged dependent variables and regression residuals in the previous iteration as valid instruments (Hahn et al. (2007)). Further details on this estimation procedure are given in Appendix B. We iterate the process 3 times because Hahn et al. (2007) suggest that three iterations are often sufficient. Untabulated robustness analysis shows that four or five iterations yield nearly identical results. Panel B of Table 5 reports the results with the differencing length $k=3$ years. Although the sample is reduced to 3,240 firm years because of distant lagged terms, the coefficients of $\Delta(\Delta\mathrm{LTDRAW})_{i[t,t-3]}$ are fairly close to those of ΔLTDRAW in Panel A of Table 5. We obtain similar results (untabulated) when setting $k=5$ years. These findings suggest that our earlier results on firms' use of proceeds from long-term credit line drawdowns are robust to this alternative procedure for alleviating potential endogeneity concerns.

Next, to investigate the heterogeneity in the use of long-term credit line drawdowns across firms with different credit quality, we include the interactions of ΔLTDRAW with the credit rating class indicators: INTERMEDIATE, LOW, VERY_LOW, NO_RATING, respectively, leaving the high-rated firms as the benchmark case. Panel C of Table 5 shows that relative to high-rated firms, those with lower or no ratings use a large proportion of credit line drawdowns to finance investment (column 1), especially capital expenditures (column 4), while all credit classes rely heavily on drawdowns for acquisitions, with unrated firms relying most heavily on credit lines to finance acquisitions. These results indicate that firms with poorer credit quality rely more on credit lines for long-term investments, possibly because other sources of financing are costly or unavailable. Also, column 2 shows that lower-rated and unrated firms make relatively fewer drawdowns to accumulate cash, consistent with Berrospide and Meisenzahl (2015), who document a negative relation between drawdowns and cash holdings for poor credit quality firms.

V. Additional Analysis

In the previous sections, we investigated the determinants and uses of long-term credit line drawdowns. We next investigate credit line covenants as a monitoring mechanism and firms' subsequent financing activities following credit line drawdowns.

A. Credit Line Covenants

An important feature of the monitored liquidity insurance theory (Acharya et al. (2014)) is that firms drawing on credit lines are closely monitored by banks that require tight covenants ex ante and retain the right to revoke access to credit lines ex post if the borrowing firms engage in illiquidity transformation. In particular, since credit lines offer more flexibility to borrowers than term loans, credit lines can be exploited by borrowers when their financial condition deteriorates or when they seek to invest in risky low-profit projects that are difficult to finance with term loans (Acharya et al. (2013)). Thus, we expect credit lines to have tighter financial covenants than term loans to curb potential borrower agency problems.

We obtain financial covenant thresholds for term loans and credit lines with maturities over 1 year from the DealScan database for the period of 1996 to 2008.[18] We focus on four common financial covenants: the interest coverage ratio (Interest Coverage), the leverage ratio (Leverage), DEBT/EBITDA, and the current ratio (Current Ratio). Higher interest coverage and current ratio thresholds and lower leverage and DEBT/EBITDA thresholds imply tighter covenants. Panel A of Table 6 compares the financial covenant thresholds of credit lines and term loans of all firms. In Panel B, we provide evidence from a stronger experiment where we contrast the financial covenant thresholds of credit lines and term loans of the same firm. In both panels, we observe that Interest Coverage and DEBT/EBITDA

[18]Dealscan reports financial covenants at the loan package level, which can include both credit lines and term loan facilities. We exclude these combined cases to obtain a sharper comparison. The maturity of credit lines is on average shorter than that of term loans. In our sample, the average (median) maturity of term loans is 56.4 months (59 months), while that of long-term credit lines is 44.4 months (41 months). In untabulated robustness analysis, we examine term loans and credit lines with maturities shorter than 60 months and obtain qualitatively similar results.

