Do Firms Use Commercial Paper to Enhance Financial Flexibility?*

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Abstract:

We argue that firms enhance their financial flexibility by accessing the commercial paper (CP) market. CP access allows firms facing uncertain funding needs to make borrowing decisions only when their financing needs become known. Using a comprehensive sample of CP issuers from 1971 to 2005, we provide evidence consistent with this hypothesis. CP issuers enter the market when they face increased uncertainty about their cash flow or investment. After firms exit the CP market, their investment and cash flow variability declines. Unlike for other debt, CP borrowing is positively correlated with investment expenditures and negatively correlated with cash holdings.

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Introduction

A large body of research illustrates the importance of taxes, financial distress, agency, and transaction costs, along with signaling considerations in corporate debt financing policies. Despite substantial evidence on how these factors affect corporate debt issuance, much less is known about the importance of financial flexibility in capital structure choices. This disparity is particularly sharp when one considers that financial managers cite financial flexibility as the most important consideration for debt issues (Graham and Harvey (2001)).

One way firms can create financial flexibility is by maintaining high cash holdings (Opler et al. (1999)). High cash holdings allow firms to fund new investment when attractive investment opportunities arise. However, high cash holdings involve substantial costs. These include a lower expected return, increased risk of overinvestment, and substantial tax disadvantages (Opler et al. (1999), Dittmar and Mahrt-Smith (2007)). A firm choosing to maintain a high cash balance incurs these costs even if attractive investment opportunities fail to materialize in the future.

In this paper, we focus on an alternative strategy to create financial flexibility. We argue that firms can enhance their financial flexibility by accessing the commercial paper (CP) market, which allows them to raise capital only if good investment opportunities arise but avoid incurring funding costs otherwise.[1] We posit that access to the CP market represents a state-contingent funding source that partially substitutes for the need for precautionary cash holdings, thereby lowering the costs of holding excess cash. Hence, in contrast to much of the literature on financial flexibility, we focus on how the uncertainty in financing needs affects the choice of securities and the composition of debt, rather than the level of debt and cash holdings.

Several features of the CP market make it well-suited for companies seeking to achieve financial flexibility. CP access allows firms to finance projects only when financing needs become known; if no projects are available, or the firm has sufficient cash available to finance them, a firm would not need to issue CP and incur borrowing costs. Accessing the CP market requires establishing a CP program, obtaining backup lines of credit from banks, and obtaining a CP rating from the credit rating agencies. Once a firm has established a CP program, it can easily borrow up to the maximum allowed amount without any SEC registration[2]; the amount borrowed is easily

[1] This notion of financial flexibility is close to that of Billett and Garfinkel (2004) and Gamba and Triantis (2007) who emphasize low costs of accessing capital markets or issuing securities. Billett and Garfinkel (2004) view banks that have lower costs of accessing the market for insured deposits and the market for uninsured claims as more financially flexible. They find that more financially flexible banks have higher valuations and carry fewer liquid assets that could be used for financial slack. Gamba and Triantis (2007) analyze the value of financial flexibility, characterized as low security issuance costs, in a dynamic capital structure model.

[2] CP with a maturity of less than 270 days is exempt from all SEC registration requirements.

adjusted when the CP is rolled over; future borrowing occurs at low spreads over the risk-free rate; and the maturity of CP is essentially flexible, since it typically is rolled over continuously. Moreover, unlike bank debt, there are no restrictive covenants in CP and the funds can be used for any purpose, including potentially risky long-term investment. The deep liquidity of the CP market ensures the availability of capital even when financing needs may change substantially from initial expectations.[3]

CP is the only source of publicly traded short-term debt in the U.S. Although it has a short maturity, it is often used for long-term financing, because it is typically rolled over. Access to the CP market is reserved for low-risk issuers with strong credit ratings, and hence it exhibits very low default risk.[4] The CP market is a very important funding source for U.S. corporations. Domestic non-financial CP outstanding has grown from $125.4 billion (19.6% of commercial and industrial loans (CIL)) at the beginning of 1991 to $157.3 billion (22% of CIL) in 1995, and then to $278.4 billion (26% of CIL) in 2000. At the end of 2006, the amount of outstanding CP equaled $147.4 billion (12.3% of CIL).[5] CP issuance has not been dramatically affected by the current crisis in credit markets. Outstanding domestic non-financial CP decreased from $156 billion in July 2007 to $138 billion by October 2007, but increased again to $159 billion by February 2008.[6] While CP issuance is restricted to the most creditworthy firms, CP issuers are much larger than other firms and hence play a particularly important role in the economy. On average, CP issuers in our sample account for 32.1% of all Compustat firms' market capitalization, 25.3% of their sales, and 26.7% of their investment.[7] Hence, it is important to understand the capital structure choices and investment behavior of CP issuers.

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[3] Accessing the CP market for financial flexibility is related to a strategy of keeping the overall level of debt low, because access to the CP market requires a high credit rating. Low debt also allows future access to debt markets, and the most reliable and liquid source of funds is close to riskless debt such as CP. Gorton and Pennacchi (1990) show that firms can issue debt with low default risk (such as CP), to attract uninformed investors. Such securities are highly liquid in the sense that they can be traded by uninformed investors without loss to insiders. The ability of CP to overcome this adverse selection problem is in all likelihood a significant factor in explaining the deep liquidity of the CP market.

[4] For example, the average daily spread of the one-month non-financial CP rate over one-month Treasury bills between July 2001 and December 2006 was only 13.6 basis points for the highest rated CP. However, spreads in the CP market, like spreads in all credit markets, have increased substantially in the current credit crisis.

[5] These are seasonally adjusted numbers from the Federal Reserve Board. Factors contributing to the decline in CP issuance since 2000 include an unusually strong credit deterioration of high quality firms and investors' reduced risk tolerance (Shen (2003)).

[6] This stability of non-financial CP borrowing indicates the deep liquidity in this market and is in contrast to borrowing in other markets, including asset-backed CP that is issued by financial institutions, which we do not consider in this paper. Borrowing of asset-backed CP has collapsed by about 34% from July to December 2007 in the wake of the recent turmoil in credit markets.

[7] In 2005, CP issuers account for 25.3% of the market capitalization, 22.1% of the sales, and 19.6% of the investment of all Compustat firms.

Despite the importance of CP as a financing source for corporations, there is a paucity of firm-level evidence on how firms use this market to finance their investment needs. In this paper, we construct a comprehensive firm-level database of CP activity from the inception of CP ratings in 1971 to 2005 from Moody's and Standard and Poor's, supplemented with hand collected data from 10-K filings. We use this data to provide evidence on how investment needs affect CP issuance and how access to this market affects investment decisions. We conduct three types of tests: (i) how changing investment needs affect the decision of firms to enter the CP market and how investment behavior changes around the entry into the CP market, (ii) how investment needs and cash holdings determine the extent of borrowing in the CP market, and (iii) how investment behavior changes after the exit from the CP market. We use these tests to examine the predictions of the financial flexibility hypothesis. Of course, financial flexibility might not be the only, or even the primary, consideration for issuing CP. Thus, we also consider an alternative explanation related to certification motives for issuing CP that has been proposed in the literature as well as the hypothesis that firms issue CP to accommodate seasonal fluctuations in working capital.

First, we analyze firm behavior around the entry into the CP market. According to the financial flexibility hypothesis, firms should access the CP market when there is increased uncertainty about their financing needs. Consistent with this hypothesis, we find that firms are more likely to enter the CP market after they experience an increase in the variability of their investment. We also test this prediction by comparing the *ex post* variability in operating cash flow and investment expenditures before and after entry into the CP market. Our results show that after entering this market, firms display considerably higher variability in operating cash flow. The variability of investment expenditures also rises, when measured relative to a control sample of firms that could enter the CP market but choose not to do so. Moreover, the cross-sectional variability of investment and operating cash flow among CP issuers increases after they enter the market and is larger than that of firms that could enter the market but choose not to do so. These patterns are supportive of the financial flexibility hypothesis and are not easily explained by the certification and seasonality hypotheses. Moreover, in contrast to the implications of the certification hypothesis, by most measures, uncertainty about firm value does not decrease after entering the CP market. We find mixed evidence for the seasonality hypothesis. While firms entering the CP market are exposed to greater seasonality in sales, this seasonality decreases after entering the CP market, which is inconsistent with the hypothesis.

Actual borrowing amounts in the CP market represent, on average, 95% of the investment outlays per firm-year (the median is 36%). Hence, they can be an important funding source for long-term investment. Consistent with the predictions of the financial flexibility hypothesis, CP

borrowing is positively correlated with investment expenditures and negatively correlated with cash holdings. This suggests that firms use CP to fund investment when attractive projects arise and they have insufficient internal funds. In contrast, we show that non-CP debt does not display a positive correlation with investment (in fact, a negative correlation) and also no correlation with cash holdings.

We also analyze the behavior of investment and cash flows around the time of exit from the CP market. If exit decisions are determined by an expected reduction in the need for financial flexibility or loss of access to the CP market reduces financial flexibility, we expect to observe lower ex-post variability in operating cash flow and investment expenditures. Consistent with the financial flexibility hypothesis, operating cash flow variability decreases by 16 percent and investment variability decreases by 32 percent after exit from the CP market. There is also some evidence that firms experience lower seasonality in sales after the exit from the CP market, which is consistent with the seasonality hypothesis.

To address the causality of our results, we use a natural experiment to investigate whether CP access *causes* changes in firms' investment behavior. In 1991, the introduction of new regulations imposed a limit on the fraction of assets that money market funds, the most important investors in the CP market, could invest in lower-rated CP. We find that the affected group, the lower-rated CP firms, exhibits a reduction in investment variability after 1991, while the unaffected group does not. This evidence indicates a causal link between CP access and investment policy and suggests that CP access leads to changes in investment behavior.

Our paper contributes to several areas of corporate finance research. First, it adds to the growing literature on how the desire for financial flexibility affects corporate financial policy. We show that CP access is an important element of financial policy that creates financial flexibility and allows firms with uncertain funding needs to vary their investment according to the realization of their investment opportunities. This complements the other instruments of financial flexibility that have been analyzed in the literature. For example, low debt levels also enhance financial flexibility and the desire for retaining financial flexibility has been proposed as an explanation for why firms appear to be underlevered (Graham (2000)). Companies with limited or uncertain access to capital markets may choose to preserve flexibility by maintaining high cash holdings (Opler et al. (1999)). Our results suggest that firms substitute CP access to some extent for cash holdings. Sufi (2007a) shows that most firms have credit lines, which, like CP, provide state-contingent financing. He shows that while credit lines enhance financial flexibility, this flexibility has limits, due to material adverse change clauses that limit the availability of funds when firm

performance deteriorates. Based on credit line draws for a subset of our sample firms, our results cannot be attributed to more intensive usage of credit lines by CP issuers.

Second, our paper also contributes to the literature on corporate investment. Gilchrist and Himmelberg (1995) show that firms that have a CP or bond rating in 1984 exhibit lower investment-cash flow sensitivities. However, the use of investment-cash flow sensitivities as a measure of financial constraints has been a matter of considerable debate (see for example, Kaplan and Zingales (1997) for a critique). Yet CP access, measured by the presence of a CP rating, is often used as a proxy for being financially unconstrained (see for example, Almeida et al. (2004)). We add to this literature by providing direct evidence on how CP access affects corporate investment. Our results show that it is indeed CP, and not other forms of debt, that finances variations in investment for the set of large and well-established firms that are active in the CP market. These firms behave differently from firms with access to the bond market but not the CP market. CP access appears to affect real investment behavior for these firms in a manner that is consistent with the presence of fewer financial constraints.

Finally, our paper contributes to the literature on CP. Using 132 CP ratings announcements from 1981 to 1985, Nayar and Rozeff (1994) find that firms obtaining an initial CP rating experience a small positive announcement return. They argue that CP ratings certify firm quality. Motivated by the countercyclical aggregate issuance of CP, the macroeconomic literature has argued that firms issue more CP in downturns to compensate for losing access to bank financing (Kashyap et al. (1993)).[8] Using CP data from 1985 to 1992, Calomiris et al. (1995) provide the first (and, to our knowledge, only) detailed firm level analysis of CP issuers and contradict this view. They show that CP issuers are the most creditworthy firms and CP issuance is positively correlated with sales and earnings at the firm level. To reconcile these findings with the countercyclical aggregate issuance of CP, Calomiris et al. (1995) hypothesize that in downturns investor demand for liquid CP increases, CP issuers finance less creditworthy firms through an increase in accounts receivable, or CP issuers finance accumulations of inventories. Consistent with these hypotheses, CP issuance is positively correlated with accounts receivable and inventories and the cash flow sensitivity of inventories and financial working capital is lower for CP issuers than other firms. Our contribution to this literature is to provide evidence on how CP access affects firm-level investment behavior and the use of alternative sources of financial flexibility such as cash

[8] CP issuance is also more generally of interest to the macroeconomic literature. CP volumes and spreads over the risk-free rate are often seen as a leading economic indicator (see, for example, Stock and Watson (1989), Bernanke (1990), and Kashyap et al. (1993)). Gatev and Strahan (2006) show that banks provide liquidity insurance in times of low aggregate liquidity, as indicated by high CP spreads over the risk-free rate.

holdings and bank credit lines. More generally, we highlight how financial flexibility considerations are also an important driver of firms' decisions to access this source of capital.

The remainder of the paper is structured as follows. Section I gives a brief overview of the CP market and develops the hypotheses underlying our analysis. Section II introduces our sample. Section III tests the implications of the hypotheses around the time of entry into the CP market. Section IV analyzes CP holdings. Section V considers firm behavior around the time of exit from the CP market. Section VI looks at the effects of a change in regulations affecting the ability of money market funds to invest in lower-rated CP on these lower-rated firms' investment behavior. Section VII concludes.

I. Overview of the Commercial Paper Market and Hypotheses

1. The Commercial Paper Market

CP is short-term publicly traded, unsecured debt. It has a maturity of up to 270 days in the U.S., and the average maturity is about 45 days. However, CP can be and often is used for long-term financing. It is typically not paid back at maturity but rolled over (Ou et. al (2004)). As discussed in the Introduction, CP is an important funding source for U.S. corporations. However, CP borrowing is more concentrated than other sources of finance among a relatively small number of large and well-established firms. We do not consider asset-backed CP that is mainly issued by financial institutions or by conduit vehicles sponsored by financial institutions in this paper.

