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Cash Is Not King: Evidence from the Commercial Paper Market

Abstract

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JEL Classification: G32

Keywords: cash, Commercial paper, Adverse Selection, Disclosure, Window dressing

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Introduction

We document a new fact about corporate cash and financing policies: Firms systematically reduce their outstanding short-term debt at quarter-end and year-end disclosure dates. While cash is commonly viewed as negative debt or liquidity buffer against adverse situations, we argue that firms have incentives to disclose low cash holdings, by using cash to repay maturing short-term debt on disclosure dates. This challenges the common perception that "cash is king." The mechanism we highlight is that disclosed cash holdings suffer from an asymmetric information problem: investors and other stakeholders cannot verify if the holdings are readily available and thus constitute a proper liquidity buffer. Indeed, reported cash holdings could be set aside for an investment, used as collateral for derivatives, or trapped in a foreign subsidiary where they cannot be repatriated at short notice. When this information friction is severe, investors care not only about *net* debt, measured as total debt minus cash, but also about *gross* debt, so that firms with genuinely free cash holdings have an incentive to reduce their short-term debt on regulatory disclosure dates.

Our analysis focuses on new transaction-level data for non-financial commercial paper (CP) in the U.S., which allow us to examine corporate short-term debt usage at a daily frequency. In line with our hypothesis that firms prefer repaying short-term debt over disclosing high cash holdings, we show that companies systematically reduce their outstanding short-term debt on quarterly and annual disclosure dates. Constraints on CP lending supply cannot explain this pattern. Instead, we hypothesize that reducing the outstanding CP debt results from a trade-off between the cost of temporarily deviating from the optimal financing policy and the benefit of disclosing lower gross debt. In line with this view, firms with higher cash holdings, more sales in regions with tight capital controls, or with higher debt-equity ratios compared to industry peers reduce their short-term debt more aggressively at disclosure

dates.

In perfect capital markets cash is equivalent to negative debt and repaying short-term debt around disclosure dates is therefore equivalent to holding more cash instead. However, asymmetric information about the availability of cash can lead outside investors to value corporate cash holdings below face value and focus on a company's gross debt instead of its net debt. Loan covenants frequently focus on gross debt and all major rating agencies explicitly consider gross debt in their rating decisions – for instance, Fitch (2016) states that cash needs to be "readily available" and explicitly excludes "restricted cash" from net debt calculations. Hence, our first hypothesis is that companies strategically reduce their disclosed gross debt. In line with our hypothesis, Panel (a) of Figure 1 shows that outstanding volumes for the aggregate non-financial CP market drop at the end of each calendar quarter and even more so at the end of each calendar year, that is when many companies file their quarterly and annual reports. Panel (b) confirms this pattern for a subsample of CP issuers for which we observe daily CP issuances and maturities.

The data in Panel (b) comes from a novel database of individual non-financial CP transactions, provided by the Depository Trust & Clearing Corporation (DTCC), which we hand match to detailed balance sheet information from Compustat. We use these issuer-level information to confirm that individual corporations reduce their gross debt at their specific reporting dates, which are not necessarily the end of the calendar quarter or calendar year. To rule out that lending supply shortages at quarter-end and year-end dates drive the drops in CP volumes, we first show that neither financial CP volumes nor asset-backed CP volumes drop at quarter- or year-end dates. In addition, given that the debt repayments are most pronounced at year-ends, we examine the subsample of firms whose year-end reporting does not align with the end of the calendar year and find that these firms also reduce their CP

debt at their annual disclosure dates, which is inconsistent with year-end supply frictions as the main driver.

Repaying short-term debt around disclosure dates carries a shadow cost because companies temporarily deviate from their optimal cash and financing policies. We hypothesize that this shadow cost is lower for cash-rich companies and next examine the link between disclosed cash holdings and short-term debt repayments. To that end, we first split firm-years into quartiles based on the ratio of firms' cash holdings to total assets in the current year. We proxy year-end repayments as the difference between year-average and year-end CP debt outstanding and find that the percentage difference is approximately 20% for firms in the lowest cash quartile and increases above 50% for firms in the highest cash quartile. These debt repayments are sizeable compared to the disclosed amount of short-term debt – by repaying CP debt before the annual reporting date, the average firm with high cash holdings reduces its disclosed short-term debt by approximately 20%.

We confirm the robust link between firms' year-end CP repayments and cash holdings in a regression setting, controlling for firm size, total debt, and time fixed effects. Remarkably, the link between CP debt repayments and cash holdings is robust to including issuer fixed effects and using first differences instead of levels. Hence, the same company repays more CP debt on year ends when it discloses higher cash holdings.

We next hypothesize that the benefits of repaying short-term debt around disclosure dates are higher for firms that generate larger sales revenues in regions with capital flow constraints because these firms face more stringent asymmetric information problems about their cash holdings. To test this hypothesis, we use the geographic distribution of companies' sales and construct a proxy for trapped cash abroad that reflects capital outflow restrictions imposed by foreign countries. We find that firms with higher measures of trapped cash repay

their short-term debt more aggressively around disclosure dates. In addition, because firms with trapped cash need to use their *free* cash for repaying short-term debt, the disclosed cash holdings of these firms are unlikely to proxy free cash. Consistent with this intuition, we find that the link between disclosed cash holdings and CP repayments breaks down for firms with more trapped cash and becomes more accentuated for firms with less trapped cash.

Before concluding, we test two additional hypotheses. First, we hypothesize that strategically reducing disclosed gross debt is more beneficial for firms with higher gross debt compared to industry peers. This can be the case if these firms are more likely to violate loan covenants. To test this hypothesis, we define relative gross debt as the percentage difference between a firm's debt-equity ratio and the industry median. In line with our hypothesis, CP repayments are more prevalent for firms with more relative gross leverage. Second, the Tax Cuts and Jobs Act passed in December 2017, commonly known as tax reform, reduced the tax costs of accessing foreign cash holdings for companies headquartered in the U.S. Hence, we hypothesize that the tax reform lowered the shadow cost of reducing disclosed gross debt for U.S. companies generating positive foreign income. We test this hypothesis in a difference-in-differences setting, where we compare CP repayments for U.S. companies with positive foreign income to other sample companies. In line with our hypothesis, we find a positive and statistically significant difference between the two groups after the tax reform. This difference remains statistically significant after controlling for cash holdings, debt levels, firm size, relative gross debt, and our proxy for trapped cash.

We conclude by discussing alternative explanations. First, we provide additional evidence against the existence of specific financial frictions at the end of quarters or calendar years (Musto, 1997, Griffiths and Winters, 1997, Musto, 1999, Griffiths and Winters, 2005, Covitz

and Downing, 2007). To do so, we quantify the potential costs of lending supply frictions during our sample period, using individual CP yields at issuance and examine if financing costs are higher for CPs that mature in the following calendar quarter or calendar year. We find no evidence of elevated financing costs at the quarterly frequency and a modest effect of, on average, 1.55 basis points on the annual frequency. Second, we also rule out explanations based on agency costs of holding cash (Jensen, 1986).

Our study is related to the literature examining the CP market (Hahn, 1993, Calomiris, Himmelberg, and Wachtel, 1995, Gatev and Strahan, 2006, Anderson and Gascon, 2009, and Kahl, Shivdasani, and Wang, 2015, among others). Closest to our study, Kahl et al. (2015), document that firms use CPs as "bridge financing" and we contribute to this literature by showing that the short maturity of CPs allows firms to strategically reduce their gross debt around disclosure dates. The practice that we refer to as *gross debt management* is akin to "window dressing" – a pattern where portfolio managers (e.g., Lakonishok, Shleifer, Thaler, and Vishny, 1991, Musto, 1997, Musto, 1999) or banks (e.g., Allen and Saunders, 1992, Kotomin and Winters, 2006, Owens and Wu, 2015, Duffie, 2017, Munyan, 2017, or Klingler and Syrstad, 2020, among many others) alter their positions to appear safer than they actually are. While window dressing often refers to the attempt by low-quality entities to pool with high-quality ones (Kedia and Philippon, 2007), the phenomenon we document is different; gross debt management is an attempt by high-quality firms to separate from low-quality firms by signalling that they do not suffer from trapped cash problems. To the best of our knowledge, this is the first paper examining the CP debt of non-financial firms at a high frequency and documenting that firms substantially reduce their outstanding CP debt at regulatory reporting dates.

Our paper is also related to the vast literature on corporate cash management policies

(e.g., Lins, Servaes, and Tufano, 2010, Denis and Sibilkov, 2010, Dittmar and Mahrt-Smith, 2007, Harford, Mansi, and Maxwell, 2008, Duchin, 2010, Bates, Kahle, and Stulz, 2009 Graham and Leary, 2018, Cunha and Pollet, 2020). While these papers study cash on firms' balance sheets, we use data on daily outstanding short-term debt to examine cash management by repaying short-term debt. Our analysis builds on previous studies that value corporate cash holdings (Faulkender and Wang, 2006, Pinkowitz, Stulz, and Williamson, 2006), examine difficulties with repatriating foreign cash (Foley, Hartzell, Titman, and Twite, 2007, Faulkender, Hankins, and Petersen, 2019), and study the impact of trapped cash on firm value (Harford, Wang, and Zhang, 2017 Laplante and Nesbitt, 2017). While other studies document moral hazard problems that can arise from free cash holdings (Jensen, 1986, Opler, Pinkowitz, Stulz, and Williamson, 1999, Harford, 1999) or suboptimal investments due to potentially trapped cash (Graham, Hanlon, and Shevlin, 2011, Edwards, Kravet, and Wilson, 2016, Harford et al., 2017), we focus on the resulting corporate short-term debt management policies.

Moreover, while Acharya, Almeida, and Campello (2007) emphasize that cash is not equal to negative debt due to potential future hedging needs, we argue that cash differs from negative debt because of an asymmetric information problem. In this context, our findings contribute to understanding corporate usage of short-term debt, as was previously done for other forms of debt such as credit lines (Sufi (2009) and Yun (2009), Acharya, Almeida, and Campello, 2013, Acharya, Almeida, Ippolito, and Perez (2014).

1 Hypotheses Development

In this section, we formulate hypotheses and provide anecdotal evidence on the relevance of gross debt management.

1.1 Theory and hypotheses

In perfect capital markets, cash is equivalent to negative debt and firms are indifferent between holding cash or using it to repay parts of their gross debt – firms have no optimal level of cash balances, no incentives to report a particular amount of gross debt, and *net* debt is the only relevant measure of leverage. Building on the idea that cash is negative debt, most valuation models, such as those using the weighted average cost of capital (WACC), rely on net debt as a measure of leverage (Berk and DeMarzo, 2019).

However, financial market frictions can prevent firms from accessing cash when they need it and corporate treasurers therefore target an optimal level of cash holdings (e.g., Opler et al., 1999, Damodaran, 2005). Deviating from this target level by holding less cash can be costly because of potential liquidity shortfalls or missed investment opportunities. In addition, deviating from the target level and disclosing large cash holdings can be costly too. Theoretically, this is the case when there is asymmetric information between the firm and investors about the availability of cash; investors may be unable to verify that the disclosed cash is available to provide short-term liquidity benefits and therefore value the cash holdings at a discount. We now focus on the optimal responses to this information asymmetry and discuss its possible causes and empirical relevance in Section 1.2 below.

When cash is valued at a discount it is no longer equivalent to negative debt and firms' gross debt becomes relevant to investors, giving firms with genuinely free cash an incentive

to signal that their disclosed cash is free cash (Spence, 1973). To be credible, such a signal must involve spending the cash and one possibility would be using it to pay dividends (Miller and Rock, 1985). However, once cash has been paid out as dividend, bringing it back in is cumbersome (Cooper and Haltiwanger, 2006), making this signalling approach costly. An alternative approach is using the free cash to repay short-term debt instead of rolling it over. This approach is less costly than paying dividends because it only involves a temporary deviation from optimal cash holdings (the debt can be rolled over later) and repaying debt around annual or quarterly reporting dates has the advantage of disclosing less gross debt. We refer to the practice of repaying short-term debt at disclosure dates as *gross debt management* and hypothesize that firms engage in this practice.

Hypothesis 1 (Gross debt management)**.** *Firms reduce their outstanding short-term debt at quarterly and annual disclosure dates.*

The extent to which a company conducts gross debt management depends on the costs and benefits associated with sending such a signal. The shadow cost associated with strategically repaying short-term debt at regulatory disclosure dates is that the company temporarily deviates from its optimal cash holdings. All else equal, this cost is lower for firms with more liquid assets and we therefore expect that cash-rich companies engage more aggressively in the practice of gross debt management.

Hypothesis 2 (Gross debt management and cash holdings)**.** *Firms with more cash holdings reduce their outstanding short-term debt more aggressively.*

One challenge for testing this hypothesis is that observed cash holdings are disclosed *after* firms conduct gross debt management. We discuss this measurement concern in our empirical

analysis and note that, to the extent that disclosed cash holdings are correlated with firms' free cash, we expect a positive link between cash holdings and gross debt management.

