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HOW MANAGEMENT RISK AFFECTS CORPORATE DEBT

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ABSTRACT

Management risk occurs when uncertainty about future managerial decisions increases a firm's overall risk. This paper argues that management risk is an important yet unexplored determinant of a firm's default risk and the pricing of its debt. CDS spreads, loan spreads and bond yield spreads all increase at the time of CEO turnover, when management risk is highest, and decline over the first three years of CEO tenure, regardless of the reason for the turnover. A similar pattern but of smaller magnitude occurs around CFO turnovers. The increase in the CDS spread at the time of the CEO departure announcement, the change in the spread when the incoming CEO takes office, as well as the sensitivity of the spread to the new CEO's tenure, all depend on the amount of prior uncertainty about the new management.

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1. Introduction

A firm's default risk reflects not only the likelihood that it will have bad luck, but also the risk that the firm's managerial decisions will lead the firm to default. Management risk occurs when the impact of management on firm value is uncertain, and, in principle, could meaningfully affect the firm's overall risk. Practitioners have long understood the importance of management risk, and regularly characterize it as an important factor affecting a firm's risk.[1] However, the academic literature on corporate default risk and the pricing of corporate debt has largely ignored management risk. This paper evaluates the extent to which uncertainty about management is a factor that affects a firm's default risk and the pricing of its debt.

We identify the effect of management risk using the idea that uncertainty about future managerial decisions rises around executive turnovers, particularly CEO turnovers, and decreases over time as the manager's actions are observed. When a senior manager departs, there is an immediate increase in the uncertainty about who his replacement will be, and also about the impact the new manager will have on firm value. Part of this uncertainty is resolved when the incoming manager's identity is revealed, but substantial uncertainty remains about his ability and the quality of match between him and the firm. If the ex ante expectation of a manager's quality is on average correct, then there should be no systematic change in the market's estimate of an average manager's ability over his tenure in office. What will decline unambiguously, however, is the noise in this estimate, since more observations of his actions will allow the market to learn more about the manager. Therefore, management risk, which arises because of the *uncertainty* of the manager's value added, should decline with a manager's tenure. If management risk increases the market's assessment of a firm's default probability, then the default risk embedded in the pricing of firms' debt should also increase around the time of executive turnover and subsequently decline over the executive's tenure.

[1] For example, a special document Moody's circulated about corporate governance claims: "[T]here is inherent transition risk in any CEO change and we therefore look to evaluate any changes to strategic initiatives or financial policies that differ from previous expectations, and whether credit metrics or liquidity deteriorates as a result." See: Plath (2008).

Using a sample of primarily S&P 1500 firms between 1987 and 2012, we characterize the way that the risk of a firm's corporate debt varies with the uncertainty the market likely has about its management. The basic pattern is depicted in Figure 1, which illustrates the way CDS spreads change around the time of a CEO change. The announcement of a CEO's departure is associated with an increase in the firm's CDS spread, reflecting an increased market assessment of the firm's default risk. The CDS spread declines at the announcement of the successor, and further declines during the new CEO's time in office, approximately back to the pre-turnover level after about three years. Holding other factors constant, the 5-year CDS spread is about 35 basis points (22% relative to the sample mean) higher when a new CEO takes office than three years into his tenure. Spreads on shorter-term CDS contracts exhibit an even larger sensitivity to CEO turnover and tenure. Spreads on loans and bond yield spreads also decline following CEO turnovers. These patterns occur regardless of the reason for the turnover; changes in spreads following turnovers that occur because of the death or illness of the outgoing CEO are not economically or statistically significantly different from changes in spreads in the entire sample.

The CEO, however, is not the only member of the management team that is relevant for decision-making in the firm. We examine the effect of Chief Financial Officers' (CFOs') turnovers as well. Our estimates indicate that, similar to CEOs, spreads on a firm's CDS and new debt decline over the first three years of its CFO's tenure, but the magnitude of the decline is smaller than that following CEO turnovers, especially if the CFO turnover is not accompanied by a CEO turnover.

The observed decline in default risk over tenure potentially reflects the resolution of uncertainty about management and hence a decline in management risk. To evaluate whether this interpretation is the appropriate one, we examine cross-sectional variation in the way that *ex ante* uncertainty gets resolved across CEOs and firms. In particular, Bayesian learning models imply that if the changes in spreads around CEO turnover occur because of changes in management risk, then when ex ante uncertainty about management is higher, spreads should increase more around management turnover and decline faster subsequently.

Consistent with this prediction, our estimates suggest that the increase in the CDS spread at the time of the CEO departure announcement, the change in the spread when the incoming CEO takes office, as well as the sensitivity of the spread to the new CEO's tenure, all depend on the amount of uncertainty there is about the new management. For example, the increase in CDS spreads at the announcement of a CEO departure when the firm does not have a presumptive replacement is almost three times as high as when there is such an "heir apparent." The revelation of the new CEO's identity leads to smaller declines in spreads prior to the time when he takes over if the new CEO is younger than if he is older; presumably less is known about the young CEOs *ex ante* so less uncertainty is resolved when they are appointed. But once a younger CEO does take over, the market learns more about his ability from observing his performance, so the spreads decline faster.