Almost all CP is rated by at least one credit rating agency (Post (1992)). Moody's Investor Services started rating CP issuers in 1971 (P for Prime, NP for Not Prime), and has employed its current rating system since 1972. The current ratings are, from best to worst credit quality, P-1, P-2, P-3, and NP. S&P has a similar ratings system as shown in Figure 1. For expositional ease, we use the Moody's taxonomy henceforth, but it should be understood that we also mean the equivalent S&P ratings (A-1 or A-1+ corresponding to P-1, A-2 corresponding to P-2, and so on). The vast majority of CP issuers are rated P-1 or P-2. Issuers rated P-3 or lower can issue only limited amounts of CP if at all (Nayar and Rozeff (1994)). One reason for the importance of a P-1 or P-2 rating is that the most important investors in CP, money market mutual funds, are only allowed to hold paper rated P-1 or P-2. Moreover, since 1991 they are not allowed to hold more than 5% of their assets in tier-2 paper, which mainly includes paper rated in the second highest category (P-2 or A-2) by any of the two rating agencies (Post (1992)). Thus, the overall size of the P-2 market is considerably smaller than that of the P-1 market.

CP (rated P-1 or P-2) is considered to be close to risk-free debt and default rates in this market are very low. There are several reasons behind this. Since the early 1970s, most CP is backed

up by a line of credit for at least 50% of the size of the issue for highly rated CP and for 100% for less highly rated issuers (Nayar and Rozeff (1994)). This allows firms to meet their CP obligations in the event of a sharp downgrade in their credit rating that would prevent them from rolling over their CP borrowings (Calomiris et al. (1995)). Moreover, there is a process of "orderly exit" (Lucas and Noe (1989), Fons and Kimball (1992), and Ou et al. (2004)). It prevents most issuers whose credit quality has deteriorated substantially from issuing new CP. When firms are downgraded to P-3, they typically lose the ability to issue meaningful amounts of new CP. Accordingly, the literature infers exit from the CP market if a firm's rating is downgraded to P-3 or NP (see, for example, Nayar and Rozeff (1994)).

2. Hypotheses and Empirical Predictions

In this section, we describe the primary hypotheses that guide our empirical analysis. We discuss the predictions of each hypothesis for firm behavior around the entry into the CP market, for the amount of firm-level borrowing of CP, and for firm behavior around the exit from the CP market. Our comprehensive sample allows us to analyze why firms enter and exit the CP market and how firm behavior changes around the time of the entry into and exit from the CP market. We can do so in a setting that controls for unobservable heterogeneity, since we observe the same firms with and without CP access.

The Financial Flexibility Hypothesis

The financial flexibility hypothesis posits that CP provides firms with flexibility in their investment and financing decisions.[9] We focus on three aspects of financial flexibility – flexibility in the decision to borrow, flexibility with respect to the amount of borrowing, and flexibility with respect to the length of the borrowing period. Firms may desire flexibility if their future investment prospects are uncertain. If there is a high degree of uncertainty regarding the potential arrival of investment projects, flexibility with respect to the decision to borrow allows firms to observe the arrival of projects before raising capital. If the size of the potential project is unknown, or might be expected to change over time, flexibility with respect to the amount of borrowing will allow firms to match borrowing amounts to investment needs more closely. Finally, flexibility in the length of the borrowing period is expected to be valuable to issuers when the length of the

[9] Financial flexibility is also important for other financial policies such as distribution choices. Jagannathan et al. (2000) show that firms with more volatile cash flows and higher temporary excess cash flows are more likely to use share repurchases rather than dividends as method of payout. They argue that share repurchases are associated with more financial flexibility than dividends.

project is uncertain. Thus, we expect that flexibility will be valuable for firms that face a high degree of uncertainty about their investment opportunities.

Flexibility is also expected to be valuable for firms with uncertain cash flow streams. Since firms typically prefer to fund investment expenditures through internal cash before seeking external capital (Myers (1984)), uncertainty regarding the magnitude or the timing of internal cash flows is also expected to lead to a desire for flexibility in financing decisions.

The financial flexibility hypothesis is related to Holmstrom and Tirole (1998). They provide a model of liquidity in which the reinvestment needs at the interim period are uncertain. Holmstrom and Tirole (1998) show that it is optimal for firms to insure against liquidity shocks and provide *ex ante* for funds for needed reinvestment instead of relying only on spot borrowing after the liquidity shock is realized (see also Holmstrom and Tirole (2000)). Firms can obtain this *ex ante* insurance by holding precautionary cash reserves or by setting up lines of credit, which allow them to borrow up to a maximum amount after the liquidity shock is realized. Both of these strategies for *ex ante* insurance against liquidity shocks are superior to spot borrowing after the realization of the liquidity shock, because the firm is able to pledge less collateral and hence raise less financing after the realization of the liquidity shock. We apply a similar idea to the CP market. Establishing access to a flexible source of funding before the liquidity shock is realized (or investment needs become known) allows firms to obtain funds if needed after the liquidity shock is realized and hence is similar in spirit to establishing a credit line.

Several features of the CP market make it a desirable funding venue for firms seeking flexibility. First, it is a state-contingent financing source; it allows firms to finance projects if and only if they become available and internal funds are not enough to finance them. Once a firm has obtained a short-term credit rating and established a CP program, it can borrow very quickly (without SEC registration) at predictably low spreads above the risk-free rate. In addition, the amount of borrowing in the CP market can easily be adjusted by issuing new CP or retiring outstanding paper at maturity. Unlike bank debt, there are no covenants in CP, allowing the funds to be used for any purpose, including potentially risky long-term investment. Moreover, CP has, in effect, very flexible maturity, since it is typically rolled over many times.[10] This flexible maturity allows firms to use it for projects whose cash flow timing is uncertain. It is the combination of short maturity (which makes the debt less risky and hence more liquid and readily available) and the roll-over option that enhances financial flexibility. The rollover option also makes it possible that short-term debt is used to finance long-term investment.

[10] Myers (1977) and Hart and Moore (1994) show that it can be optimal to match the maturities of assets and liabilities. Diamond (1991) offers a model that shows that both high and low quality firms use short-term debt while firms in the middle of the quality spectrum choose long-term debt.

The financial flexibility hypothesis can explain why some firms would choose not to issue CP. Firms that do not experience an increase in the uncertainty of their funding needs do not benefit from the state-contingent nature of CP financing. Establishing a CP program typically entails meaningful costs. These include the fees to credit rating agencies for obtaining and maintaining a short-term credit rating, fees to banks for backup credit facilities, and fees paid to dealers.[11] Thus, not all firms that can issue CP are likely to do so.

The financial flexibility hypothesis offers several testable empirical implications. First, the financial flexibility hypothesis implies that firms are likely to enter this market when they face increased uncertainty about their financing needs. Financing needs can be uncertain either because the arrival of future investment opportunities is uncertain or because there is variability in internal cash flows, creating uncertainty about the need for external capital. Hence, companies that face increased uncertainty about either future investment opportunities or future cash flow are likely to find it beneficial to enter the CP market.[12]

Testing this prediction is complicated by the fact that the uncertainty of future investment opportunities and cash flows is private information, known only to managers at the time of potential entry into the CP market. As a proxy for managers' private information, we analyze whether firms have experienced an increase in investment or operating cash flow variability before entering the CP market. Here we assume that managers expect such a change in investment or operating cash flow variability to continue. The financial flexibility hypothesis also suggests that entry into the CP market is followed by higher variability in investment expenditures or internal cash flow. This occurs for two reasons. First, higher *ex ante* uncertainty should be reflected in greater *ex post* variation in investment and cash flow outcomes. Hence, if firms enter the CP market if they anticipate an increase in the variability of their investment and cash availability, investment or cash flow variability should increase after entering the market. Second, CP access allows firms to increase the variability of their investment. As an alternative approach, we also investigate whether CP entrants exhibit higher cross-sectional variability in investment and cash flows after (but not before) entry compared to a control sample that do not enter the CP market. An additional prediction of the financial flexibility hypothesis is that firms lower their cash holdings after

[11] Dealers commissions cost about 12.5 basispoints on average and backup lines of credit as much as 25 basispoints (see Calomiris et al. (1995) citing Stigum (1983)).

[12] We note, however, that disentangling the investment opportunity effect from the cash flow effect is difficult in our framework because internal cash flow may simply proxy for investment opportunities. As a result, we do not attempt to make such a distinction. Note that the empirical implication of the financial flexibility hypothesis is the same – an anticipation of increased variability after entry into the market – for both interpretations of internal cash flow.

entering the CP market. If access to CP provides financial flexibility, the need for firms to hold costly precautionary cash holdings to fund unexpected investment needs should be reduced.

The financial flexibility hypothesis also has implications for the amount of borrowing in the CP market. How much financing is needed depends on the realization of the uncertainty about the size of the firm's investment opportunities. If it turns out that the firm has a greater number or larger projects to invest in, it should use CP more extensively to finance these investments. Thus, we expect that the amount of borrowing in the CP market should be positively correlated with new investment expenditures. Additionally, since firms may choose to hold cash in order to fund attractive investments opportunities, we expect that CP borrowing amounts are negatively correlated with cash holdings. The financial flexibility hypothesis does not offer a clear prediction about the relation between CP borrowing and cash flow. On the one hand, low cash flow should lead to a higher need for CP financing, suggesting a negative correlation between CP borrowing and cash flow. However, cash flow may also proxy for the attractiveness of future investment opportunities. This suggests a positive correlation between CP borrowing and cash flow.

Firms may exit the CP market voluntarily or involuntarily. For some firms, the ex-post realization of their uncertain investment opportunity set and performance will reveal that their investment opportunities are unfavorable and their performance is poor. Such a negative realization may also lead to a downgrade of their credit rating, forcing them to withdraw involuntarily from the CP market. Since firms are expected to enter the CP market when investment opportunities and performance become more variable, the number of firms exiting the market involuntarily due to an unfavorable ex-post realization may be substantial. Firms may also choose to voluntarily exit from the CP market if the benefits are lower than the ongoing costs associated with CP access.

The predictions of the financial flexibility hypothesis around the exit from the CP market are essentially the opposite of those concerning entry. Firms should experience a decline in investment and cash flow variability after the exit. One reason is that firms that exit the market lose their ability to vary investment as much as while they had access to the CP market. Firms that voluntarily exit the market may also do so because they anticipate a reduction in the variability of their investment or cash flow. Finally, the financial flexibility hypothesis implies that firms increase their cash holdings after exiting from the CP market. Losing access to the CP market should increase the need for precautionary savings in form of cash holdings.

As indicated above, we consider both why firms choose to enter and exit the CP market in anticipation of changes in the variability of investment and cash flow (the *selection effect*) as well as whether CP access affects their real investment policies (the *treatment effect*). For example,

when we analyze whether firms that have experienced an increase in the variability of investment and cash flow are more likely to enter the CP market, we are testing for a pure selection effect. This test relies only on pre-CP issuance data and the results cannot be attributed to a treatment effect. On the other hand, when we examine the changes in the variability of investment and operating cash flow after involuntary exit, our results point to the treatment effect, since the decision to exit is involuntary. We also consider a natural experiment that isolates the treatment effect in section VI, where we focus on a regulatory change in the CP market. Our other tests represent joint tests of the selection and the treatment effect. For example, changes in the variability of investment and operating cash flow after entry into the CP market or a correlation between CP borrowing amounts and investment can be driven by both the selection and treatment effects.

The Certification Hypothesis

Nayar and Rozeff (1994) hypothesize that an initial CP rating certifies that an issuer is of high quality. They argue that the certifying agents are credit rating agencies who assign the short-term ratings necessary for the issuance of CP and the banks that provide the backup lines of credit.[13] Nayar and Rozeff (1994) show that, consistent with the certification hypothesis, on average, initial CP ratings are informative to investors. There is a small but positive announcement effect around new CP ratings announcements for P-1 rated firms, but no significant announcement effect for P-2 ratings.[14] This positive announcement effect is also, however, potentially consistent with other hypotheses, including financial flexibility. The certification hypothesis does not offer any predictions about the behavior of investment expenditures around entry into the CP market. However, if certification of firm value underlies the decision to enter the CP market, we expect that the uncertainty about firm value should decline after entry into the market. This is consistent with the argument that initial credit ratings lower investor uncertainty (Wakeman (1984)). The certification hypothesis does not have clear predictions concerning the change in the uncertainty about firm value around the time of the exit from the CP market or about the amount of borrowing from the CP market.

[13] Sufi (2007b) shows that the introduction of syndicated bank loan ratings increased the availability of credit to firms that obtained a rating. Hence, certification by the bond rating agencies may affect real investment decisions.

[14] There is a negative announcement effect for ratings downgrades that imply an exit from the CP market (see also Chandra and Nayar (1998)). Slovin et al. (1988) do not find abnormal returns around the announcement of CP programs without bank backstop letters of credit. Crabbe and Post (1994) find that downgrades in bank holding CP ratings lead to a reduction in CP borrowings.

The Seasonality Hypothesis

The seasonality hypothesis posits that firms use CP to accommodate seasonal fluctuations in working capital. These fluctuations are more prevalent for firms with stronger seasonality in sales. Thus, the seasonality hypothesis implies that CP issuers should display stronger seasonality in sales than other firms that do not issue CP. It also implies that firms that anticipate an increase in seasonality are more likely to establish a CP program, which then allows them to accommodate the seasonal fluctuations in working capital. Hence, the seasonality hypothesis implies that measures of seasonality should increase after firms enter the CP market. Similarly, the seasonality hypothesis suggests that firms should experience a decline in seasonality after exiting the CP market because firms are likely to choose to exit when they anticipate lower seasonality. In addition, the ability to accommodate seasonal fluctuations in working capital may be lower after firms lose access to the CP market.[15]

II. Sample Selection and Descriptive Statistics

Firm level data on CP issuance activity are not readily available since these are unregistered securities and companies rarely announce new issues. Hence, we employ a multifaceted approach to compile a comprehensive data set of CP issuance. First, we obtain credit ratings and ratings changes for all non-financial corporate CP rated by Moody's from 1971 to 2005. Second, we obtain the universe of credit ratings by S&P from 1923 onwards for both long-term and short-term issuer ratings, including all ratings changes. Finally, we manually collect all available annual amounts of outstanding CP from 10-K filings from 1993, the first year since 10-K filings are electronically available, for firms entering the CP market after 1971.[16]

In order to enter the CP market, a firm needs to establish a CP program and obtain a short-term credit rating from a major rating agency such as Moody's or S&P. We define the date at which a firm obtains this rating as the date of entry into the CP market. Similarly, exit from the market is inferred from the date at which the short-term rating is withdrawn (or the firm is severely downgraded). We ignore temporary exit from (and reentry into) the CP market. Since an issuer can enter the market by obtaining a rating from either Moody's or S&P, and remain in the market

[15] The seasonality hypothesis also suggests that CP holdings should be positively correlated with quarterly sales. However, we are unable to test this prediction, because CP holdings are not systematically available on a quarterly basis. The seasonality hypothesis is related to a hypothesis in Nayar and Rozeff (1994) that firms use CP to accommodate transitory fluctuations in working capital. They argue that it is inconsistent with the positive announcement effects around initial CP ratings they find. Sufi (2007a) posits the seasonality hypothesis for lines of credit, suggesting that lines of credit are used to accommodate seasonal fluctuations in sales, and finds evidence supporting this hypothesis.