We next highlight two benefits of gross debt management. First, asymmetric information about cash holdings is more severe for firms with more sales in regions with high cash-flow restrictions. As we explain in more detail below, cash flow restrictions can imply that a firm is unable to use its foreign cash holdings to repay U.S. debt and hence reducing both the disclosed cash holdings and gross debt is more beneficial if a company has more sales in regions with capital constraints. Second, loan covenants and rating agencies frequently consider companies' gross debt. Hence, firms with more gross debt compared to other firms in the same industry gain more by repaying parts of their gross debt at disclosure dates.

Hypothesis 3 (Benefits of gross debt management)**.** *Firms with the following characteristics reduce their outstanding short-term debt more aggressively:*

(a) Firms that generate a larger fraction of their income in countries with cash flow restrictions.

(b) Firms that have a higher level of gross debt compared to their industry peers.

1.2 The Importance of Gross Debt

We now discuss the empirical relevance of gross debt and highlight the asymmetric information friction that distinguishes cash from negative debt.

Asymmetric information about the genuine availability of cash can arise for several reasons. Most importantly, even though U.S. companies' overseas cash holdings are estimated between $25\% - 40\%$ of total cash (Hinks, 2016), firms are not required to disclose the geographic distribution of their cash holdings but report only aggregate quantities (Mott and

Schmidt, 2011). Offshore cash can be unavailable to a parent company in the U.S. because of the tax costs associated with the repatriation of foreign cash (Foley et al., 2007) but can be a broader issue for all multinational corporations because some countries impose capital flow restrictions.[1] Another reason for the asymmetric information problem is that disclosed cash can be earmarked for some specific purpose, such as an acquisition, or can be used to collateralize derivative positions. Consistent with this asymmetric information problem, J.P. Morgan (2015) highlights that "excess cash on a corporate balance sheet is often perceived to be valued at a discount to face value." Harford et al. (2017), Laplante and Nesbitt (2017), and Faulkender et al. (2019) confirm this view and provide empirical evidence that foreign cash holdings on corporate balance sheets are valued at a discount.

Because rating agencies do not view cash as negative debt, gross debt and the asymmetric information about cash holdings can also have a first-order impact on companies through credit ratings. The importance of credit ratings for firms stock returns (Nayar and Rozeff, 1994) and balance sheets (Kisgen, 2006 and Alissa, Bonsall Iv, Koharki, and Penn Jr, 2013) gives firms an incentive to minimize their disclosed gross debt, thereby minimizing the risk of a rating downgrade.

Specifically, all three major rating agencies explicitly acknowledge the role of *gross* debt in their corporate rating methodologies (see Moody's, 2016a, Standard & Poor's, 2016, and Fitch, 2016). Standard & Poor's (2016) highlights that net debt is considered on "a case by case basis" (subject to additional information such as a company's liquidity position) and Fitch (2016) explicitly states that cash must be "readily available" and that "restricted cash" is excluded from net debt. While debt issued by firms with more cash than debt should, in

[1]While the Tax Cuts and Jobs Act of 2017, commonly known as U.S. tax reform, reduced the tax costs of repatriating foreign cash, capital flow restrictions are still in place. We discuss both the tax reform and capital flow restrictions in more detail in the following sections.

theory, be risk-free, anecdotal evidence from Moody's (2016b) downgrade of Oracle in 2016 challenges that view: Despite Oracle having more cash and short-term investments than debt, Moody's argued that the rise of debt levels was problematic because cash holdings were potentially trapped and changed its rating outlook to negative.

2 Data

Because firms disclose their cash holdings and debt levels in annual and quarterly reports, only short-term debt is most suitable to manage the level of disclosed gross debt. We examine gross debt management of non-financial firms using commercial papers (CP), which are uncollateralized short-term debt securities with an initial maturity of less than 270 days.[2] Our analysis builds on a novel data set of U.S. non-financial CP transactions, obtained from the Depository Trust and Clearing Corporation (DTCC). We use these issuance data to construct time series of outstanding CP debt at the issuer level, which we hand-match to balance sheet information from Compustat. The resulting sample comprises 362 firms and captures approximately half of the outstanding dollar-denominated non-financial CP debt reported by the New York FED.[3]

In this section, we first illustrate the distribution of CP issuers in our sample across sectors and countries. We then describe their main balance sheet characteristics and our proxies for trapped cash. Finally, we examine the relevance of CP compared to other forms

[2]An alternative debt instrument that gives firms flexible financing are credit lines (e.g., Lins et al., 2010). However, Kahl et al. (2015) show that credit lines are significantly more expensive than CP debt and Sufi (2009) computes the average time to maturity of a drawn credit line as three years. Because of this longer average time to maturity and the problem that we cannot observe daily drawdowns and repayments of credit lines, we focus on the CP market.

[3]One reason for our smaller sample size compared to the New York FED data is that several non-financial CP issues are by municipalities, government sponsored entities, or public bodies such as universities, which are not part of our matched sample.

of corporate debt.

2.1 Commercial Paper Data

To issue CPs, a firm needs to register a "CP program," which requires obtaining a short-term credit rating, specifying several legal characteristics that all issuances must satisfy, and finding a dealer (or group of dealers) that places the securities in the market (Barclays, 2020). Given these necessary steps to set up a CP program, CP is usually issued by large firms. However, once a CP program is set up, the costs of using CP is significantly lower than for other forms of short-term debt, such as credit lines (see Kahl et al., 2015). Moreover, issuing new CPs is easy because no additional legal documentation to investors is necessary (unlike for traditional longer-term bond issues). To issue new CPs, a company would typically contact its dealer who purchases the entire issuance before selling the CPs to the ultimate investors (Eiger, Jennings-Mares, and Marlatt, 2017). Hence, the cost of issuing or rolling over CP debt is small and the CP market provides an ideal laboratory for examining gross debt management.

Table 1 provides detailed summary statistics of our CP data, broken down by sector, country of parent organization, and maturity structure. We have a total of 362 firms in our matched sample, and grouping them into sectors based on the first two digits of their NAICs code shows that a majority of 101 firms in our sample are in the utilities industry while the largest share of CP issuance is by IT companies.[4] Moreover, grouping the issuers by country of incorporation shows that most firms in our sample are headquartered in the U.S., with 80.11% of the issuers and 82.14% of the issuance conducted by U.S. companies. Table 1 also shows that, even though our sample comprises a relatively small number of firms, it captures

[4]We include utilities companies in our main analysis and confirm later that excluding them does not affect our main results.

a significant part of all Compustat firms – aggregating the firm assets in our sample shows that it captures 34.33% of the total assets in Compustat.

In Panel C of Table 1, we aggregate the CP issuance by issuer and calendar week into six maturity categories, ranging from "1 to 3 days" to "more than 180" days. The panel gives summary statistics of the CP issuance volumes by initial maturity and shows that the vast majority of CP issuance is with maturity below 90 days. This short maturity gives firms the flexibility to repay short-term debt at regulatory reporting dates instead of rolling the debt over.

2.2 Balance Sheet Data

We next hand-match the CP data to balance sheet information from Compustat and present key balance sheet characteristics in Table 2. Table A1 in the appendix contains an overview of all variable definitions and data sources. Panel A of Table 2 summarizes the annual balance sheet information and shows that the average firm in our sample has $50.92 assets, confirming that our sample comprises large firms. Moreover, as percentage of assets, the average debt is 33.43% with 4.71% short-term debt (i.e., debt with less than one year to maturity). The key variable of interest for our analysis is firms' cash holdings, measured as ratio of "cash and short-term investments" to firm assets. Cash holdings exhibit a large variation from a 10% quantile of 0.12% to a 90% quantile of 14.88%.

The debt-equity ratio of firms in our sample ranges from a 10% quantile of 38.10% to a 90% quantile of 230.71%. $Distance^{DE}$ captures the distance between a firm's debt-equity ratio and the industry median (based on the first two NAICs digits, using *all* firms in Compustat) in the same year as the difference between the two variables, divided by the sum of the two variables. As we can see from the table, this variable ranges from a 10%

quantile of -8% to a 90% of close to 100%.

Next, we discuss different proxies for trapped cash. First, foreign pre-tax income, which we report as percentage of firm assets, is not available for utilities companies and only reported by a subset of firms. While foreign pre-tax income can make it costly for U.S. companies to repatriate foreign cash, a broader concern arises for companies generating large parts of their income in regions with cash-flow restrictions. To proxy for this type of trapped cash, we use the geographic distribution of companies' sales in Compustat Segments (GEOSEG). This database provides annual breakdowns of the geographic distribution of firms' revenues by countries or regions.[5] Table 2 shows that the fraction of foreign sales (outside the U.S.) varies substantially across firms with some firms generating their entire sales revenues outside the U.S.

Because sales outside the U.S. do not necessarily indicate trapped cash issues, we construct a proxy for difficulties in repatriating foreign earnings. To that end, we weight each reported sales segment outside the U.S. with a measure of capital outflow restrictions. We use the measure for capital outflow restrictions (kao), provided by Fernandez, Klein, Rebucci, Schindler, and Uribe (2015), which assigns a number between zero and one to each country or region, depending on how difficult it is to withdraw cash from a country. We then proxy trapped cash as:

$$\text{Trap}_{i,k}^{kao} = \frac{\sum Sale_{l,i,k} \times kao_l}{\sum Sale_{l,i,k}}, \tag{1}$$

where the sums run over all countries or regions l that firm i reports sales for in period k. We provide summary statistics of this variable in Table 2 under Trap^{kao} (%), showing that

[5]Figure IA.3 in the Internet Appendix compares the aggregate sales volumes from Segments to the reported sales volumes Compustat, confirming that Segments captures most sales.

the variable has a 10% quantile of 0 and a 90% quantile 24.49%.

2.3 Relevance of CPs on Corporate Balance Sheets

We next examine the relevance of CP debt on firms' balance sheets in Panel B. The average percentage of CP debt is 3.17% relative to total debt and 22.92% relative to short-term debt with 90% quantiles of 8.52% and 70.70%, respectively. Because we are interested in the link between CP debt and firms' cash holdings, we also put the CP debt into perspective with cash holdings and find that the average CP-debt ratio in the truncated sample is 94.59%. Throughout the paper, when reporting percentages relative to disclosed short-term debt or cash holdings, we avoid large outliers that potentially overstate the role of CP debt by removing firm-year observations where the disclosed short-term or cash holdings are below the 10% short term debt or cash holding percentile in the given year, respectively.

To illustrate the economic magnitude of CP repayments, we proxy repayments as the difference between year-average and year-end CP outstanding and report summary statistics of these repayments as fraction of total debt, short-term debt, and cash holdings, respectively. The average CP repayments account for 1.22% of total debt, 26.48% of short-term debt and 9.61% of cash holdings with 90% quantiles of 5.02%, 56.64%, and 148.9%, respectively. Taken together, Panel B suggests that CPs are an important component of corporate debt and CP repayments can have a meaningful impact on debt statistics and cash holdings. While Table 2 focuses on annual figures, Table IA.1 in the Internet Appendix confirms a similar pattern for quarterly CP debt repayments.

3 Gross Debt Management: Stylized Facts

We now test Hypothesis 1 and establish the main stylized fact of the paper: Firms substantially reduce their outstanding short-term debt at regulatory reporting dates. After providing six examples of firms that aggressively manage their gross debt, we show that non-financial CP volumes drop at quarter-end and year-end dates in the aggregate market. We then confirm that CP repayments are a cross-sectional phenomenon that aligns with firms' quarterly and annual reporting dates.

3.1 Selected Examples

In this section, we show that six major CP issuers – Kimberly-Clark, Mattel, Colgate, Sanofi, BASF, and Siemens – engage in gross debt management. Figure 2 plots the outstanding CP debt for the six companies together with vertical lines indicating the last trading day of a calendar quarter. We highlight quarter-end dates because the quarterly reports of all six companies are based on numbers observed at the end of each calendar quarter and note that, with the exception of Sanofi, whose year-end reporting is based on September numbers, all companies' annual reporting aligns with the end of the calendar year.

Figure 2 illustrates considerable fluctuations in the outstanding CP debt of the six companies. In particular, the figure shows that these companies drastically reduce their CP debt at quarter-end dates, frequently repaying their entire CP debt. Note that the term *repayment* refers to maturing CP debt that is not replaced by newly-issued CPs and companies therefore need to plan reducing their outstanding short-term debt at regulatory reporting dates in advance. While the figure suggests that the disclosed CP debt at quarter-end and year-end dates is significantly lower than the average CP debt, it is not obvious from the fig-

ure whether year-end repayments are more pronounced than other quarter-end repayments. In addition, because we hand-picked these examples, we next need to examine if gross debt management is a market-wide phenomenon.