In addition, when the CEO has an existing relationship with a lender before he takes his current job, the lender is likely to know more about the CEO's ability and future actions, leading to lower management risk. Consistent with this argument, we find that the sensitivity of interest rates to the CEO's time in office is 39-57% lower for loans in which the CEO has a prior relationship with the lender compared to those without such a relationship. This relation holds even if the CEO is an outsider and the relationship was built while he worked at a different firm, so the existence of the relationship is exogenous to the credit condition of the current firm. Further, any additional management-induced risk should have a larger impact on the default risk and the pricing of riskier debt than of safer debt. Consistent with this prediction, we find that the firm's spreads are more sensitive to CEO tenure when the firm is more highly levered, for term loans and for junior bonds. Overall, the cross-sectional evidence is consistent with the notion that the decline in spreads over executive tenure reflects the resolution of uncertainty about management.

Since uncertainty about management is likely to be idiosyncratic rather than systematic, it theoretically should not affect a firm's cost of debt (i.e., the expected return on debt). Accordingly, firms should not adjust the cost of capital they use for capital budgeting purposes because of management-related uncertainty. In addition, since variation in management risk appears to be relatively short-term, it is unlikely

to affect firms' long-term capital structure targets. However, since management risk increases the volatility of cash flows, it should increase the demand for precautionary savings. Consistent with this idea, we find that firms facing higher management risk tend to have higher cash holdings. In particular, cash holdings decline with executive tenure, but only for firms for which management risk is likely to be high.

Understanding the way management risk affects corporate default risk and the pricing of corporate debt has a number of implications. First, our study identifies an important yet unexplored source of corporate default risk and a potentially important determinant of the pricing of corporate debt. The corporate finance literature on corporate debt pricing has focused on variables intended to capture risks coming from economy-wide factors, or those correlated with the nature of firms' assets (see for example van Binsbergen, Graham, and Yang (2010)). A parallel literature in asset pricing models a firm's credit risk, usually again as a function of economy-wide factors and firms' assets. However, Collin-Dufresne, Goldstein, and Martin (2001) find that these traditional credit risk factors and liquidity measures fail to explain the bulk part of the credit spread changes. Our analysis suggests that models predicting credit risk could be meaningfully improved by including variables that capture management risk, such as the CEO's tenure and his background including his age and whether he is an heir apparent.

Second, our study suggests that the effect of management risk on corporate debt pricing can be used to quantify the relative value impact of different types of managers. For example, our estimates suggest that the impact on debt price from the uncertainty about CFO is about 40-66% of that from the uncertainty about CEO.[2] In addition, the fact that there is not a significant difference in the impact of tenure on spreads between insider and outsider CFOs, while there is a significant difference between insider and outsider CEOs, suggests that the managerial skills required by the CFO job are more general and transferrable than those required by the CEO job. These results complement prior studies using interview scores or employment history to infer the generality of managerial skills and their value impact (Kaplan, Klebanov, and Sorensen, 2012; Custodio, Ferreira, and Matos, 2013).

[2] A recent study that uses a similar approach to compare the relative importance of different types of directors is Stern (2015).

Third, our study highlights the importance of managing the management risk in a firm. Practices such as managerial succession planning and transparency in managerial policies can significantly reduce the firm's perceived default risk. Since 2009, the U.S. Securities and Exchange Commission has required that corporate boards significantly address the succession related issues as leadership voids or uncertainty could adversely affect companies.[3] Our findings support SEC's concern and suggest that creditors clearly care about management risk.

2. Data

2.1. The Risk of Corporate Debt

The price of corporate debt is in large part determined by the likelihood that the firm's future cash flows will be insufficient to cover the promised payments to debtholders. When management's policies become more uncertain, the firm's cash flow distribution becomes more dispersed, so the likelihood of default and the loss conditional on default are likely to increase. For this reason, we expect management risk to affect the firm's default risk premium.

One way to measure the default risk premium is through the CDS spread that is traded on a firm's debt. The payoff from the CDS contract occurs when the firm defaults on its debt, so the market clearing price on the CDS contract reflects the market's expectation that the debt will default. This default risk premium is also embedded in the promised yield on a firm's debt. Let r_D be the expected return on a firm's debt, *y* be the promised yield, *p* be the probability of default, and $r_{default}$ be the recovery rate in default. Then we have the following relation:

$$r_D = (1-p) * y + p * r_{default}$$
$$\Rightarrow y = r_D + \frac{p}{1-p}(r_D - r_{default}) \qquad (1)$$

[3] See the Securities and Exchange Commission's Division of Corporate Finance Legal Bulletin 14E, released on Oct. 27, 2009.

In other words, the promised yield equals the sum of the expected return on debt and a default risk premium. Uncertainty about a firm's management should affect the firm's idiosyncratic risk rather than systematic risk, since the uncertainty about an incoming CEO's skills are unlikely to co-vary with the overall state of the economy. Thus, management risk likely affects the promised yield through the default risk premium component. We measure the promised yield by the interest rate that the firm pays on its new loans, and the yield to maturity on its newly issued bonds.

2.1.1 The CDS Spread

To measure management risk, the CDS spread is particularly useful, because it provides a direct measure of the firm's default risk. Blanco et al. (2005) documents that the CDS and bond yield spreads are close to each other over long intervals, while over short intervals, CDS spreads tend to respond more quickly to changes in credit conditions. In addition, CDS spread data is available at the daily frequency, so they allow us to measure changes in risk over relatively short intervals. However, many firms do not have CDS contracts traded on their debt, and CDS data are only available since 2001.