TABLE 6

Financial Covenants of Credit Lines

Panel A of Table 6 compares the financial covenant thresholds of long-term credit lines (with maturities greater than 1 year) and term loans for the entire sample in 1996–2008. Panel B compares long-term credit lines and term loans issued by the same firm. *, **, and *** indicate that the mean or median values of financial covenant thresholds are statistically significant at the 10%, 5%, and 1% levels between the firms with long-term credit lines and those with term loans. The test of mean values is a 2-tail *t*-test, while the test of median values (distribution equality) is the Kolmogorov–Smirnov nonparametric test. In Panel C, we place firms in 21 clusters according to their financial convenient thresholds. Within each cluster, the firm is treated as accepting a tight covenant if its covenant threshold is more restrictive than the cluster's median covenant threshold. The dependent variable (TIGHTNESS) equals 1 if the covenant is tight, and 0 otherwise. CREDIT_LINE equals 1 when the type of the loan is a long-term credit line, and 0 when it is a term loan. LOAN_AMOUNT is the amount of the entire loan package scaled by total assets. LOAN_MATURITY is the number of months until the loan's maturity. ALL_IN-DRAWN_SPREAD is the sum of facility fees and the spread that the borrower pays in basis points over LIBOR for each dollar drawn down under the loan commitment. All explanatory variables are lagged 1 year. Intercept terms are included in all the regressions but are unreported. The *t*-statistics in parentheses are calculated from the Huber/White/Sandwich heteroskedastic-consistent errors, which are also corrected for correlation across observations for a given firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Min Interest Coverage		Max Leverage Ratio		Max DEBT/EBITDA		Min Current Ratio	
	Credit Lines	Term Loans	Credit Lines	Term Loans	Credit Lines	Term Loans	Credit Lines	Term Loans
Panel A. Entire Sample with Covenant Threshold Data								
Mean	2.56***	2.33	56.2%	60.5%	3.68***	4.73	1.28	1.32
Median	2.50***	2.00	60.0%	60.0%	3.50***	4.50	1.15	1.23
N	3,458	476	2,010	187	4,182	609	1,084	134
Panel B. Comparing Credit Lines and Term Loans of the Same Firm								
Mean	2.56***	2.34	57.7%	63.1%	3.72***	4.42	1.20	1.30
Median	2.50***	2.25	60.0%	60.0%	3.50***	4.00	1.08	1.20
N	476	241	254	109	494	270	96	48

Panel C. Covenant Tightness of Credit Lines Based on a Clustering Procedure

	Dependent Variable: TIGHTNESS in			
	Interest Coverage	Leverage	DEBT/EBITDA	Current Ratio
	1	2	3	4
CREDIT_LINE	0.064*	0.025	0.069**	−0.061
	(1.70)	(0.49)	(2.21)	(−0.91)
ln(ASSETS)	0.023**	−0.014	−0.066***	−0.039**
	(2.04)	(−1.03)	(−8.11)	(−2.11)
ROA	−0.102	0.049	0.134	0.034
	(−0.69)	(0.28)	(1.19)	(0.25)
LOAN_AMOUNT	−0.015	−0.112	−0.231***	−0.283***
	(−0.25)	(−1.09)	(−4.54)	(−3.65)
ln(LOAN_MATURITY)	0.029	−0.014	−0.083***	−0.026
	(0.90)	(−0.41)	(−3.35)	(−0.56)
ln(ALL_IN-DRAWN_SPREAD)	0.004	0.005	−0.137***	−0.038
	(0.18)	(0.19)	(−7.93)	(−0.89)
Industry and quarterly FE	Yes	Yes	Yes	Yes
No. of obs.	2,265	1,611	3,692	719
Adj. R^2	0.07	0.10	0.15	0.15

covenants included in credit lines are significantly tighter than those found in term loans, while no statistically significant differences in the tightness of Leverage and Current Ratio covenants are found across the two debt instruments.[19]

Panel C of Table 6 examines covenant tightness of credit lines in a regression setting. Following Demiroglu and James (2010), we measure financial covenant