3.2 Market-Wide CP Repayments

We first examine the aggregate daily outstanding volume for our matched sample of 362 firms and use weekly outstanding CP volumes provided by the Federal Reserve Bank of New York (New York FED) as additional test afterwards. To test for drops in CP volumes at quarter-end and year-end dates, we regress the time series of outstanding CP debt on two dummy variables QEnd_t and YEnd_t that equal one for the last observation in the calendar quarter and calendar year, respectively. To mitigate the impact of a potential time trend, we control for year-fixed effects. Panel A of Table 3 shows the results of these regressions.

In Columns (1) – (2), we examine the aggregate daily CP volumes from our matched sample and confirm that CP volumes drop on the last business day of the calendar quarter. Given that the average outstanding CP volume in our sample is \$110 billion, the average quarter-end drop of \$15.42 billion suggests that the firms in our sample, on average, repay close to 15% of their CP debt at quarter end dates. These repayments are significantly more pronounced at year-end dates, where the effect increases up to \$30.54 ($11.11 + 19.43$) billion, suggesting average repayments close to 30%.

Columns (3) – (4) repeat the analysis using the weekly CP volumes provided by the New York FED. Corroborating the results for our matched sample, aggregate non-financial CP volumes drop at quarter-end dates with significantly stronger drops at year-ends. As before, the magnitude of these repayments is economically meaningful with average decreases of \$13.18 billion at quarter-ends and \$29.40 billion ($8.54 + 20.86$) at year-ends. Note that

both the statistical and economic significance of these drops is less pronounced than for our matched sample. One potential reason for these weaker results is that the New York FED data are weekly numbers (reported on Wednesdays), which makes it difficult to capture the effect on the last day of the quarter or year.

One potential concern about our results so far is that these drops in CP volumes could reflect supply frictions in the CP market rather than firms choosing to repay their short-term debt. To test this alternative view, we exploit that the New York FED also provides volumes for financial CPs and asset-backed CPs. In Columns (5) – (6), we repeat our analysis for the aggregate volume of financial and asset-backed CPs. In sharp contrast to the results for non-financial CPs in Columns (1) – (4), we find no significant drops in the volumes of these other segments of the CP market.[6] Hence, CP debt repayments are difficult to reconcile with limited lending supply at quarter-end and year-end dates, which would affect other CP segments too.

3.3 Issuer-Level CP Repayments

We next examine CP repayments at the issuer level more formally and study within-issuer variations in CP debt. To that end, we run panel regressions of the following form:

$$\log(Outst_{i,t}+1) = \beta^{QEnd}\text{QEnd}_{i,t} + \beta^{YEnd}\text{YEnd}_{i,t} + FE_i + FE_t + \varepsilon_{i,t}, \tag{2}$$

where $\log(Outst_{i,t}+1)$ is the log amount of CPs outstanding for firm i at day t. Because the outstanding volumes can drop to zero, we add one dollar to ensure that the logarithm is bounded below. $\text{QEnd}_{i,t} := \mathbb{1}_{\{t=QEnd(i)\}}$ and $\text{YEnd}_{i,t} := \mathbb{1}_{\{t=YEnd(i)\}}$ are dummy variables

[6] Figure IA.1 in the appendix plots the volumes in the three parts of the CP market, confirming that CP debt repayments are only prevalent for non-financial CPs.

that equal one on the quarter-end and year-end disclosure date of company i, taking firm-specific reporting dates into account instead of focusing on calendar quarter and calendar year effects. FE_i and FE_t are firm fixed effects and year fixed effects.

Panel B of Table 3 shows the results of this regression. Focusing first on the coefficient estimates of Equation (2) for the full sample, Columns (1) – (2) confirm our earlier results, highlighting significant drops in CP debt at firms' quarter-end disclosure dates. As before, the magnitude of these drops more than doubles on year-end disclosure dates, confirming our earlier results and suggesting that CP repayments are a persistent phenomenon across CP issuers that is most pronounced around year-end reporting dates.

We next examine the potential role of year-end supply effects by considering two different subsamples – CP issuers whose year-end reporting aligns with the last business day of the calendar year and CP issuers whose year-end does not align with the end of the calendar year. Focusing first on firms whose annual reporting dates align with the end of the calendar year, Columns (3) – (4) show that the magnitude of the quarter-end drops for these firms is similar to the entire sample. Turning to the subsample of firms whose year-end reporting does not align with the end of the calendar year, Columns (5) – (6) show virtually identical drops in CP volumes at quarterly and annual reporting dates. Importantly, Panel (6) shows that firms reduce their outstanding CP debt at the end of their reporting year, even if it does not align with the end of the calendar year. Taken together, Table 3 shows a seasonality of CP debt that is hard to reconcile with lending supply shortages at year-ends.

4 Gross Debt Management and Cash Holdings

In this section, we test Hypothesis 2 and examine the link between gross debt management and disclosed cash holdings. As our main measure of gross debt management for firm i in year k, we compare the year-average CP debt to the year-end CP debt:

$$\mathcal{D}_{i,k} = \log(Outst_{i,k}^{Avg} + 1) - \log(Outst_{i,k}^{End} + 1), \tag{3}$$

mitigating the impact of large outliers by using the logarithm of the dollar amount of CP debt and adding one dollar to ensure that the logarithms are bounded at zero. We first link corporate gross debt management to disclosed cash holdings using non-parametric tests and then confirm the robustness of our findings using regression analysis. We focus our analysis on annual reporting dates, where gross debt management is most pronounced, and relegate additional tests with quarterly data to the Internet Appendix.

4.1 Non-Parametric Evidence

As a starting point, we split the sample of CP issuers into quartiles by comparing their cash holdings (as a fraction of total assets) in year k to the cash holdings of other CP issuers in the same year. As a baseline test, the first row of Table 4 compares the mean and median $\mathcal{D}_{i,k}$ for the entire sample, confirming the strong drops in CP volumes at firm's annual reporting dates. To illustrate the economic magnitude of gross debt management, we repeat the analysis with two alternative proxies: The difference between year-average and year-end CP debt (i) relative to $Outst_{i,k}^{Avg} + Outst_{i,k}^{Avg}$ and (ii) relative to the disclosed amount of short-term debt. As we can see from the first row of Table 4, the average CP repayment relative to the outstanding CP debt is 35.84% and 15.74% relative to the disclosed

short-term debt.

We next examine the difference between yearly averages and year-ends for the different cash quartiles. In Table 4, *Q4* corresponds to the quartile with the highest cash holdings and *Q1* to the quartile with the lowest cash holdings. The table illustrates that $\mathcal{D}_{i,k}$ decreases monotonically as firms hold less cash and that the statistical significance of the median $\mathcal{D}_{i,k}$ drops for firms with low cash holdings. Turning to repayments relative to total CP, Table 4 shows that firms in *Q4*, on average, repay 50.44% of their CP debt while firms in *Q1*, on average, repay 14.28%. Focusing next on gross debt management relative to reported short-term debt, the Table shows that gross debt management has a sizable impact on disclosed short-term debt ranging from 18.30% and 21.30% for firms in *Q4* and *Q3* to 6.51% for firms in *Q1*.

To conclude our non-parametric analysis, we examine the difference between gross debt management for firms with the highest cash holdings (*Q4*) and firms with the lowest cash holdings (*Q1*) more closely. To that end, we estimate the kernel density of the difference between year-average and year-end CP debt for firms in *Q4* and firms in *Q1*. Figure 3 plots these kernel densities for the two subsamples and illustrates that these distributions are bimodal; the first mode is around zero, corresponding to firm–years without window dressing, and the second mode is around twenty, corresponding to firm-years where the company repays the entire CP debt at the regulatory reporting date. As we can see from the figure, these extreme repayments are more common for firms with high cash holdings.

In addition, Figure 3 plots bootstrapped confidence bands, estimated using a permutation test. As we can see from the figure, the two kernel densities do not lie within these confidence bands, suggesting that the two distributions are significantly different. Overall, Figure 3 confirms that firms with high cash holdings engage in significantly more gross debt

management than firms with low cash holdings, suggesting that corporate cash holdings are a key variable in explaining gross debt management.

4.2 Regression Analysis

We next use regression analysis to examine the link between gross debt management and corporate cash holdings. We run regressions of the following form:

$$\mathcal{D}_{i,k} = \beta^{Cash} Cash_{i,k} + \gamma Controls_{i,k} + \varepsilon_{i,k}, \tag{4}$$

where $\mathcal{D}_{i,k}$ captures the difference between year-average and year-end CP debt for firm i in period k, as defined in Equation (3). Compared to the non-parametric tests, this approach has the advantage that we can include other firm characteristics, such as size and debt outstanding in $Controls_{i,k}$. Moreover, we can add time and issuer fixed effects to the analysis, which help mitigating concerns that our results are driven by unobservable firm characteristics or by macroeconomic characteristics.

Table 5 examines the link between cash holdings and gross debt management. As we can see from Column (1), the link between the two variables is statistically significant and a one standard deviation increase in cash holdings ($sd = 8.48$) increases $\mathcal{D}_{i,k}$ by 1.44.[7] Adding the logarithm of the firms' assets, the debt-to-assets ratio, and year-fixed effects as controls, Column (2) shows that these characteristics are insignificant and that controlling for them

[7] Throughout the paper, we cluster the standard errors in our regressions at the issuer level. An alternative approach would be using double-clustered standard errors at the time and issuer level. However, because our panel has a relatively small time dimension, clustering at the time level is not crucial and could even inflate the resulting t-statistics. We follow the rule of thumb proposed by Angrist and Pischke (2008) and compare the t-statistics with and without clustering at the time level. In Column (1), the t-statistic with clustering at time level is 4.55 and marginally larger than the reported t-statistic of 4.03. Hence, we view standard errors clustered at the issuer level as conservative and use them throughout the paper.

does not affect the statistical and economic significance of the cash ratio. We next examine whether controlling for past gross debt management affects the link to disclosed cash holdings. Column (3) shows that controlling for $\mathcal{D}_{i,k-1}$ leaves the statistical and economic significance of the cash ratio for gross debt management in the current period largely unchanged (even though controlling for $\mathcal{D}_{i,k-1}$ lowers the amount of firm-year observations). However, $\mathcal{D}_{i,k-1}$ is highly significant, suggesting that firms that are active in gross debt management in year $k-1$ continue this behavior in year k. Instead of controlling for past gross debt management, Column (4) repeats the analysis controlling for issuer fixed effects and suggests that controlling for unobserved issuer characteristics increases the statistical and economic significance of the cash ratio further. Even after controlling for both issuer and time fixed effects, Column (5) shows a robust link between cash holdings and firms' gross debt management.

Because both gross debt management and cash holdings can fluctuate from one year to the other, we next examine the link between the two variables considering changes instead of levels. Specifically, Column (6) shows the results of regressing changes in gross debt management on changes in cash holdings, controlling for changes in total assets and debt. As we can see from the column, the link between gross debt management and cash holdings remains highly significant with a one standard deviation increase in cash holdings ($sd = 4.33$) increasing gross debt management by 1.60. In line with our analysis in levels, Column (7) confirms that controlling for issuer fixed effects leaves the relationship virtually unchanged.

5 Benefits of Gross Debt Management

Turning to Hypothesis 3, we now examine if (a) firms with a higher Trap^{kao}, whose sales income is generated countries with more cash-flow restrictions, and (b) firms with more gross debt relative to their industry peers engage in more aggressive gross debt management. In addition, we address the potential measurement concern with reported cash holdings and test if the link between reported end-of-period cash holdings and gross debt management breaks down for firms with higher Trap^{kao}.

5.1 Non-Parametric Tests of the Role of Trapped Cash

Focusing first on Hypothesis 3a, we split the sample into firms with high or low trapped cash, measured by Trap^{kao} above or below the annual median. Table 6 shows that the difference between year-end CP debt and year-average CP debt is more pronounced for firms with higher Trap^{kao}; the average difference between year-average and year-end CP debt increases from 5.04 for firms low Trap^{kao} to 7.11 for firms with high Trap^{kao}.

We next examine the difference between firms with high and low cash holdings (measured as firms with cash holdings above or below the annual median) in the different subsamples. While the difference between year-average and year-end CP debt increases for firms with higher cash holdings in both subsamples, the effect is less pronounced for firms with high trapped cash. For low Trap^{kao} firms, corporate gross debt management increases sharply from 2.53 in *Cash Q1* to 8.91 in *Cash Q4* compared to high Trap^{kao} firms, for which we observe an increase from 5.84 to 9.20.

To get a better idea of the economic magnitude behind these effects, Figure 4 plots the gross debt management relative to $Outst_{i,k}^{Avg} + Outst_{i,k}^{Avg}$ or relative to the reported amount

of short-term deb. As we can see from Panel (a), gross debt management for the subsample with low trapped sales increases monotonically in cash holdings. Moreover, gross debt management for the subsample with high trapped sales exceeds that of firms with low trapped sales in each cash quartile. The gross debt management of firms with more trapped sales fluctuates less in terms of their total cash holdings. Visualizing the effects relative to disclosed short-term debt, Panel (b) shows a similar pattern for firms with less foreign sales. However, the link between cash holdings and gross debt management breaks down for firms with more foreign sales, where firms in *Cash Q2* reduce their short-term debt on average by 30%.