Our CDS data are provided by *MarkIt*, a comprehensive data source that assembles a network of industry-leading partners who contribute information for about 2,600 CDS on a daily basis. Based on the contributed quotes, *MarkIt* creates a daily composite quote for each CDS contract. We use the five-year spreads in our main specifications because these contracts are the most liquid and constitute over 85 percent of the entire CDS market. But for robustness, we also use the one-year and three-year CDS spreads in some specifications. To maintain uniformity in contracts, we only keep CDS quotations for senior unsecured debt, which makes up over 91% of the entire CDS sample in *MarkIt*, with a modified restructuring (MR) clause and denominated in U.S. dollars.[4] The first section of Panel A of Table 1 reports the CDS statistics at the daily frequency over 946 CEOs' first ten years in office in 539 firms (the CEO sample is described in Section 2.2). The average 5-year CDS spread in our sample is 159 basis points (median 76).

[4] The Modified Restructuring clause was introduced in the ISDA standard contract in 2001. This clause limits the scope of opportunistic behavior by sellers in the event of restructuring agreement to deliverable obligations with maturity of 30 months or less. This clause applies to the majority of quoted CDS for North American entities.

2.1.2 Loan Spread Data

We retrieve data for bank loans occurring between 1987 and 2012 from *DealScan*, which is maintained by Thomson Reuters' Loan Pricing Corporation (LPC). This database contains detailed information on loans to U.S. corporations since 1987.[5] We match the borrowers to the firms in our sample using a procedure described in Chava and Roberts (2008).[6]

The second section of Panel A of Table 1 reports loan-level statistics for loans taken by our sample CEOs during the first ten years of their tenure. The 3,693 CEOs, from 2,316 firms, initiated 17,076 loans for which *Dealscan* reports non-missing spreads.

To measure the price of bank debt, we use the All-in-Drawn Spread (AIS) that the borrower pays over LIBOR at the loan origination date,[7] winsorized at the top and the bottom 1% of the *DealScan* sample distribution. The mean of the loan spreads in our sample is 158 basis points, and the median is 125 basis points. We also report summary statistics for other components of the bank loan contracts, such as loan maturity, loan size, number of lenders, number of loan covenants, whether the loan has performance pricing, whether the loan is secured, whether the borrowing company has a speculative grade when the loan was initiated, and whether the loan is classified as "refinancing" by *DealScan*. Detailed variable definitions are reported in the Appendix.

2.1.3 Corporate Bond Yield Spread Data

The corporate bond data are taken from the *Mergent Fixed Investment Securities Database* (*FISD*), a comprehensive database of publicly-offered U.S. bonds since 1987. *FISD* provides details on debt issues and the issuers. Our sample period is from 1987 to 2012. The third section of Panel A of Table 1 reports statistics for bonds issued during the first ten years of CEO tenure. There are 8,525 public bonds with available data on offering yield, which were issued by 2,135 CEOs from 1,433 firms.

[5] The data are primarily gathered from SEC filings, and the rest from direct research by LPC through contacts with borrowers, lenders, and the credit industry at large. Strahan (1999) provides a detailed description of the *DealScan* database.

[6] See http://wrds-web.wharton.upenn.edu/wrds/ds/linkingtable/index.cfm.

[7] This measure adds to the borrowing spread any annual fees the firms pay to the lenders.

To measure the bond yield spread, we use the offering yield of a corporate bond at issue minus the yield of the maturity-matched Treasury bond. We winsorize the spreads at the top and the bottom 1% of the entire *FISD* sample distribution. When the maturity of the bond for which the spread is calculated does not exactly match the maturity of the available government bonds, we use linear interpolation to estimate the yield of the risk-free benchmark. The average bond yield spread in our sample is 182 basis points (median 121). Summary statistics for other bond characteristics, such as bond maturity, offering size, and whether the bond is subordinated, are also reported in Panel A of Table 1.

2.2. CEO Turnover and Tenure

We construct a sample of CEOs from 1987 to 2010, since both the loan data and the bond data begin in 1987. We use the information on job title, the year becoming CEO, and the CEO annual flag provided in *ExecuComp*, to identify CEOs at the firm-year level, from which we identify whether there is a CEO turnover in a firm and year.[8] Panel B of Table 1 describes the distribution of turnovers over time in the loan, bond, and CDS samples.

For each CEO, the variable "*Tenure*" equals 0 for the fiscal year in which the CEO takes office, and increases with each year the CEO is in office. The average CEO's total time in office (see Appendix for definition) in our sample is 6.14 years and the median is 5 years. About 85% of the CEOs in our sample are long-term CEOs with total time in office no less than three years.

A challenge in drawing inferences in the CEO turnover setting is that the timing of CEO turnover can coincide with firm performance because CEOs are sometimes fired for performance-related reasons. Following Pan, Wang, and Weisbach (2015, 2016), we identify several subsamples of turnovers that are likely to have occurred for non-performance related reasons. The first group consists of turnovers caused by illness or death of the departing CEO. We combine CEO turnover announcements in Capital IQ's *Key*

[8] Although *ExecuComp's* coverage starts in 1992, some of the CEOs in the database took office before 1992, leading to some CEO turnovers from the late 1980s in our sample. In our main analysis, we examine CDS spreads during the first three years of CEO tenure. Since the CDS data starts in 2001, CEOs in the CDS sample took office later.