[19]Christensen and Nikolaev (2012) argue that performance covenants (e.g., the interest coverage ratio and DEBT/EBITDA) are more timely indicators of distress than capital covenants (e.g., leverage and the current ratio). Thus, the former covenants are more useful trip wires, allowing earlier lender intervention if firm performance deteriorates. Sufi (2009) finds that cash flow based-covenants are more common than current and leverage ratio-based covenants for credit lines.

tightness based on a clustering procedure. More specifically, the interest coverage covenant thresholds in our sample range from 1.00 to 6.00 with clustering at discrete intervals of 0.25. Thus, we place firms whose interest coverage is below 6.00 at their loan origination into 20 clusters, each of which has a width of 0.25. Firms with interest coverage ratios of 6.00 or more are placed in the 21st cluster. Within each cluster, a firm is treated as accepting a tight covenant if its covenant threshold is more restrictive than the cluster's median interest coverage ratio. The tightness of the Leverage, DEBT/EBITDA, and Current Ratio covenants are measured similarly.

We estimate separate regressions for each financial covenant, where the dependent variable in Panel C of Table 6 is an indicator variable (TIGHTNESS) that equals 1 if the covenant is tight, and 0 otherwise. The key explanatory variable is an indicator (CREDIT_LINE) that equals 1 if the loan is a long-term credit line, and 0 when it is a term loan. Other explanatory variables include ln(ASSETS), ROA, LOAN_AMOUNT defined as the amount of the entire loan package scaled by total assets, LOAN_MATURITY defined as number of months until loan maturity, and ALL_IN-DRAWN_SPREAD measured as the sum of facility fees and the spread that a borrower pays in basis points over LIBOR for each dollar drawdown under its loan commitment (Demiroglu and James (2010)).

The results show that CREDIT_LINE has significantly positive coefficients for Interest Coverage and DEBT/EBITDA covenants, but it has insignificant coefficients for the other two financial covenants, consistent with the univariate analysis in Panels A and B of Table 6. Taken together, the results in Table 6 indicate that banks impose tighter covenants on credit lines relative to term loans, consistent with credit lines acting as monitored liquidity insurance through tight financial covenants.

B. Repayment and Refinancing of Long-Term Drawdowns

Credit lines are more valuable when firms have long-term investment needs and when external market conditions become adverse. Compared with other sources of long-term finance (e.g., corporate bonds, term loans, or equity issues), credit lines have clear advantages because they can be accessed promptly with low transaction costs, and their borrowing amounts can be adjusted up or down as funding needs change.[20] Despite these advantages, we do not expect credit lines to be a permanent solution to a firm's long-term investment needs for the following reasons. First, as discussed above, lines of credit entail relatively tighter covenants and more intense bank monitoring. A negative cash flow shock or poor performance can trigger covenant violations that limit a firm's additional borrowing or even result in credit line revocations. As a result, credit lines can become unavailable prior to their maturity when they are most needed (Sufi (2009)). Second, credit lines typically do not offer very long maturities (e.g., Demiroglu and James (2011)). In

[20]Financial flexibility is particularly valuable for unanticipated investment opportunities arising at short notice, such as acquisition bids. In contrast, issuing corporate bonds or equity entails substantial flotation costs, such as SEC registration costs, underwriting fees, and potential underpricing (e.g., Beatty and Ritter (1986), Lee, Lochhead, Ritter, and Zhao (1996), Fang (2005), and Cai, Helwege, and Warga (2007)).

our sample, the average (median) maturity of long-term credit lines is 44 months (41 months). Thus, financing long-term investments (e.g., acquisitions) with short or medium-term credit lines can create a maturity mismatch between a firm's assets and liabilities, exposing a firm to rollover risk. Together, these concerns encourage firms to repay such drawdowns or refinance them with other sources of long-term financing once more reliable long-term financing becomes available.