5.2 Regression Analysis

We now examine Hypothesis 3a in a regression setting. As before, we focus on $\mathcal{D}_{i,k}$, which measures the difference between year-average and year-end CP debt for firm i in reporting year k. We then examine the relevance of Trap^{kao} and gross debt, gradually adding $\mathcal{D}_{i,k-1}$, firm size, debt outstanding, year and issuer fixed effects.

Focusing first on the impact of Trap^{kao} on gross debt management, Panel A of Table 7 shows that firms with higher Trap^{kao} conduct more aggressive gross debt management. The link between the two variables is robust to controlling for lagged gross debt management, firm size, total debt, and year fixed effects . However, Columns (5) and (6) show that the impact of Trap^{kao} becomes borderline insignificant when adding issuer fixed effects. This insignificant impact suggests that Trap^{kao} does not vary substantially within issuer, which is in line with firms conducting their sales in similar geographic regions over time.

Panel B repeats the analysis, additionally controlling for cash holdings and the interaction between cash holdings and Trap^{kao}. This specification allows us to examine whether cash

holdings have a different impact, depending on the firms' trapped cash. Columns (1)–(4), which do not include issuer fixed effects, show that Trap^{kao} has a virtually identical effect on $\mathcal{D}_{i,k}$ compared to Panel A. Moreover, β^{Cash} is approximately three times higher than in the baseline results from Table 5 and the interaction between *Cash* and Trap^{kao} is significant and negative, suggesting that the impact of *Cash* on gross debt management decreases for firms with more trapped cash. Columns (5) and (6) confirm the robustness of these results to controlling for issuer fixed effects and lagged gross debt management.

Next, we replace $\text{Trap}^{kao}_{i,k}$ with $Distance^{DE}_{i,k}$, which captures the distance between company i's debt-equity ratio and the average debt-equity ratio of firms in the same industry. As we can see from Panel C, there is a positive and statistically significant link between gross debt management and $Distance^{DE}_{i,k}$, which is robust to controlling for past gross debt management, firm size, amount of debt, cash holdings, and year fixed effects. However, as with $\text{Trap}^{kao}_{i,k}$, the effect disappears when controlling for issuer fixed effects, suggesting that firms' relative gross debt does not fluctuate substantially over time.

5.3 The 2017 U.S. Tax Reform

Another reason why cash might not be readily available to repay gross debt are repatriation taxes faced by multinational companies headquartered in the U.S. (e.g., Foley et al., 2007). Prior to the Tax Cuts and Jobs Act passed in December 2017 (commonly known as tax reform), the U.S. had a marginal tax rate of 35% for corporate revenues and firms generating income in regions with lower tax rates had to pay a repatriation tax equal to the difference between the U.S. tax rate and the foreign tax rate. The tax reform reduced this repatriation tax by reducing the U.S. marginal tax rate to 21%. Therefore, we expect that the tax reform reduced the costs of accessing cash holdings for U.S. companies with positive foreign income,

which allows us to test if the cost of accessing cash holdings affects gross debt management.

We define a dummy variable $Affected_{i,k}$, which equals one if firm i is headquartered in the U.S. and reports a positive foreign income in year k. We interact this variable with a dummy that equals one after the implementation of the tax reform in December 2017 to examine its impact. Because utilities companies are not required to report their foreign income, we exclude them from the analysis.

Table 8 shows the results of this regression. Column (1) shows that even without adding controls, firms with positive foreign income that are headquartered in the U.S. significantly increase their gross debt management after the tax reform. Columns (2)–(4) show that controlling for cash holdings, firm size, debt level, and relative debt-equity ratio further increases the impact of the tax reform for these firms. Even after controlling for Trap^{kao}, the impact of the tax reform remains statistically significant for affected firms.

6 Alternative Explanations

In this section, we rule out two alternative explanations for our findings on gross debt management.

6.1 Lending Supply Frictions

As discussed in the introduction, a large body of literature examines lending supply frictions in money markets at the end of the calendar year. Hence, it is possible that the year-end drops in CP volumes are not driven by lower demand for CP debt, but by frictions affecting CP lenders. Despite the results in Section 3.2 (CP volumes only drop for non-financial CPs, not in other CP segments) and Section 3.3 (CP volumes also drop for firms whose annual

reporting dates do not align with the end of the calendar year) being inconsistent with this view, we now examine lending supply frictions more closely.

We start by discussing whether previous studies are in line with lending supply shortages. Musto (1997) and Musto (1999) argues that year-end disclosures incentivize MMFs to shift their portfolio holdings to less-risky issuers. While this argument impacted CP lending before the financial crises, MMFs are now required to provide monthly portfolio disclosures, making it unlikely that this friction is a major driver. Similarly, the year-end spikes in CP yields illustrated in Covitz and Downing (2007) were most pronounced around the change of the century and for low-rated CPs. In addition, Griffiths and Winters (1997) and Griffiths and Winters (2005) argue that it is not "risk shifting window dressing" as proposed by Musto (1997) but investors' preferred habitat for cash. They argue that investors have an elevated demand for cash before year-ends to meet their cash-flow obligations and show that, in line with their hypothesis, CP yields converge back to normal levels on the last days of the year. Given that funding costs normalize on the last days of the year, lending supply frictions are not a plausible driver of CP repayments at year-ends.

To get further reassurance, we use data on the yields for newly-issued CP in our sample. To avoid our results being affected by large outliers (yields of CPs with short maturities can be extremely volatile), we winsorize yields at the 99.5% and 0.5% percentiles.[8] We then compute the yield spread of each CP issuance relative to maturity-matched overnight-index swap (OIS) rates, interpolated between adjacent OIS maturities (see Table A1 in the appendix for more details on our OIS interpolation) and examine whether yields for CPs maturing in the following calendar quarter (Cross_j^{QEnd}) or the following calendar year

[8]To confirm that our obtained CP yields are plausible, Figure IA.4 in the Internet Appendix compares monthly averages for 1-month and 3-month CP yields to monthly averages obtained from the New York FED.

(Cross_j^{YEnd}) are significantly higher than the yields of comparable CPs that do not cross a quarter-end or year-end date. If lending supply at these dates is an issue, we expect CPs maturing in the following calendar quarter or year to have significantly higher yields than comparable CPs that mature within the same calendar quarter or year. To focus on comparable CP issuance, we control for the time to maturity and issuance volume of each issued CP and add issuer-fixed effects as well as issuance-week fixed effects. Hence, in this specification, Cross_j^{QEnd} and Cross_j^{YEnd} test if the yields of CPs maturing in the following calendar quarter or year are significantly different from comparable CPs maturing within the same calendar quarter or year.

Table 9 suggests that CP yields are almost unaffected by calendar date effects. As a starting point, we focus on CPs with less than 90 days to maturity and Column (1) shows that CPs maturing in the following calendar quarter have a yield spread that is, on average, -0.40 basis points *below* ($t = -1.15$) comparable CP yields that do not cross quarter-end. By contrast, Column (2) highlights a small year-end effect: CPs maturing in the following calendar year have a yield spread that is, on average, 1.55 basis point above ($t = 2.53$) comparable CP yields that do not cross quarter-end. Combining Cross_j^{QEnd} and Cross_j^{YEnd} in Column (3) gives an inconclusive picture – while we observe a small year-end effect in CP yields, the yields of CPs crossing other quarter-end dates are, on average, -0.95 below ($t = -2.91$) the yields of comparable CPs that do not cross quarter-ends. In addition, Column (4) shows that a year-end effect is absent for CPs with more than 90 days to maturity.

Taken together, Table 9 shows an economically small cost of CP borrowing over year-end dates that is not present at quarter-end dates. Together with the fact that CP repayments are also observed for firms reporting on dates other than quarter-ends and year-ends, this

finding gives us further reassurance that lending supply frictions are not the main driver of the observed CP debt repayments.

To conclude the discussion of year-end supply effects, Figure 5 plots CP repayments relative to the outstanding CP debt at year-end and as year-average for firms in different *Cash* quartiles. We separately examine the subsamples of firms whose reporting aligns with the end of the calendar year and firms whose reporting does not align with the end of the calendar year. As shown in Figure 5, gross debt management monotonically increases in cash holdings for both subsamples.

6.2 Agency Costs of Cash

A second possible driver of our findings could be related to the "free cash flow" theory by Jensen (1986). Specifically, if corporate managers aim to misuse corporate cash for activities that destroy shareholder value (e.g., perks or empire-building acquisitions), then one could imagine that they try to hide the true amount of cash that they hold to shareholders, precisely by using it to repay short-term debt on reporting dates.

This alternative explanation can be ruled out on two grounds. First, theoretically, the free cash flow theory is not about misusing cash per se, but about misusing free debt capacity – that is, the difference between potential debt capacity and net debt. When using cash to repay CP, corporate managers disclose a lower level of cash to investors, but net debt remains unchanged. As a consequence, free debt capacity also remains unchanged. Therefore, it is theoretically not obvious that using cash to repay CP would provide any benefit to managers willing to hide wasteful expenses.

Second, some of our previous findings go against agency problems being a major driver of our results. Indeed, if corporate managers want to hide cash in order to hide wasteful

expenses to investors, they should be more likely to do so when they have more domestic cash. Instead, we find that CP repayments patterns are stronger for firms with more trapped cash. The fact that this last results holds even after including firm fixed effects cannot be reconciled with potential agency costs of cash.

7 Conclusion

We use new issuance-level CP data for non-financial companies to examine firms' short-term debt usage at a high frequency. Our findings illustrate that firms systematically reduce their short-term debt at quarter-end and year-end disclosure dates. This gross debt management by corporate CP issuers is not driven by elevated financing costs at quarter-end or year-end dates. Instead, we show that firms use their cash holdings to reduce gross debt on regulatory disclosure dates. Our findings illustrate that, even though cash is arguably the most liquid and transparent asset on a firm's balance sheet, cash is not king – firms prefer repaying short-term debt to strategically disclose low gross debt levels instead of holding more cash. These gross debt repayments reduce asymmetric information about cash holdings by showing to investors that the firm has access to genuinely "free cash."

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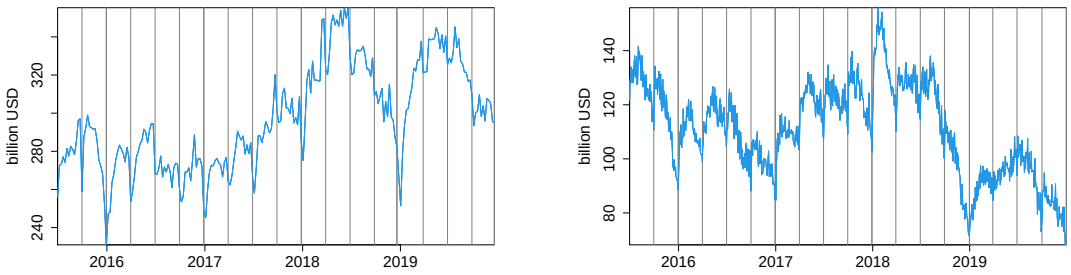
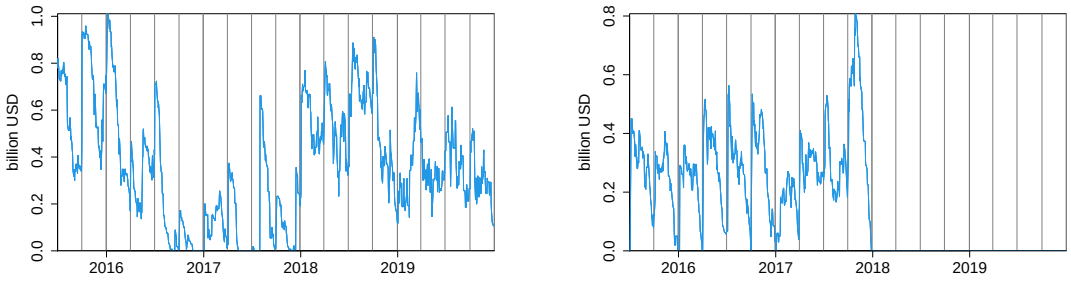


(a) Volume FED

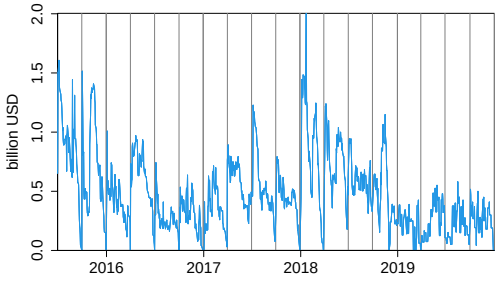
(b) Volume sample

Figure 1: **Outstanding volume of USD non-financial commercial paper.** Panel (a) shows the weekly outstanding volumes of all dollar-denominated non-financial CPs, obtained from the Federal Reserve Bank of St. Louis. Panel (b) shows aggregated daily outstanding volumes, constructed based on all issuers in our matched DTCC sample. Vertical lines mark the last observation in a calendar quarter.