Developments with *Factiva* news search to identify a subsample of such turnovers.[9] Second, we combine the death/illness subsample with announced retirements. To mitigate the incidence of "suspicious" retirement announcements, we only include retirements for which the firm's stock performance in the year prior to the turnover is above the industry-year median. The third group consists of turnovers for which there is no change in the top management team (the top four most highly paid non-CEO executives) in the CEO turnover year, which are unlikely to be firings, since firings typically involve changes of other top managers in addition to the CEO. Fourth, because forced turnovers tend to be preceded by high stock return volatility or poor stock and accounting performances, we consider the group of turnovers that are preceded by both good performance (both stock return and ROA above industry-year median) as well as low idiosyncratic volatility (below industry-year median) since these turnovers are unlikely to have been motivated by performance.

Fifth, and more specific to the context in this study, we identify a subsample of turnovers that were not preceded by a significant run-up of default risk as reflected in the firms' CDS spreads in the prior two years. The idea is that a run-up of default risk before turnover could indicate performance-related turnovers. Specifically, for each firm with CDS data in our sample, we estimate the time trend in CDS spreads during dates [-730, -30], with date 0 being the day when the new CEO takes office. We include 185 turnovers with a negative or insignificantly positive pre-turnover CDS trend in this subsample.

Finally, we use the *Factiva* news search to identify turnovers that appear to be overtly forced (e.g., *Factiva* reported that the CEO was forced to leave or left under pressure). Panel C of Table 1 reports the number of turnovers in each subsample.

The incoming CEO's background is likely to be related to the amount of uncertainty about his ability. We identify two dimensions about the CEO's background that are potentially related to such uncertainty: the CEO's age and his prior position. The average age of the incoming CEO at the time of turnover in our sample is 51. We thus classify new CEOs who are younger than 50 at the time of turnover as "*Young CEOs*".

[9] We thank Edward Fee, Charles Hadlock, and Joshua Pierce for kindly providing us with the classification of illness, death related, and outright forced turnovers between 1990 and 2006 used in Fee, Hadlock and Pierce (2013).

Using information on the time of a CEO "joining company" from *ExecuComp*, supplemented by the data from *Boardex*, we classify CEOs who have been with the firm for less than three years when becoming CEO as "*Outsider CEOs*", and others as insider CEOs. We also follow Naveen (2006) and classify "*Heir-Apparent CEOs*" in our sample as executives with the title "president" or "chief operating officer (COO)" prior to becoming CEO. Panel C of Table 1 reports the number of turnovers that involve young CEOs, outsider CEOs, or heir-apparent CEOs.

2.3. Other Variables

To control for other factors that potentially affect the loan, bond, or CDS spreads, we include a set of firm characteristics and credit market conditions in our empirical specifications, mostly following Graham et al. (2008) and van Binsbergen et al. (2010). For credit market conditions, we control for three variables: "*Credit Spread*" is the difference between the yields of AAA and BAA corporate bonds; "*Term Spread*" is the difference between the yields of 10-year Treasury bonds and 2-year Treasury bonds; "*VIX*" is CBOE volatility index, which shows the market's expectation of 30-day volatility. The first section in Table 1, Panel D reports summary statistics for the three variables.

We obtain firm-specific variables from *Compustat* and winsorize them at the top and the bottom 1% of the distribution. The average firm in our sample has book assets of about $1.4 billion, 0.24 book leverage, a market-to-book equity ratio of 2.9, an asset tangibility ratio of 0.28, cash flow volatility of 0.56, ROA of 0.11, and dividend payout ratio of 0.22. The second portion of Panel D of Table 1 reports summary statistics for these firm-specific measures, as well as other financial variables. The Appendix presents detailed definitions of all variables.

3. Measuring Variation in Default Risk around Management Changes

3.1. CDS Spreads over CEO Tenure

To evaluate whether uncertainty about a new CEO's ability and policies affects the market's expectation of a firm's default risk, we first examine the way in which firms' CDS spreads change over CEO

tenure. Since CDS spreads provide a market-based assessment of the likelihood that the firm will default on its debt at any point in time, the way they vary over a CEO's tenure measures changes in expected default risk premium over this period.

Figure 1 plots the average CDS spread around key events associated with the evolution of the uncertainty about a new CEO. It is constructed using the 284 CEO turnovers of firms with available CDS data, and for which the departure announcements of the outgoing CEOs occurred on different dates from the dates when the incoming CEOs took office. When the departure is announced, the CDS spread increases by almost 35 basis points relative to the average spread in the prior three months, likely reflecting the increase in the uncertainty about the management. The spread subsequently decreases by about 15 basis points when the new CEO is announced, indicating that part of the uncertainty about the management is resolved by the knowledge of the incoming CEO's identity. The changes in expected default risk over the relatively short window when the information about the CEO succession is being revealed suggest that the CEO himself has a major impact on the market's perception of the firm's default risk. Because of the steep increase in spreads around the time of the CEO change, it seems unlikely to be driven by turnovers tending to occur at times of high risk, the source of which could be unrelated to management.