In Panel A of Table 7, we tabulate the distribution of the number of consecutive years with positive long-term drawdowns. To mitigate the left tail-truncation problem, we only include firms that initiate long-term drawdowns within our sample period (i.e., have zero long-term drawdowns in the prior year). In view of the right tail-truncation problem, we focus only on observations where a firm's credit line history can be followed for more than 5 consecutive years.[21] The result indicates that in about 31% of cases, long-term drawdowns are repaid in full by the end of next fiscal year (i.e., the number of consecutive years = 1), and about 60% of drawdowns are fully repaid within the next 3 fiscal years (i.e., the number of consecutive years ≤ 3). Roughly 28% of drawdowns take over 5 years to be fully repaid. Given that all firms in our sample have access to lines of credit, this finding implies that while credit lines are used to finance long-term investments, a majority of firms do not hold drawdowns for extended periods, but instead use them as medium-term bridge financing.

When examining drawdown distributions of firms in different credit rating classes, we find that unrated, intermediate-rated, and low-rated firms repay drawdowns more slowly than highly rated or poorly rated firms, consistent with a non-monotonic relation between credit quality and long-term drawdowns discussed earlier. In a recent study examining the COVID-19 pandemic, Acharya and Steffen (2020) document that noninvestment-grade and unrated firms rely more on credit lines and repay drawdowns more slowly than investment-grade firms. After the Federal Reserve announced its corporate bond-buying program in Mar. 2020, investment-grade firms stopped drawing on credit lines and began issuing bonds. Yet, noninvestment-grade and unrated firms continued to rely on credit lines.

In Figure 1, we plot the mean values of several external financing measures from 2 years before to 2 years after year t, in which firms make large credit line drawdowns (i.e., ΔLTDRAW > 1%). External financing measures are long-term credit line drawdowns (ΔLTDRAW), the proceeds from other net debt issuances (ΔOD), and the proceeds from net equity issuances (ΔE). All measures are deflated by the beginning-of-period total assets. Graph A of Figure 1 shows that in a year with large drawdowns, the average amount of drawdowns is about 8.7% of total assets, while the averages of both other debt and equity issuances are around 0. However, in the subsequent 2 years ($t+1$ and $t+2$), the average size of other debt issuance is 4.7% and 2.6% of total assets, respectively, while long-term drawdowns and equity issuance average around 0.

In Graph B of Figure 1, we further decompose other debt issuance into short-term debt (ΔSTD) and other long-term debt (ΔOLD) issuances. ΔSTD is defined

[21]Extending the number of consecutive years with credit lines available to more than 6 years yields similar results. It is worth noting that our approach could overestimate the duration of a long-term drawdown because we assume that the first drawdown is repaid last when a firm has multiple drawdowns.

TABLE 7

Repayment of Long-Term Credit Line Drawdowns and Subsequent Debt Issuances

Panel A of Table 7 reports the distribution of the number of consecutive years with positive long-term credit line drawdowns outstanding. This analysis only includes cases where firms initiate long-term drawdowns within our sample period (i.e., zero long-term drawdowns in the previous year), and their availability of credit lines can be followed for more than 5 consecutive years in our sample. In Panel B, the dependent variables are external financing measures that include long-term credit line drawdowns (ΔLTDRAW), the proceeds from other net debt issuances (ΔOD), and the proceeds from net equity issuances (ΔE). Panel C examines short-term debt (ΔSTD) and other long-term debt (ΔOLD) issuances. All measures are deflated by the beginning-of-period total assets. Control variables are the same as in Table 3, but their coefficients are not reported for brevity. Intercept terms are included in all regressions. The *t*-statistics in parentheses are calculated from the Huber/White/Sandwich heteroskedastic-consistent errors, which are also corrected for correlation across observations for a given firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Distribution of the Number of Consecutive Years with Positive Long-Term Credit Line Drawdowns