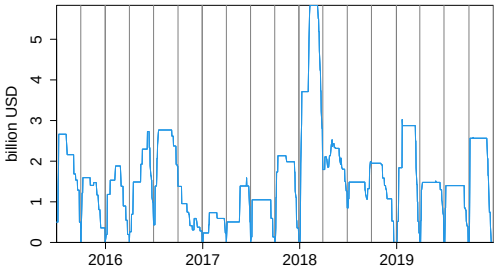


(a) Kimberly-Clark

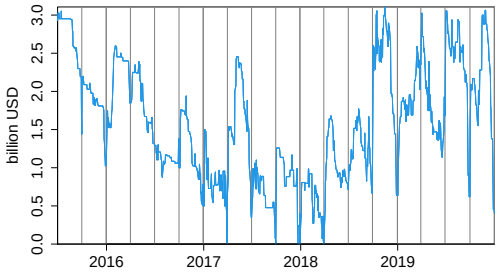
(b) Mattel



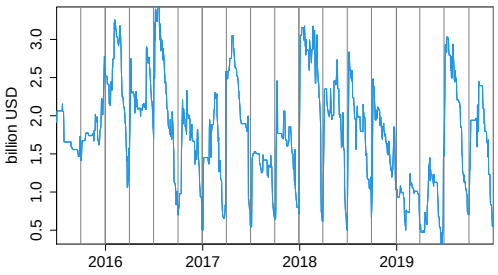
(c) Colgate



(d) Sanofi



(e) BASF



(f) Siemens

Figure 2: **Examples of gross debt management.** This figure gives six examples of non-financial CP issuers that systematically reduce their CP volumes on regulatory reporting dates. The quarter-end of all six sample firms aligns with the end of the calendar quarter and the year-end of Sanofi falls on the end of September while the year end of all other firms aligns with the end of the calendar year. Vertical lines indicate the last trading day of a quarter.

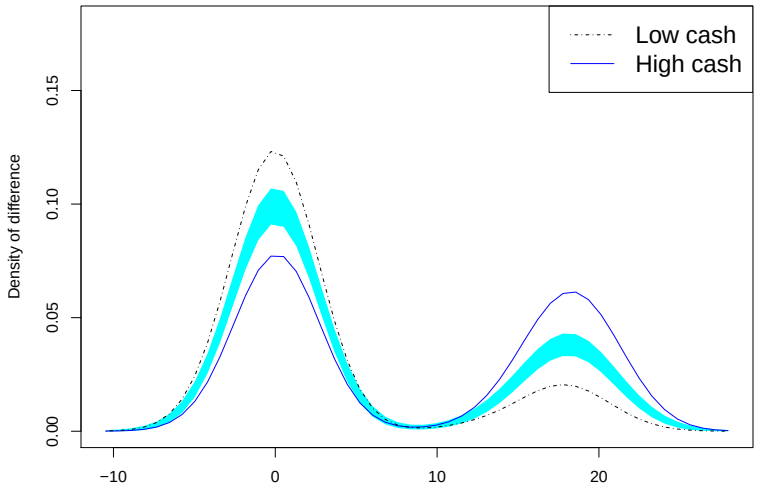
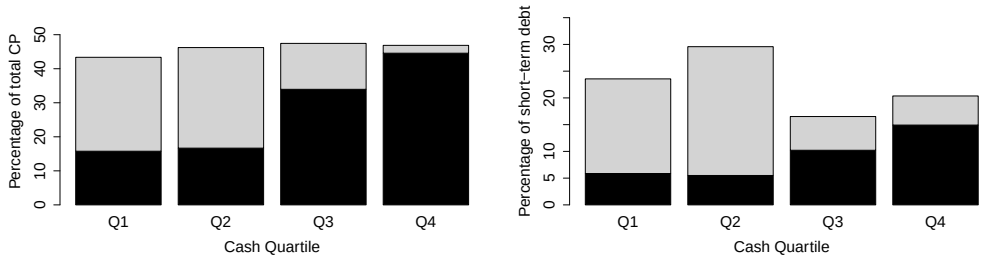
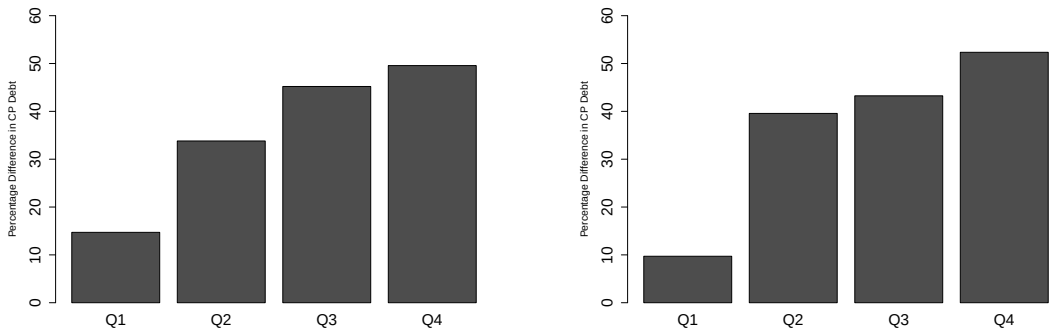


Figure 3: **Gross debt management for firms with high and low cash holdings.** This figure compares the distribution of the difference between year-average and year-end commercial paper outstanding for firms with high cash holdings (above the 75% quantile of our sample) and firms with low cash holdings (below the 25% quantile of our sample). The plots show the kernel density of the difference between period-averages and period-end observations for the two groups. We use the difference between the logarithm of these volumes, measured in USD and adding one dollar to ensure that the logarithms do not turn negative. The shaded regions illustrate the bootstrapped standard errors. We can formally reject the hypothesis that these two kernel densities are identical with a p-value below 0.1%.



(a) Percentage of total CP (b) Percentage of short-term debt

Figure 4: **Percantage differences between year-average and year-end CP debt.** This figure compares the percentage difference between year-average and year-end CP debt for subsamples of firm-years split in two ways. First, firms are separated into high and low trapped cash based on whether the trapped cash proxy is above or below the annual median. Second, each subsample is split by the corporate cash holdings (measured as fraction of assets) in the current priod. Q1 and Q4 correspond to the samples with cash holdings below the 25% quartile and cash holdings above the 75% quartile, respectively. In Panel (a), the percentages are relative to the total CP debt, adding year-average and year-end outstadning. In Panel (b), the percentages are relative to short-term debt. Fractions relative to short-term debt are wincorized at the 1% and 99% quantile. For Panel (b), firm-years with the lowest 10% short-term debt outstanding are removed to avoid upward biases in the average numbers.



(a) Aligned with year-end

(b) Not aligned with year-end

Figure 5: **Percantage differences between year-average and year-end CP debt.** This figure compares the percentage difference between year-average and year-end CP debt for four subsamples, split by corporate cash holdings (measured as fraction of assets) in the current priod. Q1 and Q4 correspond to the samples with cash holdings below the 25% quartile and cash holdings above the 75% quartile, respectively. Panel (a) only includes firm-year observations where the end of the reporting year aligns with the end of the calendar year. Panel (b) only includes firm-year observations where the end of the reporting year does not align with the end of the calendar year.

Table 1: **Description of the dataset of CP issuance.** This table describes the sample of CP issuers. Panel A shows the share of issuers and CP amounts issued by sector, according to NAICs classification. Panel B shows the share of issuers and CP amounts issued by country of incorporation. The panels report the number of firms in each category, the percentage of firms in the segment (relative to all firms in the sample), the percentage of CP issuance (relative to the total CP issuance in the sample), the largest issuer (measured as the issuer with the largest average CP outstanding over the sample period), and the percentage of total firm size in Compustat. Panel C shows the distribution of CP size by issuer-week-maturity. For each maturity bucket, we report percentiles of the distribution of the amount issued. In the last column we report the share of issuance in each maturity category.

Panel A: Distribution by sector

Sector	#Firms	%Firms	%Issued	Largest issuer	%Comp. size
All	362	100.00	100.00	—	34.33
Communication	16	4.42	2.50	Disney	33.63
Consumer Discr.	42	11.60	5.55	Toyota	34.72
Consumer Staples	36	9.94	19.97	Nestle	49.70
Energy	38	10.50	6.20	Chevron	31.36
Health Care	30	8.29	4.82	GalaxoSmithKlinke	28.97
Industrials	51	14.09	12.20	General Electric	33.73
IT	21	5.80	25.55	Microsoft	32.71
Materials	27	7.46	5.20	BASF	16.49
Utilities	101	27.90	18.00	Engie	45.61

Panel B: Distribution of issuers by country

Country	#Firms	%Firms	%Issued	Largest issuer	%Comp. size
All	362	100.00	100.00	—	—
USA	290	80.11	82.14	Coca Cola	39.86
CAN	13	3.59	1.45	Nutrien	17.32
GBR	11	3.04	1.85	GalaxoSmithKlinke	59.00
JPN	8	2.21	4.93	Toyota	52.38
DEU	7	1.93	1.82	Siemens	42.35
IRL	6	1.66	1.86	Eaton Corp.	19.44
CHE	5	1.38	1.51	Nestle	75.13
FRA	5	1.38	0.38	Sanofi	59.79
NLD	5	1.38	0.24	Lyondellbasell	14.59
Other	12	3.31	3.81	Schlumberger	8.21

Panel C: Distribution of CP size and maturity

	CP size (in million USD)						
Initial Maturity	10^{th}	25^{th}	median	mean	75^{th}	90^{th}	% Issuance
1 to 3 days	15.0	40.7	120.0	493.5	339.8	932.6	31.80
4 to 9 days	12.0	30.0	75.2	465.4	247.7	1084.1	29.06
10 to 30 days	10.0	24.6	50.0	97.8	106.0	210.0	8.17
31 to 90 days	8.0	24.0	52.2	122.5	129.4	284.4	10.43
91 to 180 days	5.0	25.0	70.0	203.1	200.0	500.0	10.87
more than 180 days	2.5	16.0	75.0	247.9	255.0	700.0	9.68

Table 2: **Balance sheet of CP issuers.** Panel A provides descriptive statistics of different balance sheet characteristics of CP issuers and the trapped cash proxy constructed according to Equation (1). Panel B relates the amounts of CP outstanding as of the end of each firm's reporting year or the difference between year-average and year-end CP volumes to other balance sheet characteristics in the pooled sample. The percentage numbers relative to cash holdings or short-term debt exclude the 10% firm-year observations with the lowest cash holdings or short-term debt, respectively. Means and quantiles are as of the reporting reporting date of each firm and computed from the pooled sample over the June 2015 – December 2019 period. The number of issuer-year observations used to compute these moments is provided in the last column. Statistics are conditional on the issuer having a non-zero average amount of CP outstanding in a given year.

	10^{th}	25^{th}	Mean	Median	75^{th}	90^{th}	N
	Panel A: Balance sheet summary statistics						
Assets (billion USD)	5.24	9.58	51.02	23.17	54.95	128.58	1407
Debt (% of assets)	19.50	25.41	33.46	31.98	39.39	50.09	1407
short-term debt (% of assets)	0.34	1.68	4.71	3.52	5.99	9.92	1407
Cash (% of assets)	0.12	0.71	6.21	3.30	8.56	14.89	1407
Debt-Equity ratio	38.10	63.60	156.73	92.81	131.92	230.71	1407
$Distance^{DE}$	-8.00	4.50	40.15	34.47	79.51	99.97	1407
Foreign Sales (%)	0.00	0.00	39.37	35.05	68.09	100.00	1238
Trap^{kao} (%)	0.00	0.00	13.92	11.31	24.50	33.99	1238
Foreign pre-tax income (%)	0.00	1.16	3.93	3.22	6.25	9.26	712
	Panel B: Size of CP funding in balance sheet						
Outstanding volumes based on year-end disclosures:							
CP outstanding (% total debt)	0.00	0.00	3.13	1.20	3.90	8.52	1407
CP outstanding (% short-term debt)	0.00	0.00	22.86	10.34	34.05	70.70	1369
CP outstanding (% cash holdings)	0.00	0.00	93.32	37.59	122.87	270.94	1266
Difference between yearly averages and year-end volumes:							
CP repayments (% total debt)	-2.16	-0.25	1.22	0.50	2.28	5.02	1407
CP repayments (% short-term debt)	-17.39	-1.93	26.48	3.94	20.27	56.64	1266
CP repayments (% cash holdings)	-176.10	-54.89	9.61	0.39	27.01	148.90	1266

Table 3: **Quarter-end and year-end effects on CP volumes.** Panel A shows results for using the time series of aggregate volumes. Columns (1) and (2) show the results of regressing daily non-financial CP outstanding volumes (constructed based on our sample of non-financial CP issuers) on two dummy variables QEnd and YEnd, which equal one in the last trading day of the quarter and the last trading day of the year, respectively. Columns (3) – (6) show the results of regressing weekly non-financial CP outstanding volumes (Columns (3) and (4)) and other CP outstanding, which include asset backed CP and financial CP (Columns (5) and (6)), on two dummy variables QEnd and YEnd, which equal one in the last week of the quarter and the last week of the year, respectively. The weekly CP volumes in Columns (3) – (6) are observed every Wednesday and obtained from the New York FED. Panel B shows the results for using the panel of issuer-level volumes. Columns (1) and (2) show the results for the full sample. Columns (3) and (4) show the results for firms whose year-end aligns with the end of the calendar year. Columns (5) and (6) show the results for firms whose year-end does not align with the end of the calendar year. In these specifications, the dummy variables QEnd and YEnd equal one on the quarterly or annual reporting date of a firm. The sample is March 2015 to December 2019. The numbers in parantheses show heteroskedasticity-robust t-statistics which are clustered at the firm and date level in Panel B. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively.