The spread decreases only slightly between the time the identity of the incoming CEO is announced and when he takes office. During his first three years of office, it declines by another 23 basis points. This decline in the early portion of his tenure likely occurs because of the resolution of uncertainty about the CEO's ability and policies.

Figure 1 suggests that spreads tend to follow an inverted U-shaped pattern around CEO turnovers. However, while the company's proxy statements usually disclose the date when the CEO takes office, it is not always possible to know the exact date when a CEO's departure is announced and when the identity of his replacement becomes known to the market. For this reason, we focus most of our analysis on the period following new CEO's appointment, by measuring the way a firm's managerial-related risk changes over his time in office. We do, however, analyze pre-turnover changes in spreads in Section 4.

To estimate the way in which CDS spreads are affected by the resolution of uncertainty about the CEO's ability in the first few years of his tenure, we estimate the following equation:

$$CDS\_Spread_t^{ij} = f(Tenure_t^{ij}) + \alpha^{ij} + \lambda_t + Controls_t^{i} + \varepsilon_t^{ij} \quad (2)$$

The variable "$Tenure_t^{ij}$" is CEO-*j*'s time in office in firm-*i* in year *t*. To capture potential nonlinearities in the tenure-spread relation, we use a piecewise-linear (spline) specification that allows the relation to change over time. The variable α^{ij} is a firm-CEO fixed effect for firm *i* and CEO *j*; its inclusion implies that we identify the effect of managerial uncertainty from the time-series variation in CDS spreads *within* a particular firm-CEO pair. This approach, therefore, controls for any time-invariant differences cross firm-CEO pairs. The variable λ_t is the calendar year fixed effect, which controls for market-wide factors that affect firm-level default risk. Time-varying controls include the debt recovery rate as reported by data distributors, firm-specific financial variables, as well as measures of credit market conditions such as the aggregate credit spread, term spread, and the VIX index.

Table 2 reports estimates of this equation. Column (1) presents estimates for all CEOs in our sample, regardless of how long they stayed in office. We estimate these equations on the period between the year when the CEO took office and the tenth year of his tenure. These estimates indicate that a firm's CDS spread declines by 0.032 basis points for each day in the CEO's first three years in office. Over the first 1095 calendar days (three years), the total decline amounts to 35 basis points, which amounts to 46% of the sample median CDS spread of 76 basis points (22% of the sample mean of 159). The speed of decline in the CDS spread becomes statistically insignificant and small in magnitude after the first three years.

In Column (2) we focus only on the first three years of CEO tenure for CEOs who stay in office for at least three years, and use a linear specification of tenure. In this specification, we exclude short-term CEOs (e.g., interim CEOs, turnaround specialists, and CEOs that departed very quickly), so that our estimates will not be affected by the unbalanced nature of the panel. The resulting estimates imply that the firm's CDS spread declines by 0.031 basis points per day during this time period, suggesting that firms' default risk is higher when there is a new CEO, and declines over time as the CEO's quality, as well as the policies he is

likely to pursue, becomes known over time. In addition, the magnitude of such decline during the first three years is very similar across the full sample of CEOs (Column (1)) and the long-term CEOs (Column (2)). Thus, including or excluding CEOs with less than three years' of tenure does not appear to affect our estimates of the decline in default risk over tenure.[10]

If uncertainty about management and its resolution are most pronounced in the first three years of a CEO's tenure, then we expect the spreads on shorter-term CDS contracts to be even more sensitive to the changes in management risk around CEO turnover than longer-term CDS contracts. To test this conjecture, we replace 5-year CDS spreads with 3-year CDS spreads in Column (3) and 1-year CDS spreads in Column (4) of Table 2. Indeed, the CDS spread-tenure sensitivity increases to 0.05 for the 3-year spreads and 0.07 for the 1-year spreads, both of which are statistically significantly different from the coefficient of 0.031 on *Tenure* in Column (2). In the first three years of a CEO's tenure, the 1-year CDS spread on the firm's debt on average declines by about 77 basis points, 70% relative to the sample mean. Therefore, the estimates using the 5-year CDS spreads can be viewed as a conservative estimate of the effect of management risk on default risk premium.

3.2. An Alternative Interpretation: Endogenous Timing of CEO Turnover

An alternative interpretation of the declining default risk over CEO tenure is that CEO changes tend to occur at times of relatively high uncertainty that is unrelated to management, leading to heightened default risk around CEO changes. To isolate the way that uncertainty about the incoming CEO varies over time and its effect on a firm's risk, we consider cases of "normal" turnovers, in which the CEO turnover is not driven by heightened uncertainty about the firm's fundamentals. In subsection 2.2, we describe a number of subsamples of such turnovers.[11]

In Table 3, we report estimates of Equation (1) on subsamples constructed by the likely reason for the turnover of the outgoing CEO. These estimates suggest that the decline in the spreads on the firm's CDS

[10] In unreported robustness tests, we use the monthly average CDS spreads instead of the daily data. The results are essentially the same as those reported in Table 2, with CDS spreads declining by about 1.1 basis points per month during the CEO's first three years.

[11] Pan, Wang, and Weisbach (2015) document that there is no abnormally poor performance or high idiosyncratic volatility prior to each of these subsamples of turnovers.

over CEO tenure occurs regardless of the factors leading to the CEO turnover. The estimated magnitude of decline in CDS spread is similar across subsamples of likely non-performance-driven turnovers (Columns 1-5), as well as in the union of the subsamples in Columns (2) to (5) (Column 6). In each specification the estimates suggest that there is a significant decline of CDS spread over CEO tenure.