[16] We tried to obtain information on outstanding CP amounts from Moody's, but its coverage was very incomplete.

as long as it has an adequate short-term rating from either agency, we check entry and exit from both sources separately. We then combine the two data sets and track the date of the first entry into the CP market (measured by the first CP rating, either from Moody's or S&P) and that of the last exit. This procedure gives us a comprehensive panel data set of short-term credit ratings and entry and exit dates for all firms that participate in the CP market at any time until 2005.

Since we are interested in investment decisions, we eliminate all financial CP issuers from our sample. We also drop all utilities, since they are regulated, and all foreign firms. Moreover, we consider only CP issued in U.S. dollars. Using the Moody's data set, we identify 1,099 non-financial and non-utility CP issuers. We are able to match 807 of these issuers with Compustat (these observations are not all unique; a firm may show up several times). The issuers that we are unable to match with Compustat are typically subsidiaries of large non-U.S. companies, which often issue their own CP. Exclusion of these firms is not problematic because we lack data on foreign companies and their subsidiaries. We consolidate the CP issuance activities of subsidiaries with their parents, counting all CP programs by subsidiaries as part of the parent firm, unless the subsidiary is publicly traded. This leaves us with 714 unique observations of CP issuing firms over the 1971 to 2005 period. We then exclude 22 firms that do not have financial data available on Compustat and 73 financial firms, utilities, and foreign firms (according to the Compustat classifications). We further exclude 35 firms that either entered with ratings of P-3 or NP, because their ability to issue CP is very limited, or, much less frequently, for which we know that the entry date is incorrect. This leaves us with a sample of 584 firms from Moody's data set.

The exit date is defined as follows. If the last rating action is a withdrawal, the exit date is defined as the date when the firm's short-term rating is withdrawn by Moody's. If the rating is not withdrawn by the end of 2005 but the firm experiences a severe downgrade, i.e. is downgraded to P-3 or NP and never upgraded to P-1 or P-2 afterwards by Moody's, then the exit date is considered to be the date of this severe downgrade. In accordance with the literature (for example, Nayar and Rozeff (1994)), we treat severe downgrades as exits from the market, because these firms cannot issue significant amounts of CP after losing their P-1 or P-2 rating.[17]

From the S&P data, we identify 454 U.S. non-financial and non-utility CP issuers. We exclude four firms that obtained their CP rating in 2006 to be consistent with Moody's data, which end in 2005. We also delete 44 firms that enter the CP market with a rating of A-3 **(**the equivalent of P-3**)** or lower. We also exclude nine firms that do not have data on Compustat or are classified

[17] Rauh and Sufi (2007) find that firms whose bond rating is downgraded from investment grade to speculative grade experience a large reduction in the availability of discretionary and flexible funds, including bank lines of credit, medium-term notes, and CP. Calomiris et al. (1995) show that firms are more likely to exit the CP market after declines in sales or earnings.

as utilities or financial firms or foreign firms. This leaves us with a sample of 397 CP issuers from S&P. We define the entry and exit dates for this sample in the same manner as the Moody's sample. Our overall sample combines the two subsamples from Moody's and S&P and consists of 677 CP market entrants, 457 of which enter with a Moody's rating and 220 of which enter with an S&P rating. For our main analysis, we exclude 193 firms that enter the CP market on or before 1971. Since the Moody's data begins in 1971, it is likely that firms which have their first rating observation in 1971 were already active in the CP market before 1971. However, several of our tests analyze investment patterns around entry into the CP market, which requires knowledge of the precise date of entry into the CP market. Thus, in the analysis of firm behavior around the CP entry, we focus on a sample of 484 firms that enter the market after 1971, called the "post-1971" sample (this also excludes seven firms from S&P's data set, in which one firm enters in 1970 and six firms in 1971). We are, however, able to use the entire sample for tests involving firm behavior around the exit from the CP market since the entry date is not relevant for these tests.

To collect actual borrowing amounts from the CP market, we search all 10-K filings, including the footnote disclosures, of our post-1971 sample firms from 1993 onwards and collect the CP amount outstanding at the end of each fiscal year. We collect outstanding CP amounts at annual intervals because quarterly filings do not report this data consistently. In our post-1971 sample, 100 firms stop issuing CP by 1993 and ten firms do not have financial data available for the period of CP access on Compustat. We are able to collect CP borrowings for 321 of the remaining 374 firms. Our CP borrowing amounts cover 2,406 of 3,032 firm-years of CP access after 1993 for the post-1971 sample.

To verify the accuracy of the market entry and exit dates inferred from Moody's ratings, we also use the 10-K filings to hand-collect data on CP borrowing for the three years preceding the inferred entry date and the three years after the inferred exit date for each firm. We do this check for the entries and exits from the Moody's data, because the lack of a common company identifier required hand matching firms in this data set to Compustat for some firms. We find discrepancies for seven firms where there is a positive CP borrowing before the ratings data indicate entry into the market. We fix five of these errors where we can identify the exact date of entry using other sources and drop the other two observations. We apply similar checks to the data regarding the exit dates from the CP market using hand collected borrowing data. There are eleven cases in which we find a positive CP borrowing amount after the ratings data indicate that the firm has exited the market. In eight cases, firms continue to have positive holdings after their rating was withdrawn or downgraded to P-3 or below. These amounts are typically very small. Hence, we do not adjust the exit date in these cases. In three cases, we correct the exit date. Overall, the high

correspondence between the ratings data and the data on CP borrowings from the 10-K filings, when available, is reassuring.

1. Descriptive Statistics

Table 1 describes our sample firms. 51 firms entered the market between 1972 and 1975, 286 between 1976 and 1985, 124 between 1986 and 1995, and 108 between 1996 and 2005. Among the post-1971 entrants, 279 (57%) enter with the highest rating of P-1, while 212 (43%) enter with a P-2 rating. Panel B compares the 484 post-1971 CP entrants at the end of the fiscal year of entry into the market with all non-missing firm years in Compustat from 1972 to 2005. CP issuers are larger, more profitable, and less levered than other firms and hold substantially lower cash balances. These results are similar to those in Calomiris et al. (1995). CP issuers also tend to invest more.

2. Survival and Exit in the Commercial Paper Market

Table 2 shows how long firms stay in the CP market. 318 of the 484 firms in the post-1971 sample exit the market. Most of the exits (306 of 318) result from ratings withdrawals. Only twelve firms are downgraded to P-3 or lower ratings without a ratings withdrawal.[18] Panel A shows that for firms that exit the market, the median time in the CP market is nine years. More than a quarter of firms exit the market within four years and more than a third within five years. Thus, interestingly, unlike in bond markets, where debt maturities typically range from 15 to 30 years, many CP issuers do not participate in the CP market for extended durations of time.

We also distinguish between voluntary and involuntary exit from the CP market. We define exit as voluntary if an issuer has its rating withdrawn from a high rating (P-1 or P-2). We define exit as involuntary if the rating is withdrawn from a low rating (P-3 or lower) or if the exit is the result of a severe downgrade. Panel B shows that in the full sample of 677 firms, which includes the firms entering in 1971, 219 (32.3%) firms exit voluntarily, 239 (35.4%) firms exit involuntarily, and 219 (32.3%) firms survive in the CP market until the end of 2005. The number of exiting firms includes delistings, which occur primarily because of acquisitions. Since exit due to an acquisition is different from a normal exit, we also report exit numbers excluding firms that are delisted within 90 days of exit from the CP market. When delistings are excluded, the fraction of firms exiting voluntarily is 21.9%, lower than that of firms involuntarily exiting (37.5%) and of firms surviving (40.6%). Overall, these findings show that voluntary exit is fairly common. Thus, many firms choose to exit the market even though they could have decided to remain in it.

[18] In the full sample, which includes firms that are in the CP market in 1971, 458 firms exit and all but 16 have their rating withdrawn.

III. Entry into the Commercial Paper Market

In this section, we examine how investment and cash flow variability change around the entry into the CP market. To do so, we construct a control sample of firms that could enter the CP market but opt not to do so.

1. Construction of the Control Sample

We identify firms that have the ability to issue CP but choose not to do so by looking at firms that could have obtained a P-1 or P-2 short-term credit rating. This approach exploits a unique feature of the credit rating process for CP. There is a close, but imperfect, correlation between short-term and long-term ratings (Ou et al. (2004)). Both Moody's and S&P publish explicit guidelines describing the correspondence between short-term and long-term ratings (see Figure 1). Overall, there is a very strong correspondence between short-term and long-term ratings suggested in these policies of the two bond rating agencies and they follow these rules very closely (see Ou et al. (2004)). This allows us to infer the likely short-term credit rating a firm would have received, based on observing its long-term credit rating.

We obtain long-term credit ratings from S&P's RatingsXpress database, because coverage of long-term ratings from Moody's is much more incomplete in comparison. Since there exists a very tight correspondence between ratings from the two agencies, we have no reason to expect that relying on S&P's long-term ratings only induces a systematic bias in the control sample. Figure 1 shows that according to the rating agency methodology, a firm with an S&P long-term rating of BBB or higher should be able to obtain a short-term rating of P-1 or P-2 or A-1(+) or A-2. Firms with a long-term rating below BBB (and some with a rating of BBB) should not qualify for such a short-term rating.

To illustrate the tight correspondence between short-term and long-term ratings, Table 3 reports data for the 273 CP issuers for which we have data on both short- and long-term ratings. Most importantly, only 18 firms, or less than 6.6% of this sample, have a short-term rating of P-1 or P-2 without having a long-term rating of BBB or better, and most of them have a long-term rating close to BBB. Nine of them have a BBB- rating and the other nine are rated BB- or higher. This correspondence between short-term and long-term ratings suggests that credit rating agencies follow their published methodology quite closely in the assignment of short-term ratings. In particular, having at least a BBB long-term rating is almost a necessary condition for a P-1 or P-2 short-term rating, as also suggested by the ratings agencies' policies in Figure 1. Henceforth, we infer that firms with a long-term rating of BBB or higher are likely to obtain a P-1 or P-2 short-term rating and hence are able to access the CP market should they choose to.

The control sample, therefore, consists of firms that have never had a short-term credit rating but have a long-term issuer rating of BBB or higher. We exclude financial firms, utilities, and foreign firms from the control sample. When a CP issuer enters the market in a particular year, we select all the control firms that maintain a long-term rating of BBB or better throughout the year. We treat the year in which we select a control firm as its "entry" year. The final control sample contains 2,883 firm-years over time with 287 unique firms. Control firms have several entry years, because they could enter the CP market in each of the years when they have a sufficiently strong long-term rating. The composition of the control sample shows that from 1972 to 1984, only between 40 and 70 firms are not in the CP market, although they could be. However, this number grows considerably in the later part of the sample period, starting in the early 1990s. By 2000, 138 firms, or more than one quarter of the firms that can issue CP, do not do so. By 2004, this fraction increases to 34%.

2. Univariate Analysis

To examine the predictions of the financial flexibility hypothesis, we construct variables to measure the uncertainty of investment and cash flows. We measure the uncertainty of investment outlays by calculating the time-series standard deviation of investment expenditures over assets over the five years preceding and the five years following entry into the CP market (INVEST-VAR). To measure uncertainty of cash flows, we calculate the standard deviation of the operating cash flow, also over the five years before and after entry into the market (CFVAR). In these tests, we use the time-series variability for the same firm, because firms with large fluctuations in investment or operating cash flow from year to year stand to benefit more from CP issuance because the borrowing amounts can be adjusted quickly.

Table 4 shows that the variability of operating cash flows increases for CP issuers after entering the market. The change is statistically significant at the 1% level both for the mean and the median. The increase is also economically significant; the mean standard deviation increases by 22 percent. In contrast, firms in the control sample do not experience an increase in the standard deviation of operating cash flow. Moreover, the difference in the cash flow variability between CP issuers and control firms is statistically significant after the entry but not before entry (this result is not tabulated).

CP issuers do not show a significant change in the variability of investment. In contrast, control firms show a decrease in the variability of investment that is statistically significant at the 1% level both for the mean and the median. Overall, these patterns are consistent with the financial

flexibility hypothesis, although the results are stronger for cash flow variability than for investment variability.

As an alternative approach, we also examine how the cross-sectional variability in investment and operating cash flow for CP entrants after their entry compares to that of the control firms. If uncertainty about investment and cash flows prompts firms to enter the CP market or if CP access allows firms to vary their investment and cash flow more, the cross-sectional variability in these measures among CP issuers after (but not before) market entry should be higher than that of the control firms, because the prospects of CP issuers are more uncertain.

Table 5 compares the cross-sectional variability of investment and operating cash flows, from two years before to two years after the entry into the CP market. Two years before their entry, the variability in operating cash flows for CP issuers is statistically indistinguishable from that of the control firms. Afterwards, this cross-sectional variation increases for CP issuers, but not for the control sample. After entry (but also in the year before), the cross-sectional variation in operating cash flows is higher for CP issuers than control firms. The difference is statistically significant at the 1% or 5% level.

The results are similar for the cross-sectional variation in investment expenditures. In the two years before entry, the variation of investment among CP issuers and control firms is statistically indistinguishable. However, after entry, the variation in investment increases for CP issuers but decreases for control firms. The cross-sectional variation of investment among CP issuers is higher than that among control firms after the entry into the CP market, and the difference is statistically significant at the 1% level. These results support the predictions of the financial flexibility hypothesis.