		Cumulative Percentage					
			High	Intermediate	Low	Very Low	No Rating
No. of Consecutive Years with LTDRAW > 0	*N*	All	[A−, AAA]	[BBB−,BBB+]	[BB−,BB+]	≤ B+	–
1	119	31.2	31.3	30.8	45.6	30.8	27.9
2	63	47.6	56.3	44.2	63.2	69.2	43.0
3	53	61.5	68.8	57.7	70.2	69.2	59.4
4	40	72.0	81.3	69.2	77.2	84.6	70.1
5 or more	107	100	100	100	100	100	100

Panel B. Regression Analyses on Credit Line Drawdowns and Subsequent External Financing Activities

	Dependent Variables					
	ΔLTDRAW	ΔOD	ΔE	ΔLTDRAW	ΔOD	ΔE
	1	2	3	4	5	6
$LTDRAW_{t-1}$	−0.259***	0.182***	0.010			
	(−13.13)	(8.03)	(0.56)			
$\Delta LTDRAW_{t-1}$				−0.225***	0.172***	0.015
				(−11.25)	(7.50)	(0.55)
$LTDRAW_{t-2}$				−0.171***	0.143***	0.015
				(−9.01)	(6.60)	(0.86)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,808	9,808	9,808	9,558	9,558	9,558
Adj. R^2	0.09	0.04	0.12	0.08	0.04	0.12

Panel C. Regression Analyses on Credit Line Drawdowns and Subsequent Debt Issuance

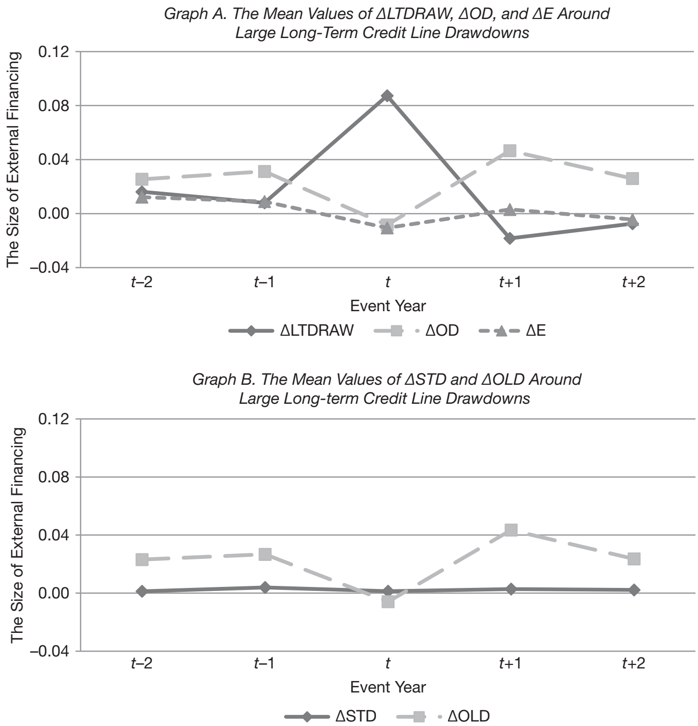
	Dependent Variables			
	ΔSTD	ΔOLD	ΔSTD	ΔOLD
	1	2	3	4
$LTDRAW_{t-1}$	0.005	0.195***		
	(0.64)	(8.82)		
$\Delta LTDRAW_{t-1}$			0.014*	0.176***
			(1.76)	(7.81)
$LTDRAW_{t-2}$			0.002	0.153***
			(0.32)	(7.20)
Other controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
No. of obs.	9,808	9,808	9,558	9,558
Adj. R^2	0.03	0.03	0.03	0.03

as the change in current debt, and ΔOLD = ΔOD − ΔSTD. They both are scaled by beginning-of-period total assets. The result reveals that firms primarily issue other long-term debt, instead of short-term debt, following large drawdowns. These financing patterns are again consistent with drawdowns acting as bridge financing, which in subsequent years are replaced by other types of financing, especially other long-term debt issuance.