In each of these subsamples, there are substantially fewer observations than in the full sample, so standard errors are higher and statistical significance levels are lower. For example, in the health/death subsample presented in Column (1), there are only 10 turnovers, corresponding to 5,928 trading days, about 2% of the 270,124 trading days used in the comparable specification in Table 2 for the full sample. Yet, the coefficient for the health/death subsample (-.037) is comparable to that for the full sample (Column (2) of Table 2, -.031), and is still significantly different from zero at the 10% level. Moreover, the p-value from a Wald test on the difference between the estimated coefficient on *Tenure* in Table 2, Column (2) and the estimated coefficient on *Tenure* in Table 3, Column (1) is 0.954, rejecting the hypothesis that the two are significantly different. The robustness of the decline over tenure regardless of the underlying reasons for turnovers suggests that it is unlikely that the negative coefficient on tenure in the full sample is generated by the endogenous timing of CEO turnover.

In contrast, for the outright forced turnover sample (Column 7), the estimated decline in CDS spread is about 0.132 basis point per day, which is about four times as large as it is for the other turnovers, and is statistically significantly different from the coefficient for the full sample. Since outright forced turnovers tend to follow poor firm performance and high volatility, the estimated larger decline could reflect relatively high uncertainty at the time of the turnover about both the firm's fundamentals and the new CEO.[12]

3.3. CEO Tenure and Interest Rates on Firms' Debt

3.3.1. Loan Spreads over CEO Tenure

If declining management risk is the reason for the decrease in CDS spreads over tenure, then this declining management risk should also affect the promised interest rates on the firms' debt. To test this

[12] In the Internet Appendix IA.1, we also address the possibility that the decline in CDS spreads is driven by increases in expected CEO ability over CEO tenure rather than decreases in the uncertainty about CEO ability.

hypothesis, we estimate the way that the spreads on newly-initiated loans vary over CEO tenure, using the specification in Equation (1) with CDS spreads replaced with the "all in drawn" spreads on the loans. When we estimate this equation, we add a number of controls for loan characteristics. In particular, we include the loan size, maturity, number of lenders, and dummy variables indicating whether the loan uses performance pricing, loan purposes, and tranche types. During the first three years of CEOs' tenure, firms initiate 1.6 loans on average (median is one loan) per year, and about 39% of new CEOs' firms only took one loan over the first three years of the CEO's tenure. To avoid having to eliminate these observations, we use firm fixed effects instead of firm-CEO fixed effects in the loan equations and control for firm life cycle effects by including firm age into the equation. Finally, since loan spreads are observable only when a new loan is initiated, we use annual rather than daily data, so the resulting coefficients have to be adjusted accordingly to compare magnitudes across specifications.

These estimates are reported in Panel A of Table 4. Column (1) documents that loan spreads decrease with CEO tenure. The speed at which loan spreads decrease declines over time, with the fastest decrease occurring in the first three years. The estimated coefficients imply that loan spreads decline 6.5 basis points per year, amounting to about 20 basis points over the three-year period. Column (2) reports the estimates over the CEO's first three years in office for the subsample of CEOs who stay in office for at least three years, which are of a similar magnitude to those reported in Column (1). Column (3) contains estimates using the subsample of likely non-performance driven turnovers (the union of rows (2)-(5) in Panel C of Table 1); these estimates imply that following these turnovers, the loan spread a firm pays declines by 5.2 basis points per year.[13]

One difference between the results using CDS spreads and loan spreads is that we observe a firm's CDS spread every day but observe its loan spreads only when a firm initiates a new loan. Therefore, it is possible that the results could be influenced by the endogenous timing of loan initiation. One approach to assessing the importance of this potential bias is to consider the set of firms for which the loan represents a

[13] Because of the relatively small number of observations with loan data, we pool the different subsamples of likely non-performance related turnovers together to calculate the estimates reported in Column (3).

refinance, rather than a new capital raising, using *DealScan's* classification (the variable "Refinancing Indicator") to identify refinancings. The equation estimated on refinancing loans only is presented in Column (4) of Panel A of Table 4. These estimates are similar to those estimated on the entire sample, and indicate that there is a statistically significant decrease in loan spread of 5.1 basis points on refinancing loans in each of the first three years of CEO tenure.[14]

Although the pattern in the loan spread is similar to that in the CDS spread around CEO turnovers, the magnitude of the decline in spread is much smaller in the loan sample (20 basis points in three years) than in the CDS sample (35 basis points). The difference in these estimated effects potentially occurs because firms in the CDS sample are on average much larger than those in the loan sample, with the CDS sample having an average book assets equal to $10.3 billion, compared to only $2.38 billion in the loan sample. Larger firms tend to be more transparent due to more disclosure, more analyst coverage, and more media coverage. This greater transparency likely facilitates market learning about the new management, leading to a faster resolution of uncertainty and a faster decline of spreads over CEO tenure. In fact, in an untabulated test, we find that firms with book assets in the top quartile of the loan sample distribution have an estimated 31-basis-point decline in loan spread in the first three years of a CEO's tenure, close to the decline in CDS spread.