Table 4 also shows that, consistent with the financial flexibility hypothesis, cash holdings (CASH) decrease after entering the CP market. The decrease in cash holdings is economically very large (24.1% for the mean, 28.8% for the median) and statistically significant at the 1% level. In contrast, the decrease in cash holdings is much smaller for control firms and statistically significant only at the 10% level for the median (and not significant for the mean). While it is known that in the cross-section CP issuers have lower cash holdings than other firms (Calomiris et al. (1995)), our results using a panel data set link the lower cash holdings to entry into the CP market, and suggest that the link between cash and CP access is unlikely to be driven by unobserved firm attributes.

Next, we explore the certification hypothesis, which predicts that the uncertainty about firm value should decline after market entry. We test this prediction by employing three measures of

uncertainty about firm value: idiosyncratic risk, PIN (the probability of information-based trading from Easley et al. (2002)), and the dispersion in analyst earnings forecasts.

Table 4 shows the results using idiosyncratic risk (IDRISK), which we measure by the residuals from a market model regression of firm returns over three years before and after the entry into the CP market (similar results hold if we use the Fama-French three factor model instead). Idiosyncratic risk increases after entering the CP market, although the mean increase is statistically insignificant, while the median is marginally significant. For control firms, the mean idiosyncratic risk increases, but the median decreases.

Table 4 also reports the change in PIN around CP market entry.[19] Since the PIN measure is only available for the 1983-2001 period, and because we require at least three years of data for our calculations, we focus on the subsample of CP entries between 1986 and 1999 for this test. Consistent with the certification hypothesis, we find that the PIN decreases after establishing a CP program (significant at the 1% level). However, a similar decrease in the PIN is also observed for control firms, suggesting that an overall decline in PIN rather than CP market entry are driving these results.

We examine the dispersion in analyst earnings forecasts (DISPERSION), using I/B/E/S, which provides this data since 1980. Since we require three years of data, we use the subsample of CP entrants from 1983 for this test. We use the summary forecast of annual earnings for the coming year on the date closest to the report date and calculate the dispersion in analyst forecasts as the ratio of the standard deviation of analyst forecasts to the absolute mean forecast.[20] We calculate the average of this dispersion in analyst forecasts for up to five years before and after entering the CP market. We find that upon entry into the CP market, the mean dispersion of analyst forecasts increases, but the median dispersion decreases. These changes are not, however, statistically significant. In contrast, the analyst forecast dispersion measure decreases for the control sample, but this decrease is statistically significant only for the median.

Overall, our evidence does not provide much support for the certification hypothesis. In contrast to its implications, we do not find that the uncertainty about firm value decreases after firms enter the CP market. Only the PIN measure indicates a decrease in uncertainty, but a decrease is also observed for control firms, implying that the decline in PIN is likely to be unrelated to CP market access.

We turn to the tests of the seasonality hypothesis in Table 4. We measure seasonality of sales (SEASON) as the within-year (quarter-to-quarter) standard deviation of sales, averaged over up

[19] We thank Soeren Hvidkjaer for making his data available.

[20] If the mean forecast is zero, we use the absolute value of the median in the denominator instead. If both the mean and the median are zero, we treat the dispersion measure as missing.

to five years before and five years after CP market entry, similar to the approach in Sufi (2007a). Consistent with the seasonality hypothesis, CP issuers display higher seasonality than the control firms, both before and after the entry into the CP market. The difference is statistically significant at the 1% level (the statistical significance is not reported in the table). However, in contrast to the prediction of the seasonality hypothesis, we find that the seasonality measure decreases substantially after entering the CP market. This decrease is statistically significant at the 1% level. Even though control firms experience a similar decrease in seasonality, this result is inconsistent with the seasonality hypothesis.

Overall, the univariate evidence from the time of the entry into the CP market is supportive of the financial flexibility hypothesis. However, we find little evidence for the certification hypothesis and mixed evidence for the seasonality hypothesis.

3. Multivariate Analysis

Table 6 analyzes the determinants of CP market entry in a regression framework. We pool the CP and control firm-years and estimate probit regressions, where the dependent variable takes on the value of 1 for CP issuers. We treat each firm year in which control firms qualify for CP access as an independent observation, but adjust for the non-independence of the observations by calculating standard errors clustered at the firm level.

We use two proxies for the need for financial flexibility. The first variable measures the increase in uncertainty about investment. We calculate ΔINVESTVAR as the difference between the standard deviation of investment over the five years before entry and the standard deviation of investment over the ten years before entry. Thus, this variable measures the actual change in the time-series variability of investment before entering the CP market. We assume that firms expect this change in uncertainty to continue in the future. According to the financial flexibility hypothesis, access to the CP market allows firms to finance more uncertain investment opportunities, implying that the probability of CP market entry should be positively related to ΔINVESTVAR.[21] Similarly, to measure the variability of cash flow, we calculate ΔCFVAR as the difference between the standard deviation of operating cash flow in the five years before entry and the standard deviation in the ten years before entry. Both ΔINVESTVAR and ΔCFVAR are winsorized at the 5% level to dampen the effects of outliers (there are a few very low values of these variables).[22]

[21] Note that for estimating the probability of CP market entry, we do not use the actual change in investment after CP market entry because this information is unobservable at the time of entry.

[22] We obtain similar, although statistically somewhat weaker, results using raw data. However, ΔINVESTVAR remains statistically significant at least at the 10% level in all specifications.

We test the seasonality hypothesis by including the average of the within-year standard deviation in sales over five years before entering the CP market, SEASON. We also winsorize this variable at the 5% level.[23] We include several control variables. Operating cash flow (CF) is operating income divided by total assets. The market-to-book ratio (M/B) is the sum of long-term debt, short-term debt, and the market value of equity divided by total assets. Leverage (LEV) is calculated as the sum of long-term and short-term debt over total assets. SIZE is the logarithm of sales. All of these variables are measured in the fiscal year before the entry into the CP market or before a control firm qualifies for CP access. We include CF, SIZE, and LEV, because Calomiris et al. (1995) show that CP issuers are larger and better performing firms with lower leverage. TERM measures the average monthly spread of ten year Treasury bonds over three month Treasury bills over the year before the entry and controls for business cycle factors. It has been shown that aggregate commercial paper issuance is countercyclical (Calomiris et al. (1995)). Moreover, the term spread is higher in economic expansions (Bansal and Zhou (2002)). Hence, one would expect that TERM enters negatively, since a steeper term structure is associated with economic expansions, in which commercial paper issuance is lower.[24]

In model (1) of Table 6 we find that the proxy for the increase in uncertainty about investment (ΔINVESTVAR) is positively related to the probability of entering the market. The coefficient is statistically significant at the 5% level. Since we measure the change in uncertainty using only pre-CP data, this is a pure selection effect; firms enter the CP market, because they anticipate an increase in investment variability. In model (3), where we add the change in uncertainty of operating cash flows, the coefficient on the investment uncertainty variable remains significant. However, models (2) and (3) show that our measure of the increase in uncertainty of cash flows is not statistically significant in these tests. Hence, we find support for the financial flexibility hypothesis, but this comes from investment variability, not cash flow variability.

In model (4) we add the standard deviation of quarterly sales (SEASON) and find that it has a positive coefficient and is significant at the 10% level. This is supportive of the seasonality hypothesis. However, we also find that in model (5), where we consider both the variability in investment and of quarterly sales, the coefficient on SEASON loses its statistical significance.

In all models, we add TERM. Consistent with our prediction, it always enters negatively and is statistically significant at the 1% level.[25] We also find that firms with higher operating cash

[23] If we do not winsorize this variable, it is never statistically significant at the 10% level.
[24] We cannot directly test the certification hypothesis in this setting, because it does not have a clear implication on how the *ex ante* level of information asymmetry would affect the decision to enter the CP market.
[25] TERM can also be interpreted as a proxy for market timing attempts by managers. Firms may attempt to time the use of fixed versus floating rate debt based on the spread between the short- and long-term interest

flow and firms with lower leverage are more likely to enter the CP market. This is in line with the expected signs for these variables, as discussed above. We also find some evidence that firms with lower market-to-book ratios are more likely to enter the CP market. This may appear surprising in light of the role of CP to finance new projects, but could reflect the fact that CP issuers tend to be more mature firms.

IV. Evidence from Commercial Paper Borrowings

We now examine the actual amounts that firms borrow in the CP market. As described earlier, our data on borrowing amounts cover 321 firms with CP programs from 1993 to 2005. The CP borrowings we collect account for around 60% to 70% of year-end domestic nonfinancial CP outstanding over the 1993 to 2005 period.[26]

1. Univariate Analysis

Table 7A shows that at the end of the fiscal year, the mean amount of outstanding CP in all firm-years is $579 million and the median amount is $110 million. These figures probably underestimate CP borrowings for firms with fiscal year end in December, because CP borrowing typically decreases during the month of December (Covitz and Downing (2007); Downing and Oliner (2007)). The second column shows that CP borrowing corresponds to 4.43% of assets, averaged over all firm-years (the median is 2.34%). CP borrowing is large relative to firm investment; it constitutes, on average, 95% of investment expenditures (the median is 36%). Hence, CP borrowing is a significant financing source for firms that access this market. This is consistent with the financial flexibility hypothesis, which implies that CP is used to finance a substantial part of investment.

There is substantial variation across firm-years in the usage of CP. In more than a quarter of firm-years, firms do not have any amount outstanding. On the other hand, the top 10% firm-years in CP use have outstanding amounts of more than twelve percent of assets. The standard deviation of CP holdings is 5.7% and is much larger than the median (not tabulated). The third column

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rate. Under this hypothesis, firms use floating rate debt, such as CP, to take advantage of favorable short-term interest rates. Thus, firms may want to use the CP market when short-term interest rates are low relative to long-term interest rates. Barclay and Smith (1995), Guedes and Opler (1996), Stohs and Mauer (1996), and Faulkender (2005) provide support for the market timing hypothesis by showing that firms tend to use more short-term debt in general (not commercial paper specifically) when the term structure is steeper (see also Baker et al. (2003)). We do not interpret our results as evidence against the market timing hypothesis applied to commercial paper, since the negative coefficient on TERM is likely to come from the well-documented countercyclicality of commercial paper issuance.

[26] Aggregate CP borrowing estimates are obtained from the Federal Reserve Board. We have less than 100% coverage because we exclude firms that established their programs in or before 1971, we exclude utilities, and we do not find data for 53 of the post-1971 sample firms.

shows CP borrowing amounts averaged across firms, where each firm's borrowing corresponds to its time-series average. The mean borrowing is 4.20% of assets with a median of 3.32%. Again, the average masks wide variation in CP use across firms. A small set of firms - fewer than ten percent of the sample - never hold positive amounts of CP at year end during the 1993-2005 period, though we cannot discern whether they borrowed and repaid CP within the fiscal year. Thus, firms that establish a CP program typically borrow funds through it at least from time to time. Panel A of Table 7 also reports that CP borrowing is an important part of the capital structure and constitutes, on average, 18% of total debt over all firm-years. This percentage is also highly variable with a standard deviation of 23.5%.

Panel B of Table 7 shows the correlation of CP borrowing with investment and cash holdings. We report the mean and the median of the individual firms' time-series correlations. CP borrowing (as a percentage of assets) is positively correlated with investment, as suggested by the financial flexibility hypothesis. The correlation is 0.16 for the mean (and 0.25 for the median), both of which are statistically significant at the 1% level. While this correlation is of moderate strength, we note that our data only reflect the annual amounts of outstanding CP borrowing. If firms adjust their CP borrowing over the year, the observed correlation between investment and year-end CP borrowing will be lowered.

CP borrowing is negatively correlated with cash holdings. The mean correlation is -0.30 and the median is -0.41, both of which are statistically significant at the 1% level. This result is also consistent with the financial flexibility hypothesis. Finally, CP borrowings are positively correlated with operating cash flows, but this correlation is not statistically significant. Recall that the financial flexibility hypothesis has no clear prediction on the sign of this correlation.

Panel B of Table 7 also shows that CP borrowing as a fraction of debt is positively correlated with investment and negatively correlated with cash holdings. Both correlations are statistically significant at the 1% level. This suggests that CP borrowing is more correlated with investment and cash holdings than other forms of debt. Indeed, we find that non-CP debt is not positively correlated with investment (in fact, this correlation is negative and statistically significant at the 10% level for the mean and at the 5% level for the median) and is not significantly negatively correlated with cash holdings. Thus, CP appears to play a unique role in the capital structure and is used, unlike other debt, to accommodate fluctuations in investment and cash holdings. Finally, in untabulated results, we find that CP borrowing (as percentage of assets) is more variable over time than other debt. We measure variability as the standard deviation normalized by the mean. The difference in variability between CP borrowing and other debt (1.07 versus 0.47) is economically large and statistically significant at the 1% level.

As a robustness check, we repeat the analysis in Table 7 using the annual *changes* in CP borrowing and non-CP borrowing. We obtain similar results. In particular, the change in CP borrowing is positively correlated with investment in that year. In contrast, changes in non-CP borrowing are not positively correlated with investment outlays (the correlation is negative but statistically insignificant). In subsequent tests, we use the amount of CP borrowing, but our main results are robust to using changes in borrowing amounts, both for CP and non-CP debt.

2. Multivariate Analysis

Table 8 analyzes the determinants of CP borrowing in a multivariate framework. We report (firm-level) fixed-effects panel regressions that isolate the time-series correlation between CP borrowing of a firm and other firm-level variables. The dependent variable is the amount of CP borrowing scaled by total assets or by total debt. We also conduct a similar regression for the amount of non-CP debt over total assets. The key independent variables of interest are investment expenditures and cash holdings. We also include operating cash flow, although the financial flexibility hypothesis has no clear predictions for this variable, as discussed before, since it may measure investment opportunities as well as cash availability. The regressions also control for lagged leverage and the market-to-book ratio. We include lagged and not contemporaneous leverage, because CP is a part of leverage and hence there is a mechanical relationship between contemporaneous leverage and CP borrowing. The inclusion of firm-level fixed effects allows us to calculate unbiased standard errors, even if the residuals of different time-series observations for the same firm are correlated, as long as the firm effect is indeed fixed and not decaying over time (Petersen (2007)).