Panel A: Aggregate time series evidence (in billion USD)

	DTCC volumes		New York FED volumes			
	Non-financials		Non-financials		Other	
	(1)	(2)	(3)	(4)	(5)	(6)
QEnd	-15.42^{***}	-11.11^{***}	-13.18^{***}	-8.54^{**}	2.03	6.97
	(-5.61)	(-6.03)	(-3.28)	(-2.46)	(0.27)	(0.96)
YEnd		-19.43^{***}		-20.86^{**}		-22.20
		(-3.06)		(-2.09)		(-1.09)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.51	0.52	0.63	0.64	0.44	0.44
Num. obs.	1,153	1,153	232	232	232	232

Panel B: Issuer-level evidence (log volumes)

	All		Only regular		Only irregular	
	(1)	(2)	(3)	(4)	(5)	(6)
QEnd	-0.67^{***}	-0.45^{***}	-0.64^{***}	-0.41^{**}	-0.76^{**}	-0.56^{*}
	(-4.19)	(-3.39)	(-3.36)	(-2.56)	(-2.46)	(-1.90)
YEnd		-0.81^{***}		-0.83^{***}		-0.80^{***}
		(-3.80)		(-2.95)		(-3.04)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Issuer FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.50	0.50	0.48	0.48	0.53	0.53
Num. obs.	447,364	447,364	339,019	339,019	101,427	101,427

Table 4: **Non-parametric evidence.** This table shows the mean and median difference between year-average CP outstanding and year-end CP outstanding. Under *Logarithm of volume*, we use logarithms of the volumes, adding one dollar to ensure that the logarithm is non-negative. Under *Perc of total CP*, we use percentages relative to the total CP debt; total CP debt is the sum of year-average and year-end outstanding CP volume. Under *Perc of short-term*, we use percentages relative to the disclosed short-term debt and remove the 10% firms with the lowest disclosed level of short-term debt. The numbers in paranthesis are the p-values of either a two-sample t test of the difference between year-average and year-end volume (under *Mean*) or the p value of a Wilcox test for difference in medians. Under $Q4$, we examine the sub-sample of issuers with cash holdings as fraction of their assets above the 75% quantile. Under $Q3$, we examine the sub-sample of issuers with cash holdings as fraction of their assets beteen the 75% and 50% quantile. Under $Q2$, we examine the sub-sample of issuers with cash holdings as fraction of their assets between the 50% and 25% quantile. Under $Q1$, we examine the sub-sample of issuers with cash holdings as fraction of their assets below the 25% quantile. The sample period is July 2015 – December 2019, including all 362 issuers in our matched sample.

	Logarithm of volume		*Perc of total CP*			*Perc of short-term*		
	Mean	*Median*	*Mean*	*Median*	*N*	*Mean*	*Median*	*N*
All	5.98***	0.69***	36.00***	29.16***	1,407	15.65***	9.99***	1,266
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	
$Q4$	8.79***	1.71***	50.36***	61.56***	339	17.82***	17.05***	292
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	
$Q3$	6.93***	0.77***	43.18***	38.88***	336	21.26***	14.59***	305
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	
$Q2$	5.56***	0.57***	36.20***	28.72***	393	17.03***	7.78***	353
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	
$Q1$	2.72***	0.13**	14.30***	5.04***	339	6.67**	2.13*	316
	(0.000)	(0.037)	(0.000)	(0.000)		(0.022)	(0.065)	

Table 5: **Link between gross debt management and cash holdings.** The dependent variable in this table is the difference between the year-average and year-end CP debt (in USD) for firm i. We use logarithms of these variables, adding one dollar to ensure that they are bounded at zero. The main independent variable captures the cash holding of company i in year k ($Cash_{i,k}$), measured as the ratio cash and short-term investments to the firm's total assets. $log(Assets)_{i,k}$ is the logarithm firm i's total assets in year k; $Debt_{i,k}$ is firm i's total debt as fraction of total assets in year k; $\mathcal{D}_{i,k-1}$ is the dependent variable from the previous period. Panels (2), (3), (5), (6), and (7) include year fixed effects. Panels (4), (5) and (7) include issuer fixed effect. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

	Levels					Changes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Cash_{i,k}$	0.17^{***}	0.17^{***}	0.15^{***}	0.26^{***}	0.29^{***}	0.36^{***}	0.37^{***}
	(3.99)	(3.98)	(4.01)	(3.19)	(3.65)	(4.33)	(4.06)
$\log(Assets)_{i,k}$		-0.38	-0.36^{*}	3.82^{**}	1.09	-0.84	-1.02
		(-1.42)	(-1.73)	(2.14)	(0.57)	(-0.45)	(-0.45)
$Debt_{i,k}$		-0.04	-0.02	-0.04	-0.07	-0.05	-0.05
		(-1.20)	(-0.87)	(-0.73)	(-1.38)	(-0.76)	(-0.65)
$\mathcal{D}_{i,k-1}$			0.40^{***}				
			(10.26)				
Year FE	No	Yes	Yes	No	Yes	Yes	Yes
Issuer FE	No	No	No	Yes	Yes	No	Yes
Adj. R^2	0.03	0.04	0.19	0.38	0.39	0.03	-0.21
Num. obs.	1,407	1,407	1,041	1,407	1,407	1,041	1,041

Table 6: **Non-parametric evidence.** This table compares the year-average CP outstanding to the year-end volume. We use logarithms of the volumes, adding one to ensure that the logarithm is non-negative. Under *mean* and *median* the mean and median differences are reported and the numbers in paranthesis are either the p-value of a two-sample t test of the difference between year-average and year-end volume (under *Mean*) or the p-value of a Wilcox test for difference in medians. Under *Low Kao*, we examine the sub-sample of issuers with sales revenues in restricted areas below the median. Under *High Kao*, we examine the sub-sample of issuers with sales revenues in restricted areas above the median. Each of the two subsamples is then further split based on the cash holdings. Under *Cash Q*4, we examine the sub-sample of issuers with cash holdings as fraction of their assets above the 75% quantile. Under *Cash Q*3, we examine the sub-sample of issuers with cash holdings as fraction of their assets beteen the 75% and 50% quantile. Under *Cash Q*2, we examine the sub-sample of issuers with cash holdings as fraction of their assets between the 50% and 25% quantile. Under *Cash Q*1, we examine the sub-sample of issuers with cash holdings as fraction of their assets below the 25% quantile. The sample period is July 2015 – December 2019, including all 362 issuers in our matched sample.

	Low Kao			*High Kao*		
	Mean	Median	N	Mean	Median	N
All	5.03***	0.38***	625	7.11***	0.95***	621
	(0.000)	(0.000)		(0.000)	(0.000)	
*Cash Q*4	8.91***	18.93***	151	9.20***	19.27***	152
	(0.000)	(0.000)		(0.000)	(0.000)	
*Cash Q*3	5.82***	0.28***	149	7.46***	1.15***	149
	(0.000)	(0.002)		(0.000)	(0.000)	
*Cash Q*2	3.27***	0.06	149	6.07***	0.56***	148
	(0.000)	(0.161)		(0.000)	(0.000)	
*Cash Q*1	2.53***	0.23*	176	5.84***	1.02***	172
	(0.000)	(0.097)		(0.000)	(0.000)	

Table 7: **Link between annual window dressing and trapped cash.** The dependent variable in this table is the difference between the year-average and year-end CP debt (in USD) for firm i, sampled over reporting years. We use logarithms of these variables, adding one dollar to ensure that they are bounded at zero. In Panel A, the main independent variable is our proxy for trapped cash (Trap^{kao}), which captures sales in capital-flow retricted areas. Panel B shows the results for interacting Trap^{kao} with cash holdings. In Panel C, the main independent variable is the percentage difference between firm i's debt-equity ratio and the industry average debt-equity ratio ($Distance^{DE}_{i,k}$). Column (2) includes the lagged difference between the year-average and year-end CP debt as control variable. Column (3) shows the results with additional controls, which include $log(Assets)$ and the amount of debt as fraction of the firm's total assets. Column (4) shows the results with additional controls and year fixed effects. Column (5) shows the results with additional controls and issuer fixed effects. Column (6) shows the results with additional controls, year fixed effects and issuer fixed effects. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

Panel A: Impact of trapped cash						
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Trap}^{kao}_{i,k}$	7.49^{***}	5.87^{***}	7.36^{**}	7.31^{**}	11.32	11.34
	(2.73)	(2.81)	(2.46)	(2.43)	(1.25)	(1.25)
Adj. R^2	0.01	0.18	0.02	0.03	0.38	0.40
Panel B: Combination of trapped cash and cash holdings						
$\text{Trap}^{kao}_{i,k}$	9.01^{***}	6.32^{**}	9.32^{***}	9.11^{***}	23.31^{**}	23.77^{**}
	(2.93)	(2.55)	(2.88)	(2.79)	(2.26)	(2.32)
$Cash_{i,k}$	0.36^{***}	0.27^{***}	0.37^{***}	0.39^{***}	0.55^{***}	0.59^{***}
	(5.65)	(5.04)	(5.93)	(6.07)	(4.60)	(5.27)
$\text{Trap}^{kao}_{i,k} \times Cash_{i,k}$	-0.98^{***}	-0.67^{***}	-1.02^{***}	-1.04^{***}	-1.26^{***}	-1.24^{***}
	(-5.13)	(-4.57)	(-5.10)	(-5.03)	(-2.98)	(-2.87)
Adj. R^2	0.05	0.20	0.05	0.06	0.40	0.42
Num. obs.	1,238	914	1,238	1,238	1,238	1,238
Panel C: Distance to Industry Debt-equity ratio						
$Distance^{DE}_{i,k}$	0.02^{***}	0.02^{**}	0.03^{***}	0.03^{***}	-0.03	0.00
	(2.84)	(2.49)	(3.26)	(3.41)	(-1.29)	(0.14)
$Cash_{i,k}$			0.11^{**}	0.11^{**}	0.25^{***}	0.29^{***}
			(2.34)	(2.40)	(2.97)	(3.53)
Lagged $\mathcal{D}$	No	Yes	No	No	No	No
Add. Controls	No	No	Yes	Yes	Yes	Yes
Year FE	No	No	No	Yes	No	Yes
Issuer FE	No	No	No	No	Yes	Yes
Adj. R^2	0.01	0.17	0.04	0.06	0.39	0.41
Num. obs.	1,246	920	1,246	1,246	1,246	1,246

Table 8: **Impact of the U.S. tax reform.** The dependent variable in this table is the difference between the year-average and year-end CP debt (in USD) for firm i, sampled over reporting years. We use logarithms of these variables, adding one dollar to ensure that they are bounded at zero. $Affected_{i,t}$ is a dummy variable that equals one if the firm (a) is incorporated in the US and (b) reports a positive foreign pretax income. We remove utilities firms because as these firms do not report their foreign pretax income. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes the 251 issuers that are not in the utilities sector and the sample period is July 2015 – December 2019.