FIGURE 1

External Financing Around Large Long-Term Credit Line Drawdowns

Figure 1 plots the mean values of external financing measures around large long-term credit line drawdowns (i.e., ΔLTDRAW > 1%) in year *t*. In Graph A, ΔLTDRAW is long-term credit line drawdowns and ΔOD is the proceeds from other net debt issuances. ΔE is the proceeds from net equity issuances. In Graph B, other debt issuance is decomposed into short-term debt (ΔSTD) and other long-term debt (ΔOLD) issuances. All variables are deflated by the beginning-of-period total assets.



In Panel B of Table 7, we investigate firm financing activities following changes in long-term credit line drawdowns. The dependent variables are a firm's three major external financing options (ΔLTDRAW, ΔOD, and ΔE). The regressions include industry fixed effects and the same control variables used in Table 3, although their coefficients are not reported for brevity. In columns 1–3, the key explanatory variable is total long-term drawdowns at the end of year $t-1$ (LTDRAW_{t-1}). Its coefficients reveal that for each dollar of long-term drawdowns at the end of year $t-1$, on average about 25.9 cents are repaid by the end of year *t*. Meanwhile, firms on average issue 18.2 cents in other forms of long-term debt and 1 cent in equity in year *t*. In columns 4–6, we decompose LTDRAW_{t-1} into additional long-term drawdowns in year $t-1$ ($\Delta\text{LTDRAW}_{t-1}$) and total long-term drawdowns at year-end $t-2$ (LTDRAW_{t-2}). Both components significantly predict repayment of credit lines and other debt in year *t*.

Panel C of Table 7 shows that when we decompose ΔOD into ΔSTD and ΔOLD and use these two components separately as the dependent variables, long-term drawdowns significantly predict subsequent issuances of long-term, rather than short-term debt. Finally, in additional untabulated analysis, using the subsample where we have detailed information on loan types from Capital IQ in 2003–2008, we find that long-term bonds and term loans respectively account for about 50% and 33% of the newly issued long-term debt following large credit line drawdowns. Collectively, the results in Table 7 imply that a sizable portion of long-term drawdowns is either repaid or replaced by other forms of long-term debt in the immediately following years. These results are consistent with Darmouni and Siani (2022) who examine corporate balance sheets data following the COVID-19 shock and find that firms use bond issuance proceeds to repay their credit lines.

Our results in Section IV show that firms draw on credit lines to finance long-term investments, especially mergers and acquisitions. Although drawdowns can be a low-cost strategy to meet urgent investment needs in short run, the relatively short maturity of credit lines can potentially result in a mismatch in the maturity of assets and liabilities that firms may typically seek to avoid (Graham and Harvey (2001), Kahl et al. (2015)). In addition, tight covenants, intense bank monitoring, and high ex post credit line revocation risk, all act to pressure firms to pay down their credit lines or replace them with long-term bonds or term loans when they can, to ensure unused credit lines remain available in the future, precisely when they are most needed (Sufi (2009)).

Taken together, our findings imply that credit lines are a highly valuable option that can help firms meet long-term investment needs, especially when other long-term external financing options are not immediately available or too costly, substantiating the real effects of credit lines. However, credit lines are not a permanent solution to the lack of long-term investment funding. Instead, credit line drawdowns are often followed by other long-term debt issuance, suggesting that credit lines provide firms, especially those with low and no credit ratings, with monitored liquidity insurance and an important bridge financing mechanism to support making long-term investments relatively quickly.

VI. Conclusions

The theoretical literature on credit lines and optimal financial contracting has long thought of lines of credit as a buffer to meet shortfalls in capital expenditures, often referred to as liquidity insurance theory (e.g., Holmstrom and Tirole (1998)). More recent theoretical work by Acharya et al. (2014) and others take a more nuanced view, considering credit lines as a conditional source of financing, which they term monitored liquidity insurance theory. Surprisingly, very limited empirical evidence explores the extent to which credit lines actually serve as a source of long-term finance to help firms address their investment funding needs or how important the conditional nature of credit lines as a funding source is. Our study addresses this gap in the literature by using hand-collected information from 10-K filings of credit line drawdowns for long-term uses. We find that credit lines used for long-term financing on average constitute a significant fraction (40%) of total debt and 10.6% of the book value of assets, making them an important financing tool for U.S. public companies.