The estimates show CP borrowing is positively correlated with investment expenditures. Depending on the regression specification, the estimated coefficient is between 0.14 and 0.20, indicating an effect of similar magnitude as the univariate analysis. Also consistent with the univariate results, CP borrowing is negatively correlated with cash holdings. We also find that CP borrowing is positively correlated with operating cash flow, possibly because operating cash flows tend to be correlated with investment opportunities, but we find no evidence that CP borrowing is related to the market-to-book ratio.

Model (2) displays a regression specification using lagged values of cash holdings to address potential endogeneity and reverse causality concerns arising from the inclusion of contemporaneous cash holdings. Lagged cash holdings are also negatively associated with CP borrowings, but the coefficient drops in magnitude (but retains significance at the 1% level). Our main results are not affected by including lagged cash holdings in the regression.

Models (3) and (4) show that CP borrowing as a fraction of total debt is positively associated with investment and negatively associated with cash holdings. The coefficients are always statistically significant at the 1% level. This suggests that CP is more positively correlated with investment and more negatively correlated with cash holdings than other sources of debt. This is confirmed in models (5) and (6), which show that debt other than CP (as a fraction of assets) is negatively associated with investment (the coefficient is statistically significant at the 1% level) and not correlated with cash holdings. Thus, CP appears to be a component of debt that is used to accommodate fluctuations in investment and cash holdings, possibly even compensating for a co-movement of other debt with investment in the opposite direction.

Overall, these results support the financial flexibility hypothesis. Our regressions also include TERM, the proxy for business cycle factors. Consistent with the countercyclicality of aggregate commercial paper issuance documented in the literature (Calomiris et al. (1995)), it is always estimated to be negative and is statistically significant at the 1% level.

3. Commercial Paper Holdings and Credit Line Usage

CP is, of course, not the only financing source that can provide financial flexibility. In particular, credit lines can provide similar flexibility because they allow firms to borrow up to a maximum amount, but do not obligate firms to do so. Hence, with a credit line, firms can adjust borrowing amounts to accommodate fluctuations in financing needs. Sufi (2007a) shows that firms in industries with a greater seasonality in sales tend to use credit lines more extensively and also have lower cash holdings. However, he also shows that firms with a greater variability in (changes in) cash flows rely less on credit lines. Moreover, material adverse change clauses imply that firms with deteriorating cash flows face reduced availability of funds from their credit lines and the presence of restrictive covenants in credit facilities may limit the potential uses of credit lines. Thus, while credit lines are an important source of funding, their flexibility may have its limits and hence, CP access can potentially provide incremental financial flexibility.[27] In this subsection, we analyze how our results may be affected by the existence and use of credit lines.

Sufi (2007a) shows that almost 95% of firms with a corporate credit rating from S&P have credit lines. Hence, most of the CP issuers and the firms in our control sample are also expected to have credit lines. As a result, our findings around the entry into the CP market, which show differences between CP issuers and the control firms, are unlikely to be driven by whether or not

[27] Other papers on credit lines include Melnik and Plaut (1986a), Melnik and Plaut (1986b), Ham and Melnik (1987), Martin and Santomero (1997), Shockley and Thakor (1997), and Agarwal et al. (2004). Lins et al. (2007) provide an international survey of CFOs on various aspects of corporate liquidity, including the role of cash holdings and credit lines.

sample firms have access to credit lines. However, some of the increased variability in investment and operating cash flow for CP issuers could be due to increased variability in their credit line usage.

To address this possibility, we hand-collect data on credit lines for a subsample of CP issuers from their 10-K filings. We collect this data for all firms that entered the CP market between 1998 and 2000. We are restricted to this timeframe because 10-K filings are electronically available only after 1993 and because we would like to have five years of data before and after entry into the CP market to calculate time-series correlations between credit line use as well as CP borrowings and other financial variables. Among the 31 firms that enter the CP market in 1998-2000, eight firms have insufficient data, primarily due to mergers and spinoffs. This leaves us with a sample of 23 firms. Given the limited sample size, the inferences should be treated with some caution.

Figure 2 shows the drawn amounts on credit lines before and after the entry into the CP market as well as the CP borrowing. The average draw on credit lines decreases from $314 million in the year before entering the CP market to $90 million in the entry year. The average borrowing from credit lines is less than $130 million in three out of the four years we have data for. CP borrowings are thus much larger than credit line draws (and at least twice as large in three out of the four years). These patterns suggest that our results for CP issuers are not driven by draws on credit lines, since they become much less important after firms enter the CP market.

Table 9 shows the correlations between credit line draws and CP borrowings, respectively, and investment and cash holdings. Credit line draws are positively correlated with investment; the average correlation is 0.19 (median of 0.22) and is statistically significant at the 5% level (but the median lacks statistical significance). However, if we calculate the correlation for the years after the firms enter the CP market, this average correlation decreases to 0.06 and loses its statistical significance. On the other hand, the correlation of CP borrowings and investment is much larger at 0.48 (median of 0.57), and is statistically significant at the 1% level for both the mean and the median. These findings indicate that CP borrowing varies with investment expenditures, suggesting that CP serves as a source of financing for investment, but credit lines do not display similar variation after entry into the CP market. We also find that the variability of credit line usage decreases after firms enter the CP market (this result is not tabulated). Finally, the mean of the correlation between credit line draws and cash holdings is not statistically significant (but the median is negative and statistically significant at the 10% level). If calculated only for years after the entry into the CP market, neither the mean nor the median are statistically significant. In contrast, CP borrowing is strongly negatively correlated with cash holdings (mean of -0.43, median -0.48,

both statistically significant at the 1% level). Taken together, these patterns suggest that our results on increased variability of investment and operating cash flow are not due to an increased reliance on credit lines after firms enter the CP market.

V. Exit from the Commercial Paper Market

We now study firms that exit the CP market to examine the predictions of the financial flexibility and seasonality hypotheses. We do not test the certification hypothesis here, because its predictions around the time of exit are unclear. For these tests, we report results for two samples. First, we show the results for firms entering the CP market after 1971, to be consistent with our earlier results. Second, we include all firms, even those that entered the CP market before 1971, since we do not require knowledge of the exact entry date for these tests.

Table 10 presents univariate results around exit from the CP market. Recall that the financial flexibility hypothesis predicts that firms experience a reduction in the variability of investment and in the variability of operating cash flows after exiting the CP market. Panel A considers all exits from the CP market, including those due to delistings. We compare the standard deviation of the operating cash flow in the five years preceding and following the exit. In the post-1971 sample, the average standard deviation of the operating cash flow for five years after exit is about 16% lower than the five years before exit, and the decrease is statistically significant at 5% level. The decrease is 23% for the median and significant at 1% level. The results are similar if one looks at the full sample, including firms in the CP market in or before 1971, but the average decline in cash flow variability is slightly lower and statistically significant only at the 10% level (the median decline remains significant at the 1% level).

Panel A also shows the change in the variability of investment in the five years before exit to the five years after exit. The standard deviation of investment decreases, on average, by about 32% after exit from the CP market; the decrease is statistically significant at the 1% level (the results are similar for the median). The pattern is also similar if we consider all firms, including those that obtain their initial rating in 1971. These results are supportive of the financial flexibility hypothesis. An additional prediction of the financial flexibility hypothesis is that the need for precautionary cash holdings should also rise after CP exit. Panel A shows that cash holdings increase substantially after the exit from the CP market, supporting this prediction. The increase is economically large (for the full sample, 51% for the mean and 39% for the median; a larger increase is observed in the post-1971 sample) and statistically significant at the 1% level.

Panel A also tests an implication of the seasonality hypothesis, which suggests that firms experience a decrease in seasonality in sales after exiting the CP market. Consistent with this hypo-

thesis, the within-year standard deviation of sales decreases after exiting the CP market by about 13-17% on average, depending on whether firms that were in the CP market before 1971 are included. However, the decrease is not statistically significant for the mean. The decline is about 13-27% for the median and statistically significant at the 5% or 10% level. Overall, these results offer some support for the seasonality hypothesis.

Panel B replicates this analysis, but excludes firms that were delisted (primarily because of mergers and acquisitions) within 90 days before or after the exit. The results for operating cash flow and investment variability are similar to the ones in panel A. The results concerning seasonality are somewhat weaker statistically.

Overall, these results show that firms experience a decrease in the variability of investment and operating cash flow after they exit the CP market. These changes could be the outcome of a selection effect, where firms anticipate the decrease in uncertainty and choose to exit, or a treatment effect, where losing access to CP financing reduces firms' ability to vary their investment. Lower investment variability in turn may lead to lower variability in operating cash flow. We attempt to distinguish between these two effects by analyzing voluntary and involuntary exit separately.

Panel C shows the results for the post-1971 sample. There is a strong decrease in investment variability after involuntary exit. The magnitude of the decrease is large − 40.9% for mean and 41.2% for median investment variability − and it is also statistically significant at the 1% level. In contrast, the decrease is smaller and not statistically significant after voluntary exit.[28] The variability of operating cash flow decreases after both involuntary and voluntary exit, although the results are somewhat stronger after involuntary exit. Moreover, the increase in cash holdings is much larger after involuntary exit. For example, in the sample excluding delisted firms, the mean cash holdings as a fraction of assets increase from 5.5% to 9.5%, and the median cash holdings more than double from 2.8% to 6.9%. These increases are statistically significant at the 1% level. The results are similar if one includes delisted firms. In contrast, the increase in cash holdings is much smaller and typically not statistically significant after voluntary exit.

These differences between the voluntary and involuntary exit subsamples suggest that the lower investment variability and higher cash holdings observed after CP market exit are not due to a selection effect, since the selection argument would apply to firms that choose to exit voluntarily. Consistent with the results, the financial flexibility hypothesis implies that firms should not face a substantially increased need for cash holdings after voluntary exit, because the exit is driven by an expectation of lower variability of funding needs, and consequently, a lower need for

[28] The results are similar in the full sample, but are not tabulated for brevity.

financial flexibility. Panel C also shows that the decrease in seasonality is also largely confined to firms that exit involuntarily, but this result does not hold in the full sample that includes CP entrants prior to 1971.

VI. Does Commercial Paper Access Affect Investment Behavior? A Natural Experiment

Our evidence so far points to both a selection effect and a treatment effect in the use of CP based on investment needs. For example, the probit models in Table 6 indicate a selection effect, where firms enter the CP market based on anticipated changes in investment needs. On the other hand, not all our results can be attributed to a selection effect. For example, the reduction of investment and cash flow variability after involuntary exit from the CP market cannot be driven by a selection effect. However, we cannot infer from this result that (the lack of) CP access affects investment behavior, because it is possible that firms involuntarily exiting the market also lose access to other financing sources or that the changes in firm characteristics that led to involuntary exit may also affect future investment behavior.

In this section, we employ a natural experiment that allows us to alleviate such concerns about the endogeneity of the change in CP access, helping to shed light on the direction of causality in the relationship between CP access and investment behavior. As noted in section I.1., the SEC changed the rules regulating the ability of money market funds to invest in CP in 1991. Specifically, it mandated that money market funds could not invest more than 5% of their assets in "second-tier" CP, which typically includes paper rated P-2 by Moody's or A-2 by S&P.

This change in the regulatory environment helps us to isolate the treatment from the selection effect, because in 1991 CP issuers were already "selected in"; they had already chosen to be in the CP market. Thus, a reduction in the variability of investment after the regulatory change is unlikely to be a consequence of firms adjusting CP usage in anticipation of reduced variability of investment opportunities. After 1991, CP issuance amounts were likely constrained by the new regulatory environment that lowered the demand for outstanding CP. Therefore, investment patterns around 1991 for CP issuers should be free of concerns about reverse causality. In addition, concerns about potential omitted variables should also be lowered since it is unlikely that firm characteristics also changed at the same time in a direction that would affect the firms' investment (or operating cash flow) variability similarly. For these reasons, if the exogenous change in CP availability for lower-rated CP issuers due to the change in regulation is followed by a change in investment behavior, this evidence would be strongly supportive of the idea that CP access affects investment behavior.

Table 11 shows that investment variability of firms affected by the regulatory change indeed decreases substantially after the change in regulations in 1991. After 1991, the mean variability of investment for CP issuers drops by 17.6%, while the median variability drops by 21.4%. These changes are statistically significant at the 10% and 5% level, respectively. In contrast, the CP issuers that were not affected by the change in regulations do not experience a significant decrease in investment variability after 1991. However, we do not find that the variability of operating cash flow changes for either group of firms. These results suggest that there indeed is a causal effect from CP access to investment behavior. Firms appear to be able to vary their investment expenditures to a greater degree if they have better access to the CP market.

VII. Conclusion

In this paper, we propose a new explanation for why firms issue CP. We argue that firms use CP to enhance their financial flexibility. CP represents a flexible source of financing because it allows firms to borrow only if good investment opportunities or a shortage of internal cash flow arise. Thus, it allows firms to observe the realization of investment opportunities and to raise capital quickly to capture these opportunities. At the same time, it allows firms to avoid financing costs if there are no good investment opportunities or they have enough internal cash. We suggest that this financial flexibility is most valuable to firms whose prospects and funding needs are uncertain.

We test this proposition by constructing a comprehensive panel data set of all U.S. nonfinancial CP issuers from the inception of CP ratings in 1971 to 2005. Our evidence largely supports the financial flexibility hypothesis. We show that firms enter the CP market when they face increased uncertainty about their operating cash flow or investment. Moreover, after the exit from the CP market, investment and cash flow variability decline. We also show that CP borrowing is positively correlated with investment expenditures and negatively correlated with cash holdings, but similar relations do not hold for other corporate debt.

We also test several alternative hypotheses that could explain why firms use CP, although they would have difficulties explaining the patterns described above. We find mixed evidence for the seasonality hypothesis and little evidence for the certification hypothesis.

Our results indicate both that firms choose to access the CP market in anticipation of changes in investment opportunities and that CP market access affects investment behavior. While CP issuance has remained fairly stable in the current credit crisis, our analysis suggests that a shutdown in this market can have important real effects on investment. Analyzing the macroeconomic effects of this credit channel is an interesting topic for future research. Our analysis also

raises several questions. For example, we find that the fraction of firms that do not enter the CP market although they should be able to do so has risen in recent years. Our findings also raise the question of how firms choose between alternative sources of financial flexibility, such as CP and bank credit lines. These questions represent interesting avenues for future research.