	(1)	(2)	(3)	(4)	(5)
$Affected_{i,t} \times \mathbb{1}_{t>2017}$	2.01^{**}	2.33^{**}	2.34^{**}	2.37^{**}	2.04^{*}
	(1.97)	(2.20)	(2.22)	(2.27)	(1.87)
$\mathbb{1}_{t>2017}$	0.25	0.39	0.57	0.69	1.14
	(0.33)	(0.49)	(0.72)	(0.86)	(1.35)
$Affected_{i,t}$	0.37	-0.43	-0.70	-0.85	-0.95
	(0.41)	(-0.45)	(-0.70)	(-0.85)	(-0.90)
$Cash_{i,k}$		0.22^{***}	0.21^{***}	0.19^{**}	0.48^{***}
		(2.80)	(2.69)	(2.42)	(5.54)
$\log(Assets)_{i,k}$			-0.51	-0.56^{*}	-0.46
			(-1.51)	(-1.69)	(-1.27)
$Debt_{i,k}$			-0.05	-0.09^{**}	-0.06
			(-1.59)	(-2.46)	(-1.36)
$Distance_{i,k}^{DE}$				0.03^{**}	
				(2.17)	
$\text{Trap}_{i,k}^{kao}$					3.83
					(0.87)
$\text{Trap}_{i,k}^{kao} \times Cash_{i,k}$					-1.05^{***}
					(-4.28)
Year FE	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.01	0.03	0.04	0.05	0.06
Num. obs.	979	944	944	944	854

Table 9: **CP yields over quarter-ends and year-ends.** This table shows regressions of non-financial CP yield spreads relative to OIS rates (in basis points) on two different dummy variables. $Cross_{i,j}^{QEnd}$ is equal to one if the issuance and maturity date of the CP are in different calendar quarters and zero otherwise. $Cross_{i,j}^{YEnd}$ is equal to one if the issuance and maturity date of the CP are in different calendar years and zero otherwise. $TTM_{i,j,t}$ is the time to maturity (in days) of the issued security. $\log(Issued)_{i,j}$ is the issuance amount of the issued security. All specifications include issuer and week fixed effects. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuance date and issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

	< 90 days			≥ 90 days
	(1)	(2)	(3)	(4)
$Cross_{i,j}^{QEnd}$	-0.40		-0.95^{***}	
	(-1.15)		(-2.91)	
$Cross_{i,j}^{YEnd}$		1.55^{**}	2.17^{***}	0.78
		(2.53)	(3.59)	(0.52)
$TTM_{i,j,t}$	0.26^{***}	0.26^{***}	0.26^{***}	0.08^{**}
	(8.84)	(8.43)	(8.77)	(2.37)
$\log(Issued)_{i,j}$	-0.71^{***}	-0.71^{***}	-0.71^{***}	-0.96
	(-3.69)	(-3.67)	(-3.68)	(-0.79)
Issuer FE	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes
Adj. R^2	0.72	0.72	0.72	0.73
Num. obs.	189,141	189,141	189,141	11,990

A Additional Details

Table A1: **Variable definitions.** This table defines the variables used in the empirical analysis. The logic behind indexing the variables is as follows: i indicates an issuer, j indicates one CP issue by a given issuer, t indicates a date, k indicates a time period, such as a quarter or year.

Variable	Definition	Source(s)
$Outst_{i,t}$	Outstanding CP debt for issuer i at date t	DTCC & own calc.
$YS_{i,j,t}$	Yield spread of CP j over the maturity-matched OIS rate at date t. The maturity-matched OIS rate is computed by linearly interpolating between the effective FED funds rate, the 7-day, 14-day, 21-day, 30-day, 60-day, 90-day, 120-day, 150-day, 180-day, 210-day, 240-day, 270-day, 300-day, 330-day, and 360-day OIS rate	DTCC, Bloomberg & own calc.
$\mathcal{D}_{i,k}$	Difference between $Outst_{i,k}^{Avg}$ and $Outst_{i,k}^{Eng}$, which measure the average or period-end outstanding CP debt for issuer i in period k. The period is measured from one annual (or quarterly in the Internet Appendix) reporting date in Compustat to the next	DTCC & own calc.
$QEnd_{i,t}$	Dummy variable that equals one on the last business day of firm i's reporting quarter and zero otherwise	Compustat
$YEnd_{i,t}$	Dummy variable that equals one on the last business day of firm i's reporting year and zero otherwise	Compustat
$Cross_{i,j}^{QEnd}$	Dummy variable that equals one if CP j matures in the following calendar quarter and zero if CP j matures within the same calendar quarter	DTCC & own calc.
$Cross_{i,j}^{YEnd}$	Dummy variable that equals one if CP j matures in the following calendar year and zero if CP j matures within the same calendar year	DTCC & own calc.
$TTM_{i,j,t}$	Time to maturity of CP j at time t	DTCC & own calc.
$\log(Issued)_{i,j}$	log issuance amount of CP j	DTCC
$\log(Assets)_{i,k}$	log assets (ticker: AT) of firm i at the end of period k	Compustat
$Debt_{i,k}$	Total debt (tickers: DLTT + DLC) of firm i at the end of period k expressed as percentage of total firm assets	Compustat

$Cash_{i,k}$	Cash and liquid assets (ticker: CHE) of firm i at the end of period k expressed as percentage of total firm assets	Compustat
$Debt^{ST}_{i,k}$	Short-term debt (ticker: DLC) of firm i at the end of period k expressed as percentage of total firm assets	Compustat
$DE\ Ratio_{i,k}$	Total debt (tickers: DLTT + DLC) of firm i at the end of period k divided by the equity (ticker: TEQ) of firm i at the end of period k	Compustat
$Distance^{DE}_{i,t}$	The difference between firm i's debt-equity ratio and the industry median (based on the first two NAICs digits, using *all* firms in Compustat) in the same year, divided by the sum of the two variables.	Compustat & own calc.
$Sales^{Foreign}_{i,k}$	Sum of all sales generated outside the U.S. as a fraction of total sales	Segments & own calc.
$\text{Trap}^{kao}_{i,k}$	Ratio between the weighted sum of sales, weighted by the difficulty of capital outflows (kao) as constructed in Fernandez et al. (2015) (we use the last available kao if kao is not available in a given year), divided by the unweighted sum of sales.	Segments & own calc.
$IncForeign^{Pre}_{i,k}$	Foreign pretax income (ticker: PIFO) expressed as a percentage of firm assets	Compustat

Table A2: **Anecdotal evidence of the importance of gross debt management.** This table shows quotes from various sources, documenting that gross debt is an important variable considered by firms' stakeholders. *Highlights* by the authors.

Source	Statement
Rating agencies:	
Standard & Poor's (2016)	"Ratios employed by Standard & Poor's to capture the degree of leverage used by a company include: Total debt/total debt + equity [...]"
	"Funds earmarked for future use, such as an acquisition or a capital project, are not netted out."
	"Available cash or marketable securities are ideal to provide backup [for a CP facility]. (*Of course, it may be necessary to 'haircut' their apparent value* [...]"
Fitch (2016)	"The 'readily available' component of Fitch's definition of cash points to the *timely, unconditional availability of cash* to the rated entity and the reasonable certainty that the attributable value at par is available"
	"The *concept of cash being 'readily available'* to the rated entity [...] takes into account *where the cash is located within the corporate group* or jurisdiction, and if there are material costs [...] affecting its availability to the rated entity"
Moody's (2016b)	"[Oracle's] vast majority of cash [...] is located in foreign entities [...]. As Oracle generates a significant portion of its cash flow overseas (more than half), the company has chosen to fund domestic cash needs with debt rather than incur the tax on repatriating capital. *Given the trajectory of debt issuance during the past two years, Moody's anticipates that Oracle will continue to raise debt as offshore cash builds*"
	"The negative outlook reflects Moody's concerns regarding elevated debt balances"
Loan covanants:	
Bradley and Roberts (2015)	"The average loan restricts 2.5 financial variables, with the most popular covenants restricting the ratio of debt to operating income and tangible net worth"
Corporate Finance Institute	Among the "top 10 most common metrics lenders use as debt covenants" numbers 5 and 6 are Debt/Equity and Debt/Assets, which are both based on total (gross) debt
Articles on corporate cash holdings:	

J.P. Morgan (2015)	"To the extent cash on corporate balance sheets is valued at face value, having more of it increases the value of the firm dollar for dollar. *The issue, however, is that excess cash on a corporate balance sheet is often perceived to be valued at a discount to face value.*"
Agilent Technologies, 2014 10-K filing (borrowed from Harford et al. (2017))	"We have substantial cash requirements in the United States while most of our cash is generated outside of the United States."
	"Our business operating results, financial condition, and strategic initiatives could be adversely impacted if we were unable to address our U.S. cash requirements"
Harford et al. (2017)	"David Einhorn, the president of Greenlight capital that used to be a large shareholder of Dell, said on February 21, 2013 that he decided to sell Dell's shares after he was told Dell's foreign cash couldn't be repatriated and domestic cash was needed for acquisitions and other operational activities"

Internet Appendix

(Not for publication)

This internet appendix contains additional descriptive statistics and robustness checks that were omitted in the body of the paper.

A Additional Descriptive Statistics

Figure IA.1 plots the weekly outstanding volumes for non-financial, financial, and asste-backed commercial papers obtained from the New York FED.

[Insert Figure IA.1 near here]

Figure IA.2 plots the CP issuance amounts from our sample broken up by maturity category.

[Insert Figure IA.2 near here]

Figure IA.3 compares sales volumes aggregated across different parts of GEOSEG to the total reported volume in Compustat. The figure suggests that GEOSEG gives a complete picture of all sales in a given year.

[Insert Figure IA.3 near here]

Figure IA.4 shows that our estimated CP yields are noisier compared to the FED (which is likely because we include all issuers, not just AA).

[Insert Figure IA.4 near here]

B Results for Quarterly Gross Debt Management

Table IA.1 provides summary statistics of quarterly balance sheet variables and quarterly gross debt management.

[Insert Table IA.1 near here]

Table IA.2 repeats Regression (4) for quarterly instead of annual observations.

[Insert Table IA.2 near here]

C Additional Robustness Checks

In this section, we conduct two additional robustness tests. First Table IA.3 shows how gross debt management correlates with other balance sheet characteristics. Importantly, even after controlling for 11 additional characteristics, the link between cash holdings and gross debt management remains intact.

[Insert Table IA.3 near here]

Finally, we examine what happens if we replace log-differences with differences in percentages. Using percentage differences has the disadvantage that firms with small CP quantities outstanding receive the same weight as major CP issuers. Hence, this test can be interpreted as an equal-weighted analysis. As we can see from Table IA.4, the link between gross debt management and cash holdings is robust to using percentage changes.

[Insert Table IA.4 near here]

Similarly, Table IA.5 shows that the link to trapped cash and $Distance^{DE}$ is comparable to our main results when we use percentage differences instead.

[Insert Table IA.5 near here]

Figure IA.1: **Outstanding volume of different USD commercial paper.** Panel (a) shows the weekly outstanding volumes of all dollar-denominated non-financial CPs, Panel (b) shows the weekly outstanding volumes of all dollar-denominated financial CPs, and Panel (c) shows the weekly outstanding volumes of all dollar-denominated asset-backed CPs. The data are obtained from the Federal Reserve Bank of St. Louis. Vertical lines indicate quarter ends.

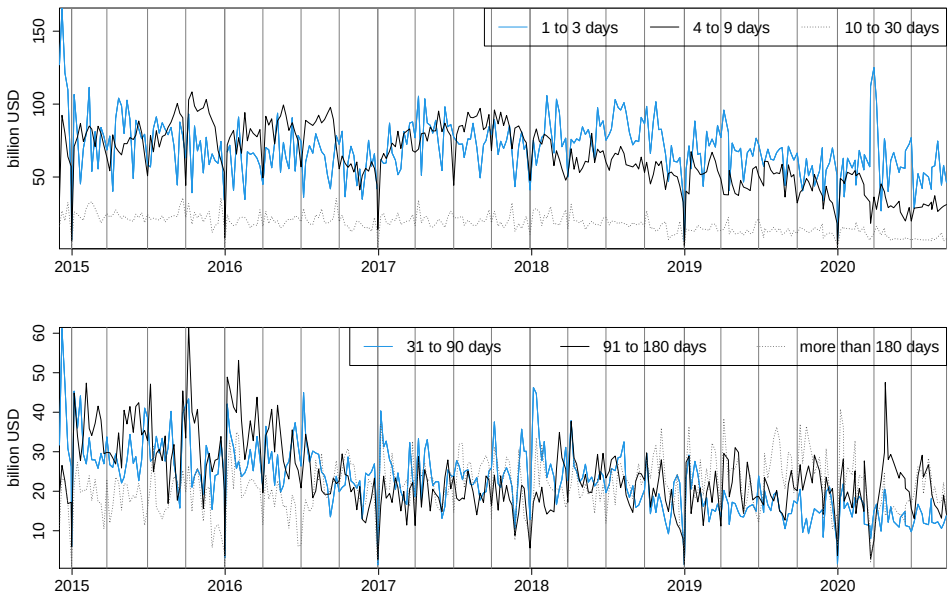


Figure IA.2: **Weekly issuance in the different maturity buckets.** This figure shows aggregate issuance volumes in six different maturity buckets. Vertical lines indicate the last month of a quarter.