Our results suggest that such drawdowns are greater for firms with relatively larger investment needs or when other forms of long-term finance dry up or become more costly. This is consistent with liquidity insurance theory's prediction that loan commitments allow firms to avoid forced reductions in investments when external financing becomes costlier or less available due to capital market disruptions (e.g., Holmstrom and Tirole (1998)). To further test this theory, we use an integrated multi-equation regression framework to establish that investment is the primary use of long-term credit line drawdowns. Among different investment forms, mergers and acquisitions are the most important long-term use of credit line drawdowns.

While credit lines are a valuable source of external finance, their use across firms with different credit ratings is very uneven. We find that unrated firms and intermediate and low credit-rating firms use long-term drawdowns the most, whereas high-rated firms and very low-rated firms use them the least. Moreover, unrated and lower-rated firms rely on credit line drawdowns more heavily than other firms when credit market conditions worsen. Finally, unrated firms rely more on drawdowns to finance acquisitions than rated firms.

Further analysis reveals that firms typically have tighter covenants on their credit lines than on their terms loans, consistent with the monitored liquidity insurance theory of credit lines (Acharya et al. (2014)). Consistent with the conditional nature and potential rollover risk of credit lines, we find firms mainly use long-term drawdowns of credit lines for bridge financing since they fairly quickly pay off drawdowns by shifting to other forms of long-term debt, which again supports predictions of the monitored liquidity insurance theory of credit lines.

Overall, our study focuses on drawdown activity, which is central to understanding how firms manage liquidity (Campello et al. (2011)). In particular, we study drawdowns as a long-term financing activity and examine the determinants of drawdowns, the uses of drawdowns, drawdown duration, replacement financing methods, and how these drawdown patterns vary by borrower credit ratings. Our findings offer support for the liquidity insurance theory of credit lines and strong support for the monitored liquidity insurance theory of credit lines. Our results also highlight the importance of credit line drawdowns as a bridge financing tool in sustaining the real investment activity of firms.

Appendix A. Variables in the Cash Flow Identity

Appendix A defines variables using the Statement of Cash Flows (SCF) data of Compustat. The variables include investment (INV), the change in working capital (ΔWC), the change in cash holdings (ΔCASH), cash dividends (DIV), cash flows (CF), net debt issuance (ΔD), and net equity issuance (ΔE). PPE denotes property, plant, and equipment. The definition of cash flow (CF) is almost the same as cash flow from operations in the SCF except that CF does not include spending on working capital (ΔWC), which is viewed as a use of funds. The proceeds from other net debt issuance (ΔOD) are the difference between long-term credit line drawdowns (ΔLTDRAW). We include in parentheses the Compustat XPF variable names in lowercase italics letters.

INV: net capital expenditure (CAPEX) + acquisitions (ACQ) + other investments (OI)

CAPEX: capital expenditure (*capx*) − sale of PPE (*sppe*)

ACQ: acquisition (*aqc*)

OI: increase in investment (*ivch*) − sale of investment (*siv*) − change in short-term investment (*ivstch*) − other investing activities (*ivaco*)

ΔWC: change in account receivable (*recch*) − change in inventory (*invch*) − change in account payable (*apalch*) − accrued income taxes (*txach*) − other changes in assets and liabilities (*aoloch*) − other financing activities (*fiao*)

ΔCASH: cash and cash equivalents increase/decrease (*chech*)

DIV: cash dividends (*dv*)

ΔD: long-term debt issuance (*dltis*) − long-term debt reduction (*dltr*) + changes in current debt (*dlcch*)

ΔOD: ΔD − ΔLTDRAW

ΔE: sale of common and preferred stock (*sstk*) − purchase of common and preferred stock (*prstkc*)