References

Agarwal, Sumit, Souphala Chomsisengphet, and John Driscoll, 2004, Loan Commitments and Private Firms, Working Paper, Board of Governors of the Federal Reserve System.

Almeida, Heitor, Murillo Campello, and Michael S. Weisbach, 2004, The Cash Flow Sensitivity of Cash, *Journal of Finance* 59, 1777–1804.

Baker, Malcolm, Robin Greenwood, and Jeffrey Wurgler, 2003, The Maturity of Debt Issues and Predictable Variation in Bond Returns, *Journal of Financial Economics* 70, 261-291.

Bansal, Ravi, and Hao Zhou, 2002, Term Structure of Interest Rates with Regime Shifts, *Journal of Finance* 57, 1997-2043.

Barclay, Michael J., and Clifford W. Smith, Jr., 1995, The Maturity Structure of Corporate Debt, *Journal of Finance* 50, 609-631.

Bernanke, Ben S., 1990, On the Predictive Power of Interest Rates and Interest Rate Spreads, *New England Economic Review*, November 1990, 51-68.

Billett, Matthew T., and Jon A. Garfinkel, 2004, Financial Flexibility and the Cost of External Finance for U.S. Bank Holding Companies, *Journal of Money, Credit, and Banking* 36, 827-852.

Calomiris, Charles W., Charles P. Himmelberg, and Paul Wachtel, 1995, Commercial paper, corporate finance, and the business cycle: A microeconomic perspective, *Carnegie-Rochester Conference Series on Public Policy* 42, 203-250.

Chandra, Uday, and Nandkumar Nayar, 1998, The Information Content of Commercial Paper Rating Downgrades: Further Evidence, *Journal of Accounting, Auditing & Finance* 13, 417-435.

Covitz, Dan, and Chris Downing, 2007, Liquidity or Credit Risk? The Determinants of Very Short-Term Corporate Yield Spreads, *Journal of Finance* 62, 2303-2328.

Crabbe, Leland, and Mitchell A. Post, 1994, The Effect of a Rating Downgrade on Outstanding Commercial Paper, *Journal of Finance* 49, 39-56.

Diamond, Douglas W., 1991, Debt Maturity Structure and Liquidity Risk, *Quarterly Journal of Economics* 106, 709-737.

Dittmar, Amy, and Jan Mahrt-Smith, 2007, Corporate Governance and the Value of Cash Holdings, *Journal of Financial Economics* 83, 599-634.

Downing, Chris, and Stephen Oliner, 2007, The Term Structure of Commercial Paper Rates, *Journal of Financial Economics* 83, 59-86.

Easley, David, Soeren Hvidkjaer, and Maureen O'Hara, 2002, Is Information Risk a Determinant of Asset Returns?, *Journal of Finance* 57, 2185-2221.

Faulkender, Michael, 2005, Hedging or Market Timing? Selecting the Interest Rate Exposure of Corporate Debt, *Journal of Finance* 60, 931-962.

Fons, J.S, and A.E. Kimball, 1992, Defaults and Orderly Exits of Commercial Paper Issuers, Moody's Special Report.

Gamba, Andrea, and Alexander Triantis, 2007, The Value of Financial Flexibility, *Journal of Finance*, forthcoming.

Gatev, Evan, and Philip E. Strahan, 2006, Banks' Advantage in Hedging Liquidity Risk: Theory and Evidence from the Commercial Paper Market, *Journal of Finance* 61, 867-892.

Gilchrist, Simon, and Charles P. Himmelberg, 1995, Evidence on the Role of Cash Flow for Investment, *Journal of Monetary Economics* 36, 541-572.

Gorton, Gary, and George Pennacchi, 1990, Financial Intermediaries and Liquidity Creation, *Journal of Finance* 45, 49-71.

Graham, John R., 2000, How Big Are the Tax Benefits of Debt?, *Journal of Finance* 55, 1901-1941.

Graham, John R., and Campbell R. Harvey, 2001, The Theory and Practice of Corporate Finance: Evidence from the Field, *Journal of Financial Economics* 60, 187-243.

Guedes, Jose, and Tim Opler, 1996, The Determinants of the Maturity of Corporate Debt Issues, *Journal of Finance* 51, 1809-1833.

Ham, John C., and Arie Melnik, 1987, Loan Demand: An Empirical Analysis Using Micro Data, *Review of Economics and Statistics* 69, 704-709.

Hart, Oliver, and John Moore, 1994, A Theory of Debt Based on the Inalienability of Human Capital, *Quarterly Journal of Economics* 109, 841-879.

Holmstrom, Bengt, and Jean Tirole, 1998, Private and Public Supply of Liquidity, *Journal of Political Economy* 106, 1-40.

Holmstrom, Bengt, and Jean Tirole, 2000, Liquidity and Risk Management, *Journal of Money, Credit, and Banking* 32, 295-319.

Jagannathan, Murali, Clifford P. Stevens, and Michael S. Weisbach, 2000, Financial Flexibility and the Choice between Dividends and Stock Repurchases, *Journal of Financial Economics* 57, 355-384.

Kaplan, Steven N., and Luigi Zingales, 1997, Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?, *Quarterly Journal of Economics* 112, 169-215.

Kashyap, Anil K., Jeremy C. Stein, and David W. Wilcox, 1993, Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance, *American Economic Review* 83, 78-98.

Lins, Karl V., Henri Servaes, and Peter Tufano, 2007, What Drives Corporate Liquidity? An International Survey of Strategic Cash and Lines of Credit, Working paper.

Lucas, D.J., and D.E. Noe, 1989, Defaults and Orderly Exits of U.S. and European Commercial Paper Issuers, Moody's Special Report.

Martin, J. Spencer, and Anthony M. Santomero, 1997, Investment Opportunities and Corporate Demand for Lines of Credit, *Journal of Banking and Finance* 21, 1331-1350.

Melnik, Arie, and Steven Plaut, 1986a, The Economics of Loan Commitment Contracts: Credit Pricing and Utilization, *Journal of Banking and Finance* 10, 267-280.

Melnik, Arie, and Steven Plaut, 1986b, Loan Commitment Contracts, Terms of Lending, and Credit Allocation, *Journal of Finance* 41, 425-435.

Myers, Stewart C., 1977, Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, 147-175.

Myers, Stewart C., 1984, The Capital Structure Puzzle, *Journal of Finance* 39, 575-592.

Nayar, Nandkumar, and Michael S. Rozeff, 1994, Ratings, Commercial Paper, and Equity Returns, *Journal of Finance* 49, 1431-1449.

Opler, Tim, Lee Pinkowitz, Rene Stulz, and Rohan Williamson, 1999, The Determinants and Implications of Corporate Cash Holdings, *Journal of Financial Economics* 52, 3-46.

Ou, Sharon, David T. Hamilton, and Richard Cantor, 2004, Short-Term Rating Performance and Corporate Commercial Paper Defaults, 1972-2004, Moody's Special Comment.

Petersen, Mitchell A., 2007, Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches, *Review of Financial Studies,* forthcoming.

Post, Mitchell A., 1992, The Evolution of the U.S. Commercial Paper Market Since 1980, *Federal Reserve Bulletin* 78, 879-891.

Rauh, Joshua D., and Amir Sufi, 2007, The Composition and Priority of Corporate Debt: Evidence from Fallen Angels, Working paper, University of Chicago.

Shen, Pu, 2003, Why Has the Nonfinancial Commercial Paper Market Shrunk Recently?, *Federal Reserve Bank of Kansas City Economic Review* 88, 55-76.

Shockley, Richard L., and Anjan V. Thakor, 1997, Bank Loan Commitment Contracts: Data, Theory, and Tests, *Journal of Money, Credit, and Banking* 29, 517-534.

Slovin, Myron B., Marie E. Sushka, and Carl D. Hudson, 1988, Corporate Commercial Paper, Note Issuance Facilities, and Shareholder Wealth, *Journal of International Money and Finance* 7, 289–302.

Stigum, M., 1983, The Money Market, Homewood, Illinois: Dow Jones Irwin.

Stock, James H., and Mark W. Watson, 1989, New Indexes of Coincident and Leading Economic Indicators, *NBER Macroeconomics Annual* 1989, 351–393.

Stohs, Mark Hoven, and David C. Mauer, 1996, The Determinants of Corporate Debt Maturity Structure, *Journal of Business* 69, 279-312.

Sufi, Amir, 2007a, Bank Lines of Credit in Corporate Finance: An Empirical Analysis, *Review of Financial Studies*, forthcoming.

Sufi, Amir, 2007b, The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings, *Review of Financial Studies*, forthcoming.

Wakeman, L. MacDonald, 1984, The Real Function of Bond Rating Agencies, in: Michael C. Jensen and Clifford W. Smith, Jr., eds., The Modern Theory of Corporate Finance, New York: McGraw- Hill.

Table 1: Summary Statistics

Panel A: Number of Firms Entering the Commercial Paper Market Over Time

This table reports the number of firms that entered the commercial paper (CP) market in each period and the CP ratings at the time of entry into the CP market. CP ratings are obtained from Moody's non-financial corporate CP ratings data set and S&P's short-term ratings from RatingsXpress. Moody's data set covers the complete short-term ratings history for non-financial corporate CP issuers up to the end of 2005. There are 1099 domestic dollar CP issuers classified as non-finance and non-utility, of which 807 issuers are found on Compustat. Combining subsidiaries leads to 714 unique firms. 22 firms are excluded because no financial data are available on Compustat. We then exclude 73 financial firms and utilities (2-digit SIC code 49 or 60-69) and foreign firms (state 99) based on Compustat classifications. 35 firms that either entered with ratings of P-3 or NP or, much less frequently, for which we know the entry date is incorrect are deleted. This leaves us with a sample of 584 firms from Moody's. There are 450 U.S. non-finance and non-utility dollar issuers of CP in S&P's RatingsXpress up to the end of 2005. 44 firms with an initial rating of A-3 or worse are deleted. We exclude firms without financial data on Compustat and finance, utility, and foreign firms (based on Compustat's classification). This gives us 397 sample firms from S&P. Combining the sample from Moody's with that from S&P leads to 677 CP issuers in the full sample. We define the CP entry date as the earlier date on which a firm obtained a short-term rating from either Moody's or S&P. There are 457 entries from Moody's and 220 entries from S&P. Moody's high short-term ratings include P-1 and P-2 for most of the sample and S&P's include A-1+, A-1 and A-2. Only in 1971, when Moody's started to give short-term ratings, its ratings scheme consisted only of Prime (P) and Not Prime (NP). The post-1971 sample excludes all firms that entered in or before 1971.

	P-1 (A-1+ / A-1)	**P-2 (A-2)**	**P**	**Total**
1970-1971	3	4	186	193
1972-1975	30	21		51
1976-1980	83	26		194
1981-1985	74	18		92
1986-1990	42	43		85
1991-1995	18	21		39
1996-2000	19	66		85
2001-2005	10	13		23
Full Sample	**279**	**212**	**186**	**677**
Post-1971 Sample	**276**	**208**	**0**	**484**

Panel B: Comparison of Firm Characteristics of Commercial Paper Issuers and Compustat Firms

This table presents firm characteristics for the post-1971 CP sample at the time of the entry into the CP market and compares them to the firm-year averages of Compustat firms during the sample period from 1972 to 2005. The firm characteristics for the CP sample are calculated at the end of the fiscal year in which the firm entered the CP market. W-mean, the winsorized mean (at 1% level), and medians are calculated across all non-missing firm-years from 1972 to 2005 in Compustat. Statistics from a t-test (Wilcoxon-Mann-Whitney test with the associated z-statistic) testing the null hypothesis that the mean (median) of the CP sample and the winsorized mean (median) of all Compustat firm-years are equal are reported in the last two columns. CF is defined as operating income (data13) over total book assets (data6). LEV (leverage) is the sum of long-term debt (data9) and short-term debt (data34) over total book assets (data6). The market value of assets is long-term debt plus short-term debt plus the market value of equity (data9+data34+data199*data25). MKTLEV is the sum of long-term debt (data9) and short-term debt (data34) over the market value of assets. M/B is the market value of assets over total book assets. INVEST is defined as capital expenditures (data128) over total book assets (data6). SIZE is the logarithm of total sales (data12). CASH is cash and short-term investments (data1) over total assets (data6), and WC is defined as working capital (data179) over sales (data12).

	CP firms (A)		**Compustat Firms (B)**		t-stat	z-stat
	Mean	Median	W-mean	Median	(A - B)	(A - B)
CF	0.179	0.175	0.006	0.096	6.80***	17.70***
LEV	0.233	0.225	0.298	0.235	-3.90***	-0.73
MKTLEV	0.225	0.198	0.299	0.236	-5.51***	-2.20**
M/B	1.303	1.069	1.791	0.956	-2.95***	3.44***
INVEST	0.095	0.082	0.070	0.045	5.90***	12.98***
SIZE	7.516	7.413	4.148	4.204	26.82***	27.38***
CASH	0.053	0.034	0.147	0.062	-9.77***	-9.35***
WC	0.133	0.136	0.493	0.165	-2.26**	-4.24***

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Table 2: Survival and Exit

Entry into the CP market is defined as the earlier date on which the firm obtains a CP rating from either Moody's or S&P. The exit date is defined as the later exit date from either S&P or Moody's. Within each data set, we treat both ratings withdrawal and a severe ratings downgrade (downgrade to P-3 (A-3) or worse ratings and never upgraded to P-1 (A-1, A-1+) or P-2 (A-2) afterwards) as exit. If the last rating action is a ratings withdrawal, we define the exit date to be the date of the withdrawal. If the last rating action was not a withdrawal but a severe downgrade, the exit date is defined as the date of this downgrade. If no exit date is found, the issuer is classified as a survivor in the CP market.

Panel A: Survival Duration in the Commercial Paper Market

This panel shows survival duration of post-1971 CP issuers, separately for firms that exit and firms that survive. For firms that have exited the CP market, survival duration is measured as the length of time between the date of entry into the CP market and the date of exit from the market. For survivors, duration is the length of time between the date of entry and December 31, 2005.