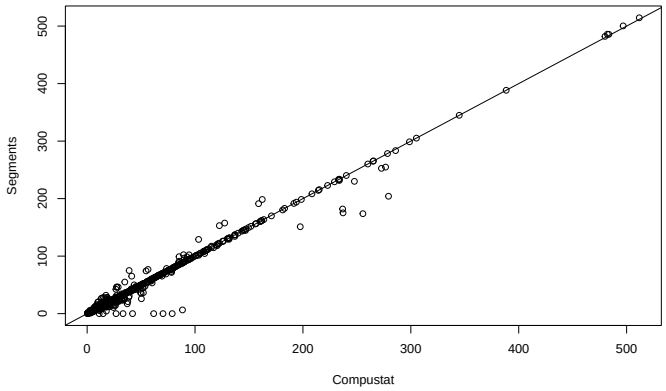
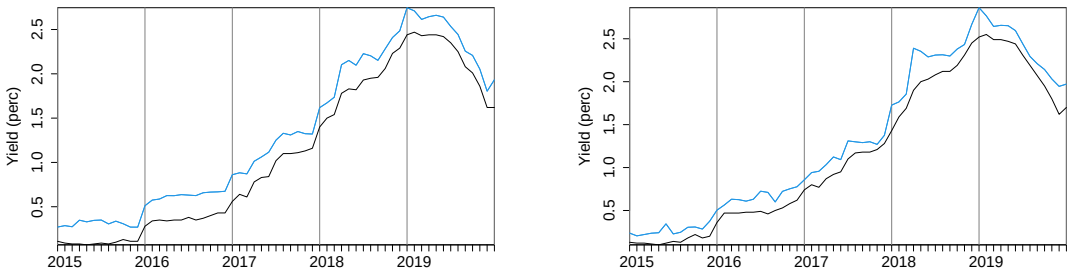


Figure IA.3: **Comparison of total sales in Segments to sales in Compustat.** This figure compares the total amount of sales (in billion USD) aggregate across all Segments to the disclosed number in Compustat, for each firm-year in our sample. The solid line corresponds to the 45 degree line.



(a) 1-month yields

(b) 3-month yields

Figure IA.4: **Non-financial CP yields.** This figure compares the monthly average CP yield for non-financial CPs (issuers with AA rating) obtained from the Federal Reserve Bank of St. Louis with the average yields for our matched DTCC sample. Panel (a) shows the DTCC yields for issues with 20-40 days to maturity (including all issuers) and the FED estimate for 1-month CPs. Panel (b) shows the DTCC yields for issues with 80-100 days to maturity (including all issuers) and the FED estimate for 3-month CPs.

Table IA.1: **Balance sheet of CP issuers.** Panel A provides descriptive statistics of the balance sheet characteristics of CP issuers. Panel B relates the amounts of CP outstanding as of the end of the of each firm's reporting quarter or as an average over each firm's reporting quarter to other balance sheet characteristics in the pooled sample. The percentage numbers relative to cash holdings exclude the 10% firm-quarter observations with the lowest cash holdings. Means and quantiles are as of the quarterly reporting date of each firm and computed from the pooled sample over the June 2015 – December 2019 period. The number of issuer-quarter observations used to compute these moments is provided in the last column. Statistics are conditional on the issuer having a non-zero average amount of CP outstanding in a given quarter.

	10^{th}	25^{th}	Mean	Median	75^{th}	90^{th}	N
Panel A: Balance sheet summary statistics							
Assets (billion USD)	5.19	9.52	50.95	22.57	53.34	128.56	4372
Debt (% of assets)	20.52	26.27	34.24	32.67	40.17	50.75	4348
short-term debt (% of assets)	0.52	2.00	5.23	4.04	6.62	10.93	4349
Cash (% of assets)	0.11	0.55	5.60	2.79	7.68	13.63	4372
Panel B: Size of CP funding in balance sheet							
Outstanding volumes based on quarter-end disclosures:							
CP outstanding (% total debt)	0.00	0.34	3.88	2.14	5.37	10.11	4348
CP outstanding (% short-term debt)	0.00	2.97	27.63	17.72	41.64	77.71	4289
CP outstanding (% cash holdings)	0.00	7.40	124.91	66.86	176.42	329.19	3934
Difference between quarterly averages and quarter-end volumes:							
CP repayments (% total debt)	-2.06	-0.55	1.05	0.20	1.41	3.62	4348
CP repayments (% short-term debt)	-14.90	-4.26	11.15	1.47	10.33	32.02	3914
CP repayments (% cash holdings)	-226.79	-88.18	15.48	-12.37	19.68	186.74	3934

Table IA.2: **Link between gross debt management and cash holdings (quarterly frequency).** The dependent variable in this table is the difference between the quarter-average and quarter-end CP debt (in USD) for firm i. We use logarithms of these variables, adding one dollar to ensure that they are bounded at zero. The main independent variable captures the cash holding of company i in quarter k ($Cash_{i,k}$), measured as the ratio cash and short-term investments to the firm's total assets. $log(Assets)_{i,k}$ is the logarithm firm i's total assets in quarter k; $Debt_{i,k}$ is firm i's total debt as fraction of total assets in quarter k; $\mathcal{D}_{i,k-1}$ is the dependent variable from the previous period. Panels (2), (3), (5), (6), and (7) include year fixed effects. Panels (4), (5) and (7) include issuer fixed effect. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

	Levels					Changes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Cash_{i,k}$	0.07**	0.07**	0.06***	0.17***	0.21***	0.41***	0.41***
	(2.35)	(2.36)	(2.64)	(2.93)	(3.64)	(5.03)	(5.07)
$\log(Assets)_{i,k}$		−0.14	−0.15	1.68	−0.83	−0.77	−0.55
		(−0.75)	(−1.12)	(1.27)	(−0.64)	(−0.24)	(−0.15)
$Debt_{i,k}$		−0.04	−0.03	−0.11***	−0.16***	−0.39***	−0.44***
		(−1.50)	(−1.41)	(−2.88)	(−4.12)	(−4.76)	(−4.97)
$\mathcal{D}_{i,k-1}$			0.33***				
			(9.67)				
Year FE	No	Yes	Yes	No	Yes	Yes	Yes
Issuer FE	No	No	No	Yes	Yes	No	Yes
Adj. R^2	0.01	0.02	0.12	0.30	0.31	0.03	−0.03
Num. obs.	4,359	4,335	3,977	4,335	4,335	3,966	3,966

Table IA.3: **Link between gross debt management and balance sheets.** The dependent variable in this table is the difference between the year-average and year-end CP debt (in USD) for firm i. We use logarithms of these variables, adding one dollar to ensure that they are bounded at zero. The independent variables are firms' R&D spending; propertry, plant, and equipment; accounts payable; log Assets; debt; short-term debt; interest expenses; leverage; sales growth; acquisitions; shares repurchases; Cash holdings. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the data and issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

	(1)	(2)	(3)	(4)	(5)	(6)
$R\&D_{i,k}$	0.02				-0.08	0.02
	(0.22)				(-0.59)	(0.04)
$PPEi,k$	-0.04^{***}				-0.07^{***}	0.12
	(-3.43)				(-4.84)	(1.18)
$Payable_{i,k}$	0.09^{**}				0.06	0.16
	(2.42)				(1.52)	(0.75)
$\log(Assets)_{i,k}$		0.17			-0.10	4.19^{*}
		(0.88)			(-0.43)	(2.27)
$Debt_{i,k}$		0.01			-0.01	-0.08
		(0.25)			(-0.27)	(-0.85)
$Debt^{ST}_{i,k}$		-0.42^{***}			-0.49^{***}	-0.55^{**}
		(-5.30)			(-5.24)	(-3.85)
$IE_{i,k}$			0.48		0.99^{**}	1.97^{*}
			(1.07)		(2.16)	(2.76)
$Leverage_{i,k}$			-7.01^{***}		3.56	3.86
			(-3.73)		(1.24)	(0.39)
$\Delta Sales_{i,k}$				1.30	-0.48	-1.41
				(0.89)	(-0.32)	(-0.77)
$Acqi,k$				-0.01	-0.12	-0.06
				(-0.15)	(-1.54)	(-0.93)
$Rep_{i,k}$				0.06	-0.12^{**}	-0.00
				(1.02)	(-2.38)	(-0.04)
$Cash_{i,k}$					0.24^{***}	0.34^{***}
					(3.97)	(5.11)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Issuer FE	No	No	No	No	No	Yes
Adj. R^2	0.04	0.06	0.01	-0.00	0.14	0.41
Num. obs.	1,392	1,410	1,148	1,404	1,092	1,092

Table IA.4: **Link between gross debt management and cash holdings (percentages).** The dependent variable in this table is the percentage difference between the year-average and year-end CP debt (in USD) for firm i. The main independent variable captures the cash holding of company i in year k ($Cash_{i,k}$), measured as the ratio cash and short-term investments to the firm's total assets. $log(Assets)_{i,k}$ is the logarithm firm i's total assets in year k; $Debt_{i,k}$ is firm i's total debt as fraction of total assets in year k; $\mathcal{D}_{i,k-1}$ is the dependent variable from the previous period. Panels (2), (3), (5), (6), and (7) include year fixed effects. Panels (4), (5) and (7) include issuer fixed effect. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

	Levels					Changes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Cash_{i,k}$	0.81***	0.87***	0.89***	1.05**	1.38***	1.88***	1.94***
	(3.21)	(3.24)	(3.68)	(2.33)	(3.08)	(3.94)	(3.59)
$\log(Assets)_{i,k}$		−1.58	−1.87	27.89**	5.09	−14.68	−21.38
		(−1.03)	(−1.42)	(2.58)	(0.43)	(−1.04)	(−1.17)
$Debt_{i,k}$		−0.17	−0.08	−0.03	−0.28	−0.54	−0.60
		(−1.04)	(−0.62)	(−0.09)	(−0.90)	(−1.23)	(−1.02)
$\mathcal{D}_{i,k-1}$			0.26***				
			(7.12)				
Year FE	No	Yes	Yes	No	Yes	Yes	Yes
Issuer FE	No	No	No	Yes	Yes	No	Yes
Adj. R^2	0.02	0.03	0.11	0.28	0.31	0.04	−0.20
Num. obs.	1,407	1,407	1,041	1,407	1,407	1,041	1,041

Table IA.5: **Link between annual window dressing and trapped cash (percentages).** The dependent variable in this table is the percentage difference between the year-average and year-end CP debt (in USD) for firm i. In Panel A, the main independent variable is our proxy for trapped cash (Trap^{kao}), which captures sales in capital-flow retricted areas. Panel B shows the results for interacting Trap^{kao} with cash holdings. In Panel C, the main independent variable is the percentage difference between firm i's debt-equity ratio and the industry average debt-equity ratio ($Distance^{DE}_{i,k}$). Column (2) includes the lagged difference between the year-average and year-end CP debt as control variable. Column (3) shows the results with additional controls, which include $log(Assets)$ and the amount of debt as fraction of the firm's total assets. Column (4) shows the results with additional controls and year fixed effects. Column (5) shows the results with additional controls and issuer fixed effects. Column (6) shows the results with additional controls, year fixed effects and issuer fixed effects. The numbers in parantheses are heterskedasticity-robust t-statistics, clustered at the issuer level. ***, **, and * indicate significance at a 1%, 5%, and 10% level, respectively. The sample includes all 362 issuers for the July 2015 – December 2019 period.

Panel A: Impact of trapped cash						
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Trap}^{kao}_{i,k}$	64.50^{***}	53.63^{***}	65.68^{***}	65.21^{***}	46.15	50.25
	(4.26)	(4.06)	(4.11)	(4.05)	(0.92)	(1.04)
Adj. R^2	0.03	0.10	0.03	0.04	0.30	0.33
Num. obs.	1,238	914	1,238	1,238	1,238	1,238
Panel B: Combination of trapped cash and cash holdings						
$\text{Trap}^{kao}_{i,k}$	88.03^{***}	65.24^{***}	90.78^{***}	89.16^{***}	107.64^{*}	113.95^{*}
	(4.89)	(4.08)	(4.91)	(4.75)	(1.74)	(1.93)
$Cash_{i,k}$	1.78^{***}	1.35^{***}	1.87^{***}	1.96^{***}	2.54^{***}	2.91^{***}
	(4.17)	(3.51)	(4.34)	(4.46)	(3.20)	(3.79)
$\text{Trap}^{kao}_{i,k} \times Cash_{i,k}$	-6.12^{***}	-4.06^{***}	-6.33^{***}	-6.44^{***}	-6.49^{**}	-6.41^{**}
	(-4.15)	(-3.68)	(-4.12)	(-4.03)	(-2.10)	(-1.97)
Adj. R^2	0.05	0.11	0.05	0.07	0.30	0.34
Num. obs.	1,238	914	1,238	1,238	1,238	1,238
Panel C: Distance to Industry Debt-equity ratio						
$Distance^{DE}_{i,k}$	0.20^{***}	0.16^{***}	0.26^{***}	0.27^{***}	-0.27^{*}	-0.01
	(4.11)	(3.41)	(4.85)	(5.04)	(-1.81)	(-0.10)
$Cash_{i,k}$			0.35	0.38	0.94^{**}	1.33^{***}
			(1.24)	(1.35)	(2.03)	(2.83)
Lagged $\mathcal{D}$	No	Yes	No	No	No	No
Add. Controls	No	No	Yes	Yes	Yes	Yes
Year FE	No	No	No	Yes	No	Yes
Issuer FE	No	No	No	No	Yes	Yes
Adj. R^2	0.02	0.09	0.04	0.06	0.30	0.33
Num. obs.	1,246	920	1,246	1,246	1,246	1,246