3.3.2. Bond Yield Spreads over CEO Tenure

The major alternative corporate debt instrument to a bank loan is a corporate bond. Since management risk should affect the pricing of all corporate liabilities, we also test the hypothesis that the perceived default risk and hence promised yields on issuances of corporate bonds decline with the tenure of firms' CEOs. To do so, we estimate equations similar to those for bank loans using the promised yield spread on a firm's corporate bonds as our dependent variable.

[14] Besides the loan spread, we also observe information on other non-price terms of the loan contracts such as the loan maturity, loan size, number of lenders, whether the loan is secured or not, and the number of loan covenants. The results are reported in Table IA.2 of the Internet Appendix. The main difference in non-price terms over CEO tenure is that bank loans originated earlier tend to have significantly shorter maturities than those originated later.

Panel B of Table 4 presents estimates of this equation. These estimates indicate that CEO tenure has a similar effect on promised bond yields as it does on CDS spreads and loan spreads. Column (1) presents the spline specification using the entire sample. The estimates in this column imply that, as with spreads on CDS and loans, bond yield spreads decline in a convex manner over the CEO's tenure. Column (2) restricts the sample to the first three years of tenure for CEOs who remain on the job that entire period, and reports a negative effect of tenure on spreads. Finally, Column (3) further restricts the sample to those CEOs following the likely "non-performance related" turnovers (the union of rows (2)-(5) in Panel C of Table 1) and again finds a negative relation between tenure and spreads. The coefficients on tenure range between 7.5 and 9.6 basis points per year, so they imply that over the three-year period, yield spreads decline between 23 and 29 basis points. This rate of decline over tenure is slightly steeper than it is for loans and less steep than it is for CDS.

3.4. Uncertainty about Management Teams: The Role of the CFO

The analysis to this point has focused on the way that the uncertainty about incoming CEOs' abilities and policies affects firms' default risks. The underlying assumption is that the CEO plays an important decision-making role in the firm, so that when the person occupying this position changes, policies can change. However, the CEO is only one member of the management team. Presumably, when top managers other than the CEO change, there is also an increase in uncertainty about future policies, although potentially a smaller one than when the CEO changes.

One important member in the senior management team is the Chief Financial Officer (CFO). We examine whether a change of CFO has a similar effect on the perceived default risk as a change of the CEO. We focus on the CFO rather than other members of the top management team because US firms almost always have one and only one individual with that title, so it is straightforward to identify changes in the individual holding that position. While there is an extensive literature on the importance of CEOs, we know little about the relative importance of CFOs, as well as the differences in the skills required for these two jobs.

The effect of management risk on corporate debt pricing can be used to quantify the importance of learning about managerial ability for different managerial roles.

We collect CFO turnover data from corporate news announcements in the Capital IQ database from 2001 to 2009.[15] We exclude transitory CFOs who stayed in the job for less than 3 years. This process leads to a sample of 1,033 CFO turnovers in 908 firms during the 2001-2009 period with CDS or loan or bond spread information, summarized in Panel A of Table 5. In this sample, the average CFO spends four years in office and the median is 3.4 years. In addition, outsider succession is more common in the CFO sample (37%) than in the CEO sample (28%), consistent with data reported by Mian (2001).

In Panel B of Table 5, we estimate the relation between the firm's CDS spread and the CFO's time in office, using the same specification as in Table 2. Column (1) contains estimates implying that the CDS spread declines by a statistically significant 0.027 basis points per day during the first three years of a new CFO's tenure. During the subsequent 3 years, the decline is just 0.004 basis points per day, which is not statistically significantly different from zero. Column (2) restricts the sample to the first 3 years of a CFO's tenure, and finds a similar decline in CDS spreads of 0.022 basis points per day.

An issue in interpreting these results is that many CFO turnovers coincide with CEO turnovers; declines in spreads following these cases likely reflect uncertainty about both managers, and possibly others as well if there is a large change in the top management team. For this reason, we reestimate this equation on the subsample of CFO turnovers accompanied by a CEO change within a year before or after the time of the CFO change (Column (3), 311 turnovers), as well as on the subsample for which there was not a CEO change within this two-year period (Column (4), 722 turnovers).

In each subsample, the firm's CDS spread significantly declines with CFO's tenure, but the magnitude of the estimated coefficient on tenure is much smaller on the subsample of CFO changes without CEO changes (-0.017 in Column (4)) than for the subsample in which there is both a CEO change and a CFO

[15] We do not use *ExecuComp* to identify CFO turnovers because there is no reliable indicator for CFOs in the pre-2007 data and there is no information on the time that a new CFO takes office. For the firm-years between 2007 and 2009, we have verified that the two data sources are consistent in 86% of observations.

change (-0.059 in Column (3)). The difference between the two estimates is statistically significant at 1% level. For further comparison, in the subsample for which there is a CEO change without a CFO or other top management change, the estimated coefficient on tenure is -0.035, which is between these two estimates (see Table 3, Column (3)), and is significantly more negative than the coefficient on tenure for the subsample of CFO changes not accompanied by CEO changes (-0.017). Since the CEO is the most important officer, uncertainty about his ability affects firms the most, but uncertainty about the CFO matters as well. Not surprisingly, when both officers change at the same time, the decline in spreads with tenure is the largest, most likely because these cases are associated with the greatest managerial uncertainty at turnover.[16]