Duration (years)	Conditional on Exit				Conditional on Survival			
	Freq.	Percent (%)	Cum. Freq.	Cum. Percent (%)	Freq.	Percent (%)	Cum. Freq.	Cum. Percent (%)
0-1	11	3.46	11	3.46	3	1.81	3	1.81
1-2	23	7.23	34	10.69	3	1.81	6	3.61
2-3	25	7.86	59	18.55	1	0.6	7	4.22
3-4	26	8.18	85	26.73	2	1.2	9	5.42
4-5	22	6.92	107	33.65	7	4.22	16	9.64
5-6	14	4.4	121	38.05	9	5.42	25	15.06
6-7	16	5.03	137	43.08	8	4.82	33	19.88
7-8	13	4.09	150	47.17	3	1.81	36	21.69
8-9	15	4.72	165	51.89	3	1.81	39	23.49
9-10	12	3.77	177	55.66	5	3.01	44	26.51
10-11	10	3.14	187	58.81	3	1.81	47	28.31
11-20	80	25.16	267	83.96	47	28.31	94	56.63
20+	51	16.04	318	100	72	43.37	166	100

Panel B: Voluntary and Involuntary Exit

This panel reports the number of firms that have exited the CP market, both voluntarily and involuntarily, and the number of firms that survive in the market as of December 31, 2005. An exit is defined as voluntary if the CP rating is withdrawn when it is either P-1 (A-1, A-1+) or P-2 (A-2). An exit is defined as involuntary if the CP rating is withdrawn when it is P-3 (A-3) or worse, or if the exit is a result of a severe downgrade. Delisted firms refer to sample firms delisted from the exchanges within 90 days before or after the exit from the CP market. The results are presented for the full sample, including firms that have a CP rating in 1971, as well as for the post-1971 sample.

	Voluntary exit	Involuntary exit	Survivor	Total
Full sample	219	239	219	677
Post-1971 sample	148	170	166	484
Exclude Delisted Firms				
Full sample	108	185	200	493
Post-1971 sample	73	127	154	354

Table 3: Correspondence of Commercial Paper Ratings and Long-Term Bond Ratings

This table illustrates the correspondence of CP ratings of our post-1971 sample firms and their long-term bond ratings from S&P at the time of entry into the CP market. 399 out of the 484 post-1971 firms are found in S&P's RatingsXpress data set. 14 firms do not have issuer ratings history data available. Long-term issuer ratings are found for 273 of the 385 firms within one month before or after their CP entry date. The table counts the frequency of this long-term bond rating for CP issuers rated initially P-1 (A-1+ and A-1) and P-2 (A-2), respectively. The shaded area marks the correspondence that is used to construct the control sample.

	S&P LT	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	Total
P-1	Freq	21	3	21	14	26	47	3	2	1	2	3	0	1	144
(A-1+	Row %	14.6	2.1	14.6	9.7	18.1	32.6	2.1	1.4	0.7	1.4	2.1	0	0.7	52.8
&A-1)	Colum %	100	100	100	93.3	100	77.0	13.0	5.3	2.2	22.2	75	0	2.2	
P-2	Freq	0	0	0	1	0	14	20	36	45	7	1	1	3	129
(A-2)	Row %	0	0	0	0.8	0	10.9	15.5	27.9	34.9	5.4	0.8	0.8	2.3	47.2
	Colum%	0	0	0	6.7	0	23.0	87.0	94.7	97.8	77.8	25	100	75	
	Total	21	3	21	15	26	61	23	38	46	9	4	1	4	273
	Percent %	7.7	1.1	7.7	5.5	9.5	22.3	8.4	13.9	16.9	3.3	1.5	0.4	1.47	100

Table 4: Univariate Time-Series Tests at the Time of Entry into the Commercial Paper Market

This table compares the variability in operating cash flow and investment, idiosyncratic risk, PIN (the probability of information-based trading), dispersion of analyst forecasts, the within-year standard deviation of sales, and cash holdings before and after the CP entry for both the post-1971 CP sample and the control sample. The cross-sectional mean (*median*) is reported for the CP sample and the control sample both before and after the entry. The number of observations is reported in square brackets. Statistics from a t-test (*Wilcoxon-Mann-Whitney test*) testing the difference in mean (*median*) before and after the entry into the CP market are reported for both CP issuers and control firms. The control sample is constructed using the S&P long-term bond ratings history up to the end of 2005, available in S&P's RatingsXpress. Firms in the control sample are non-finance, non-utility U.S. firms that have never had a CP rating from either Moody's or S&P but have a long-term bond rating of BBB or better throughout the year of the entry year of a CP issuer. CFVAR and INVESTVAR are time series standard deviations of operating cash flow (data13/data6) and long-term investment (data128/data6), respectively, calculated over up to five years before and five years after the entry into the CP market. IDRISK is idiosyncratic risk calculated as the residual of market model regressions using daily returns over three years before and three years after the entry. PIN is the probability of information-based trading and obtained from Soeren Hvidkjaer's website. It is available on an annual basis for a subset of stocks from 1983 to 2001. The time-series average of PIN using up to five years of data is calculated both before and after the entry for entries between 1986 and 1999 to ensure the availability of at least three years of data. DISPERSION is the standard deviation of analyst forecasts of EPS for the next fiscal year divided by the absolute value of the forecast mean (if the mean is not zero) or median (if the mean is zero). Analyst forecast data are available from I/B/E/S and start in 1980. The time-series average of DISPERSION using up to five years of data is calculated both before and after the entry for entries after 1983 to ensure the availability of at least three years of data. SEASON is the five-year time-series average of the within-year standard deviation of quarterly sales (quarterly sales are data2 in Compustat Quarterly) scaled by the average total assets (total assets are data44 in Compustat Quarterly) of the year. CASH is the time-series average of cash holdings (data1/data6) calculated over up to five years.

	Commercial Paper Issuers			**Control Firms**		
	Pre-entry (A) Mean *median*	Post-entry (B) Mean *median*	Test (B-A)	Pre-entry (C) Mean *median*	Post-entry (D) Mean *median*	Test (D-C)
CFVAR	0.027 *0.021* [424]	0.033 *0.025* [438]	2.96*** *3.75***	0.026 *0.020* [2264]	0.026 *0.020* [2025]	0.60 *-0.01*
INVESTVAR	0.024 *0.018* [421]	0.024 *0.017* [438]	-0.21 *-0.52*	0.024 *0.016* [2285]	0.021 *0.015* [2041]	-3.99*** *-3.370****
IDRISK	3.976 *3.091* [378]	4.251 *3.283* [395]	0.86 *1.87**	4.593 *3.681* [1586]	4.948 *3.447* [1472]	1.64* *-3.57****
PIN	0.171 *0.167* [106]	0.142 *0.133* [130]	-5.52*** *-5.28****	0.181 *0.175* [607]	0.152 *0.146* [575]	-12.35*** *-12.71****
DISPERSION	0.055 *0.027* [118]	0.167 *0.025* [189]	1.11 *-0.32*	0.106 *0.031* [1004]	0.086 *0.028* [1041]	-1.25 *-2.49****
SEASON	0.042 *0.026* [430]	0.035 *0.023* [432]	-2.49*** *-2.91****	0.025 *0.015* [2229]	0.020 *0.012* [1990]	-5.03*** *-5.38****
CASH	0.079 *0.059* [446]	0.060 *0.042* [448]	-4.28*** *-4.53****	0.056 *0.029* [2548]	0.053 *0.027* [2426]	-1.38 *-1.83**

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Table 5: Cross-Sectional Standard Deviation of Operating Cash Flow and Investment

This table reports the cross-sectional standard deviation of operating cash flow and investment for the post-1971 CP sample and the control sample around the entry into the CP market. Year 0 refers to the fiscal year in which the firm entered the CP market, year 1 to the first year after the entry, and year -1 to the year before the entry. The null hypothesis is that the variance for the CP sample and the control sample are the same. F-statistics testing the difference between the variances of the CP sample and control sample are reported in the fourth column along with the associated probability in the last column.

Entry Year	Commercial Paper Issuers	Control Firms	F-stat	Pr > F
		Operating Cash Flow		
-2	0.072	0.070	0.95	0.4986
-1	0.075	0.068	0.83	0.0088
0	0.086	0.068	0.62	<0.0001
1	0.076	0.068	0.80	0.0029
2	0.076	0.069	0.83	0.0116
		Investment		
-2	0.063	0.063	1.00	0.9422
-1	0.063	0.062	0.97	0.6513
0	0.068	0.060	0.78	0.0006
1	0.066	0.056	0.74	<0.0001
2	0.065	0.054	0.68	<0.0001

Table 6: Probit Regression Predicting Which Firms Choose to Enter the Commercial Paper Market
This table shows probit regressions that predict the likelihood for a firm to choose to enter the CP market. The dependent variable is 1 if a firm enters the CP market and 0 otherwise. The sample includes all firms in the post-1971 CP sample and the control sample. ΔINVESTVAR and ΔCFVAR are the difference of the standard deviation of INVEST (data128/data6) and CF (data13/data6), respectively, over the five years before entry into the CP market and over the ten years before the entry. SEASON is the average within-year standard deviation of quarterly sales (data2 over the average of data44 in that year in Compustat Quarterly) over the five years before the entry. These three variables are winsorized at the 5% level. CF, M/B, SIZE, and LEV are measured at the end of the fiscal year before the entry. The market value of assets is calculated as long-term debt plus short-term debt plus the market value of equity (data9+data34+data199*data25). M/B is the market value of assets over total book assets (data6). SIZE is the logarithm of sales (data12). LEV is the sum of long-term debt (data9) and short-term debt (data34) over total book assets. TERM is the average monthly yield spread of ten year government bonds over three months Treasury bills in the year before the entry. Absolute values of robust t-statistics adjusted for clustering at the firm level are in parentheses.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
CF	4.869	4.833	4.879	4.610	4.721
	(5.76)***	(5.69)***	(5.76)***	(5.43)***	(5.54)***
M/B	-0.092	-0.100	-0.091	-0.099	-0.091
	(1.76)*	(1.86)*	(1.75)*	(1.87)*	(1.76)*
SIZE	0.073	0.070	0.074	0.050	0.059
	(1.40)	(1.35)	(1.42)	(0.95)	(1.11)
LEV	-1.024	-1.059	-1.021	-0.922	-0.899
	(3.10)***	(3.20)***	(3.09)***	(2.84)***	(2.76)***
TERM	-0.114	-0.114	-0.114	-0.123	-0.120
	(3.72)***	(3.75)***	(3.73)***	(3.97)***	(3.87)***
ΔINVESTVAR	8.870		8.711		7.511
	(2.32)**		(2.24)**		(1.94)*
ΔCFVAR		2.141	0.804		
		(0.65)	(0.24)		
SEASON				3.918	3.535
				(1.66)*	(1.49)
CONSTANT	-1.462	-1.437	-1.469	-1.451	-1.520
	(3.29)***	(3.27)***	(3.30)***	(3.30)***	(3.39)***
Observations	1821	1836	1820	1816	1795

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Table 7: Commercial Paper and Non-Commercial-Paper Borrowing and Their Correlations with Investment, Cash Holdings, and Operating Cash Flow

Year-end amounts of outstanding CP are collected for the post-1971 sample firms from 10-K filings over the 1993 to 2005 period. Panel A shows the distribution of CP outstanding amounts over all firm-years and across all firms (where we calculate for each firm the time-series average). CP refers to the dollar outstanding amount. CP/ASSET, CP/DEBT, and CP/INVESTMENT are defined as CP dollar outstanding scaled by total book assets (data6), total debt (data9+data34), and investment expenditure (data128), respectively. Panel B reports the cross-sectional mean (*median*) of the time-series correlation of CP/ASSET, CP/DEBT, and NONCP/ASSET (non-CP debt defined as total debt (data9+data34) minus CP outstanding over total book assets (data6)) with INVEST (data128/data6), CASH (data1/data6), and CF (data13/data6). Statistics from a t-test (*sign test*) for the mean (*median*) are reported in the "Test" column. A paired t-test (*sign test*) for the mean (*median*) testing the null hypothesis that the correlations are the same for CP/ASSET and NONCP/ASSET is reported in the "Paired Test" column.

Panel A: Summary Statistics

	CP	**CP/ASSET**		**CP/DEBT**		**CP/INVESTMENT**	
	firm-years ($million)	firm-years	cross section	firm-years	cross section	firm-years	cross section
N	2406	2368	317	2364	317	2353	316
Mean	579.15	4.43%	4.20%	18.03%	17.08%	94.97%	92.27%
Median	110	2.34%	3.32%	10.10%	13.00%	35.57%	53.84%
Quantile							
95%	2,352	23.79%	11.88%	65.02%	53.19%	386.26%	336.56%
90%	1,350	12.22%	9.67%	49.92%	37.80%	241.69%	195.04%
75%	426	6.69%	6.07%	26.54%	23.08%	147.16%	119.26%
50%	110	2.34%	3.32%	10.10%	13.00%	35.57%	53.84%
25%	0	0	1.25%	0	4.89%	0	17.68%
10%	0	0	0.01%	0	0.02%	0	0.12%
5%	0	0	0	0	0	0	0

Panel B: Time-Series Correlation of Commercial Paper and Non-Commercial-Paper Borrowing with Selected Financial Variables

Correlation of	**CP/ASSET** (A)		**NONCP/ASSET** (B)		Paired Test (A-B)	**CP/DEBT**	
	Mean *Median*	Test	Mean *Median*	Test		Mean *Median*	Test
INVEST	0.163 *0.246*	5.14*** *35.5***	-0.069 *-0.130*	-1.87* *-18.5***	4.77*** *39****	0.188 *0.299*	5.68*** *42****
CASH	-0.300 *-0.413*	-10.03*** *-80****	-0.025 *-0.066*	-0.69 *-7.5*	-5.36*** *-36****	-0.269 *-0.391*	-8.79*** *-71.5****
CF	0.044 *0.086*	1.30 *13*	-0.227 *-0.389*	-6.20*** *-45.5****	4.55*** *31****	0.079 *0.121*	2.30** *16.5**

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Table 8: Fixed Effect Panel Regressions of Commercial Paper and Non-Commercial-Paper Borrowing
This table reports OLS panel regressions of year-end outstanding amounts of CP and non-CP debt with firm fixed effects. The dependent variables, listed in the first row, are the CP outstanding amount divided by total assets (CP/ASSET) or divided by total debt (CP/DEBT) and non-CP debt divided by total assets (NONCP/ASSET), respectively. INVEST (data128/data6), CF (data13/data6), CASH (data1/data6), M/B, and TERM are measured in the same fiscal year as the dependent variable. CASH_LAG and LEV_LAG are one year lagged values of CASH and LEV. The market value of assets is long-term debt plus short-term debt plus the market value of equity (data9+data34+data199*data25). M/B is the market value of assets over total assets (data6). LEV is the sum of long-term debt (data9) and short-term debt (data34) over total assets (data6). TERM is the average monthly yield spread of ten year government bonds over three months Treasury bills over the year. Absolute values of t-statistics are in parentheses.