CF: income before extra items (*ibc*) + extra items and discontinued operation (*xidoc*) + depreciation and amortization (*dpc*) + deferred taxes (*txdc*) + equity in net loss (*esubc*) + gains in sale of PPE and investment (*sppiv*) + other funds from operation (*fopo*) + exchange rate effect (*exre*) − ΔWC

Appendix B. The Iterated Two-Stage Least Squares (2SLS) Procedure

In Appendix B, to estimate equations (8)–(10), we take an iterated 2-stage least squares (2SLS) approach. For example, to obtain the initial coefficient estimates in equation (8), we use $\Delta\text{LTDRAW}_{it-k}$, ΔOD_{it-k}, ΔE_{it-k}, CF_{it-k}, INV_{it-k-1}, $\Delta\text{CASH}_{it-k-1}$, and DIV_{it-k-1} as instruments for $\Delta(\Delta\text{LTDRAW})_{i[t,t-k]}$, $\Delta(\Delta\text{OD})_{i[t,t-k]}$, $\Delta(\Delta\text{E})_{i[t,t-k]}$, $\Delta\text{CF}_{i[t,t-k]}$, $\Delta INV_{i[t-1,t-k-1]}$, $\Delta(\Delta\text{CASH})_{i[t-1,t-k-1]}$, and $\Delta\text{DIV}_{i[t-1,t-k-1]}$, respectively. Each iteration starts by computing the residuals, $\text{INV}_{it-1}-\widehat{\beta}^1\Delta\text{LTDRAW}_{it-1}-\widehat{\gamma}^1\Delta\text{OD}_{it-1}-\widehat{\delta}^1\Delta\text{E}_{it-1}-\widehat{\lambda}^1\text{CF}_{it-1}-\widehat{\rho}^1\text{Y}_{it-2}-\widehat{\zeta}^1\text{INV}_{it-2}-\widehat{\varphi}^1\Delta\text{CASH}_{it-2}-\widehat{\theta}^1\text{DIV}_{it-2},\ldots$, and $\text{INV}_{it-k}-\widehat{\beta}^1\Delta\text{LTDRAW}_{it-k}-\widehat{\gamma}^1\Delta\text{OD}_{it-k}-\widehat{\delta}^1\Delta\text{E}_{it-k}-\widehat{\lambda}^1\text{CF}_{it-k}-\widehat{\rho}^1\text{Y}_{it-k-1}-\widehat{\zeta}^1\text{INV}_{it-k-1}-\widehat{\varphi}^1\Delta\text{CASH}_{it-k-1}-\widehat{\theta}^1\text{DIV}_{it-k-1}$ which are shown by Hahn et al. (2007) to be valid instruments.

Each iteration ends by updating the coefficient estimates ($\widehat{\beta}^1$, $\widehat{\gamma}^1$, $\widehat{\delta}^1$, $\widehat{\lambda}^1$, $\widehat{\rho}^1$, $\widehat{\zeta}^1$, $\widehat{\varphi}^1$, and $\widehat{\theta}^1$) using the residuals as well as $\Delta\text{LTDRAW}_{it-k}$, ΔOD_{it-k}, ΔE_{it-k}, CF_{it-k}, INV_{it-k-1}, $\Delta\text{CASH}_{it-k-1}$, and DIV_{it-k-1} as instruments to estimate equation (8) with 2SLS.

When individually estimating how firms allocate the proceeds from long-term credit line drawdowns across the three components of total investments (CAPEX, ACQ, and OI), we follow the same procedure as that used for equation (8). Specifically, we replace $\Delta\text{INV}_{i[t-1,t-k-1]}$ in equation (8) with $\Delta\text{CAPEX}_{i[t-1,t-k-1]}$, $\Delta\text{ACQ}_{i[t-1,t-k-1]}$, and $\Delta\text{OI}_{i[t-1,t-k-1]}$, and use CAPEX_{it-k-1}, ACQ_{it-k-1}, and OI_{it-k-1} as their instruments, respectively.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S002210902200117X.

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