Dependent Variable	**(1)** **CP/ASSET**	**(2)** **CP/ASSET**	**(3)** **CP/DEBT**	**(4)** **CP/DEBT**	**(5)** **NONCP /ASSET**	**(6)** **NONCP /ASSET**
INVEST	0.136	0.197	0.632	0.882	-0.234	-0.241
	(3.31)***	(4.77)***	(3.86)***	(5.35)***	(3.38)***	(3.51)***
CF	0.057	0.075	0.313	0.386	-0.468	-0.465
	(2.22)**	(2.90)***	(3.06)***	(3.70)***	(10.86)***	(10.76)***
M/B	-0.001	-0.002	0.009	0.006	-0.003	-0.003
	(0.87)	(1.24)	(1.44)	(1.01)	(1.27)	(1.32)
TERM	-0.005	-0.006	-0.015	-0.017	-0.008	-0.008
	(5.60)***	(6.04)***	(4.08)***	(4.43)***	(4.86)***	(4.99)***
LEV_LAG	0.001	0.001	0.010	0.007	0.007	0.008
	(1.02)	(0.74)	(2.04)**	(1.43)	(3.25)***	(3.75)***
CASH	-0.214		-0.856		0.016	
	(10.07)***		(9.95)***		(0.44)	
CASH_LAG		-0.079		-0.322		0.014
		(3.49)***		(3.51)***		(0.38)
CONSTANT	0.049	0.036	0.141	0.088	0.338	0.338
	(9.72)***	(7.19)***	(6.96)***	(4.43)***	(39.66)***	(40.95)***
Observations	2344	2344	2340	2340	2344	2344
Number of firms	315	315	315	315	315	315
R-squared	0.09	0.05	0.10	0.06	0.11	0.11

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Table 9: Time-Series Correlations of Drawn Amounts on Credit Lines and Commercial Paper Borrowing with Investment and Cash Holdings

This table reports the cross-sectional mean (*median*) of the time-series correlation between drawn amounts on credit lines and outstanding amounts of CP with investment and cash holdings. CL/ASSET and CP/ASSET are drawn amounts on credit lines and CP outstanding amounts divided by total assets (data6), respectively. INVEST and CASH are capital expenditures (data128) and cash and short-term investments (data1) over total assets, respectively. The correlations of CL/ASSET with INVEST and CASH are calculated both over the time series up to five years before and after CP entry and over the period after CP entry only. Drawn amounts on credit lines are collected from 10-K filings for the 23 sample firms that entered the CP market between 1998 and 2000. At least three years of data are required to calculate the time-series correlation. Statistics from a t-test (*sign test*) testing the null hypothesis that the correlation is zero are reported in the "Test" columns.

Correlation of	**CL/ASSET** (Before and After CP Entry)		**CL/ASSET** (After CP Entry Only)		**CP/ASSET**	
	Mean *Median*	Test	Mean *Median*	Test	Mean *Median*	Test
INVEST	0.189 *0.223*	2.15** *4*	0.056 *0.083*	0.39 *0*	0.479 *0.568*	5.10*** *6***
CASH	-0.128 *-0.280*	-1.29 *-5**	-0.163 *-0.388*	-1.26 *-3*	-0.425 *-0.476*	-4.21*** *-7.5****

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Table 10: Univariate Tests around the Exit from the Commercial Paper Market

This table compares the variability of operating cash flow and investment, the within-year standard deviation of sales, and cash holdings for CP issuers before and after exiting the CP market. CFVAR and INVESTVAR are defined as the time-series standard deviation of operating cash flow (data13/data6) and investment (data128/data6), respectively, over a five year horizon before (pre-exit) and after (post-exit) the exit from the CP market. SEASON is the time-series average of the within-year standard deviation of quarterly sales (data2 over the average of data44 in that year in Compustat Quarterly) over five years before (pre-exit) and after (post-exit) the exit. CASH is the time-series average of cash holdings (data1/data6) over up to five years. The cross-sectional mean (*median*) is reported for before and after the exit from the CP market for both the post-1971 sample and the full sample. The number of observations is reported in square brackets. Statistics from a t-test (*Wilcoxon-Mann-Whitney test*) of significance of the difference in the mean (*median*) before and after the exit are reported in the third and last columns. Panel A shows the tests for all exits in the two samples. Firms that are delisted from exchanges within 90 days before or after the exit date are excluded in the tests in Panel B. Panel C splits the exits in the post-1971 sample into voluntary exits and involuntary exits. An exit is voluntary if the CP rating is withdrawn when it is either P-1 or P-2, and is involuntary if the CP rating is withdrawn when it is P-3 or worse, or if the exit is the result of a severe downgrade.

Panel A: All Exits

	Post-1971 Sample			**Full Sample**		
	Pre-exit (A) Mean *Median*	Post-exit (B) Mean *Median*	Test (A-B)	Pre-exit (C) Mean *Median*	Post-exit (D) Mean *Median*	Test (C-D)
CFVAR	.037 *.030* [291]	.031 *.023* [156]	2.27** *3.39***	.035 *.028* [414]	.031 *.023* [242]	1.92* *2.69***
INVESTVAR	.022 *.017* [289]	.015 *.011* [155]	4.18*** *5.16***	.021 *.016* [412]	.015 *.011* [241]	4.17*** *5.15***
SEASON	.035 *.022* [293]	.029 *.016* [195]	1.62 *2.37***	.037 *.024* [409]	.032 *.021* [287]	1.62 *1.89**
CASH	0.048 *0.031* [296]	0.080 *0.047* [176]	-4.45*** *-4.73****	0.049 *0.036* [421]	0.074 *0.050* [267]	-4.80*** *-5.07****

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Panel B: Exits Excluding Delisted Firms

	Post-1971 Sample			**Full Sample**		
	Pre-exit (A) Mean *Median*	Post-exit (B) Mean *Median*	Test (A-B)	Pre-exit (C) Mean *Median*	Post-exit (D) Mean *Median*	Test (C-D)
CFVAR	.040 *.031* [175]	.032 *.023* [139]	2.30** *3.02***	.036 *.029* [257]	.031 *.025* [217]	1.97** *2.32***
INVESTVAR	.022 *.016* [174]	.015 *.011* [139]	3.63*** *4.44***	.022 *.016* [256]	.016 *.011* [217]	3.68*** *4.44***
SEASON	.034 *.022* [177]	.029 *.016* [159]	1.51 *1.69**	.037 *.024* [252]	.033 *.022* [238]	1.57 *1.50*
CASH	0.049 *0.028* [180]	0.082 *0.048* [158]	-3.97*** *-4.41****	0.050 *0.032* [264]	0.076 *0.051* [240]	-4.37*** *-4.73****

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Panel C: Voluntary Versus Involuntary Exit (Post-1971 Sample)

	Voluntary Exit			Involuntary Exit		
	Pre-exit (A) Mean *Median*	Post-exit (B) Mean *Median*	Test (A-B)	Pre-exit (C) Mean *Median*	Post-exit (D) Mean *Median*	Test (C-D)
CFVAR	0.034 *0.027* [130]	0.028 *0.027* [43]	1.65* *0.52*	0.039 *0.034* [161]	0.032 *0.020* [113]	2.19** *3.82***
INVESTVAR	0.021 *0.016* [128]	0.017 *0.015* [42]	1.34 *1.20*	0.022 *0.017* [161]	0.013 *0.010* [113]	*4.76**** *5.14****
SEASON	0.030 *0.020* [129]	0.029 *0.015* [65]	0.25 *1.55*	0.039 *0.024* [160]	0.029 *0.018* [130]	2.29** *2.49***
CASH	0.042 *0.032* [133]	0.049 *0.033* [50]	-0.93 *-0.31*	0.052 *0.030* [163]	0.092 *0.064* [126]	-4.04*** *-4.40****
Exits Excluding Delisted Firms						
CFVAR	0.040 *0.028* [57]	0.028 *0.024* [41]	1.99** *0.94*	0.040 *0.032* [118]	0.033 *0.022* [98]	1.58 *2.96****
INVESTVAR	0.024 *0.017* [56]	0.017 *0.014* [40]	1.52 *1.47*	0.021 *0.016* [118]	0.014 *0.010* [99]	3.67*** *4.15****
SEASON	0.029 *0.016* [56]	0.026 *0.014* [49]	0.42 *0.44*	0.037 *0.024* [117]	0.029 *0.019* [110]	1.80* *2.16***
CASH	0.035 *0.027* [60]	0.050 *0.034* [48]	-1.77* *-1.54*	0.055 *0.028* [120]	0.095 *0.069* [110]	-3.57*** *-4.30****

***, **, * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

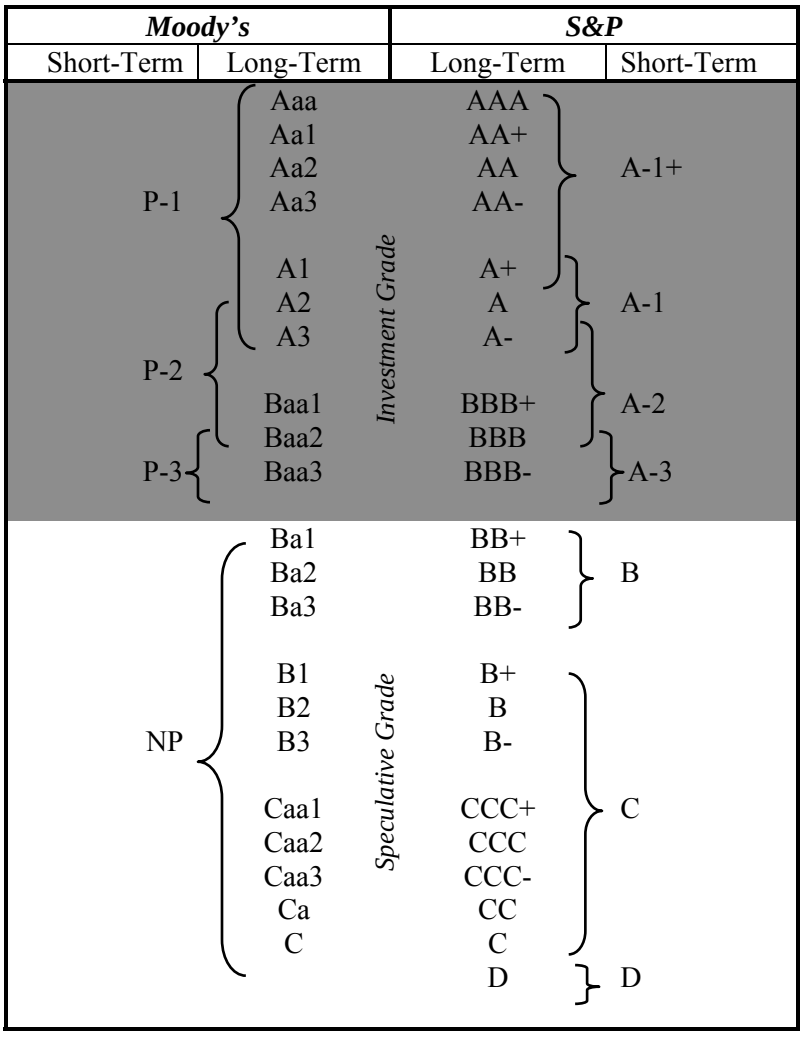
Table 11: Variability of Investment and Operating Cash Flow Before and After the Change in Regulations Affecting the Ability of Money Market Mutual Funds to Invest in Lower Rated Commercial Paper in 1991

This table compares the variability of operating cash flow and investment before and after 1991 for the treated group of CP issuers that were affected by the change in regulation introduced in 1991, along with the untreated group of issuers that were not affected. The change in regulations in 1991 limited the fraction of assets money market mutual funds could invest in tier-2 CP to 5%. The treated group thus consists of tier-2 CP issuers, generally including those rated at "2" by either Moody's or S&P (P-2 by Moody's or A-2 by S&P) in 1991. Issuers receiving only the rating "1" in 1991 from all agencies that rate them are included in the untreated group. In order to have at least three years of pre- and post-regulation data available, we restrict the test to only issuers that entered the CP market before 1988 and exited it after 1994. CFVAR and INVESTVAR are defined as the time-series standard deviation of operating cash flow (data13/data6) and investment (data128/data6), respectively, over up to five years before (pre-1991) and after (post-1991) 1991, while the firm stays in the CP market. The cross-sectional mean (*median*) is reported in each cell with the number of observations in square brackets. Statistics from t-tests (*Wilcoxon-Mann-Whitney z-tests*) testing the significance of the difference between pre-1991 and post-1991 values are reported in the "Test" column.

	Treated Group			Untreated Group		
	Pre-1991 (A) Mean *Median*	Post-1991 (B) Mean *Median*	Test (A-B)	Pre-1991 (A) Mean *Median*	Post-1991 (B) Mean *Median*	Test (A-B)
INVESTVAR	0.017 *0.014* [79]	0.014 *0.011* [76]	1.66* *2.27***	0.020 *0.013* [206]	0.018 *0.013* [203]	0.87 0.40
CFVAR	0.023 *0.021* [79]	0.025 *0.024* [76]	-0.60 *-0.83*	0.026 *0.019* [207]	0.025 *0.020* [205]	0.55 -0.56

Figure 1: Relationship between Commercial Paper Ratings and Long-Term Bond Ratings according to Moody's and S&P

This figure shows the relationship between Moody's and S&P's CP (short-term) ratings and long-term bond ratings, as suggested by Moody's and S&P.



Sources: www.Moodys.com and www.StandardandPoors.com.

Figure 2: Drawn Amounts on Credit Lines around the Time of the Entry into the Commercial Paper Market
The mean of drawn amounts on credit lines (CL) across a subsample of CP issuers is shown together with the mean outstanding amounts of CP (CP). The sample consists of firms that enter the CP market between 1998 and 2000.