As with CEO turnovers, another possible explanation for the spread/tenure relation is that both the CFO turnover and the higher default risk could be driven by factors unrelated to management risk, which is more likely when the turnover is due to poor firm performance. For this reason, we consider the subsample of 43 CFO turnovers that are not accompanied by CEO turnovers and follow the death, illness, or retirement of the departing CFOs when the firm is performing well. The estimates using this subsample are presented in Column (5) of Table 5. The results indicate that in this subsample, we still observe a significant CDS spread decline over the CFO's first three years of tenure. The magnitude of the decline (0.021 basis points per day) is close to the full sample estimate (0.022 basis points per day). Consequently, it does not appear that the observed decline in default risk over the first 3 years of a CFO's tenure occurs because of the management changes occurring at times of high uncertainty unrelated to management. Instead, the results suggest that uncertainty about his ability or future actions generates incremental default risk.

In Panel C of Table 5, we examine the relation between the firm's loan and bond yield spreads and the CFO's tenure. We find that the loan spread tends to decline by 5.3 basis points per year and the bond yield spread tends to decline by 6.2 basis points per year in the CFO's first three years in office. These declines are statistically significant, but, similar to the pattern from CDS spreads, smaller than those reported in Table 4 following CEO turnovers.

[16] This finding is consistent with the findings in Bennedsen et al. (2013) based on managers' hospitalization records that CEOs are more important to firm value than other top executives.

Overall, the results in Tables 2-5 suggest that there is a substantial, statistically significant decrease in the default risk of a firm's debt over the CEO's and the CFO's tenures, reflected by the firm's CDS spread, the spreads on its bank loans, and the yield on its corporate bonds. The decrease is fastest in the chief executives' first three years in office. This decline does not appear to come from executive turnovers occurring in periods when non-management related uncertainty is high. Just as it would for other sources of uncertainty about the firm, the market raises the default risk premium on the firm's debt when management's ability or policies are unknown.

4. Cross-Sectional Differences in the Change in Default Risk

Cross-sectional variation in the sensitivity of spreads to executive turnover and tenure provides a way to confirm that the decline in spreads over CEO tenure does in fact reflect the resolution of managerial uncertainty. In particular, if the increase in spreads following management changes reflects uncertainty about the ability and policies of the new management, then when this uncertainty is higher, there should be a larger increase in spreads around the time of the turnover. In addition, there should be a larger subsequent decline as the uncertainty becomes resolved.

4.1. CEO Background and Prior Uncertainty about the CEO

Different types of CEO successions and different types of CEOs are likely to be associated with different amounts of uncertainty about the new management. For example, the existence of an "heir apparent" usually indicates a well-anticipated succession, with an incoming CEO of known ability and a continuation of the prior CEO's policies. In contrast, appointments of outsider CEOs are likely to lead to more uncertainty about the quality of the match with the new firm or future policies, and consequently, more uncertainty about future cash flows. In addition, the market will tend to know less about younger managers who are appointed to be CEOs, since they tend to have shorter job histories and less visibility than older incoming CEOs. For this reason, the market is likely to have a more diffuse prior about younger incoming CEOs than older ones.

4.1.1. Evidence from Prior to the Arrival of the New CEO

While we have focused mostly on the declines in risk subsequent to the appointment of a new CEO, Figure 1 suggests that there are a number of components to the change in CDS spreads around a CEO turnover: CDS spreads increase at the announcement of a CEO's departure, decline to some extent when the new CEO's identity is revealed, and then decline further after the new CEO takes office. If the changes in CDS spreads are caused by uncertainty about the new management, then the magnitude of each of these changes should depend on how much uncertainty about the new management ex ante. We test this hypothesis and present the results in Table 6.

Panel A of Table 6 considers the increase in CDS spreads at the announcement of CEO departures. In the 432 CEO turnovers in our sample with CDS spread data and identifiable CEO departure announcement dates, the CDS spread increases by an average of about 41 basis points at the departure announcement, relative to the average in the three months prior to the announcement month. However, for the turnovers for which the firm has a designated heir-apparent and thus presumably lower uncertainty about the incoming management, the CDS spread increases by only 19 basis points, statistically significantly lower than in cases where there is no heir-apparent (54 basis points). This comparison reflects the difference in the *uncertainty* rather than the *expectation* of the incoming management's ability, since the identity of the new CEO has not been announced in most of these cases.

CEO departures occurring because of the death or illness of the CEO often occur unexpectedly. Therefore, these turnovers are likely to be associated with high uncertainty about the incoming management. In the ten such cases in our sample, the CDS spread increases by an average of 53 basis points, which is statistically significantly higher than for the rest of the turnovers. Forced turnovers tend to occur at times of high uncertainty. However, the average increase in CDS spread is 43 basis points at the time of announcements, which is not significantly higher than in other CEO turnovers. One potential reason for the lack of a difference for forced turnovers is that in these cases CDS spreads are likely to have already been relatively high prior to the announcement of the forced CEO turnover.

Panel B of Table 6 presents statistics on the change in CDS spread between the departure of the outgoing CEO and the arrival of the incoming CEO. Since part of the uncertainty about the new management (e.g., the new CEO's identity) is resolved during this period of time, we expect the firm's CDS spread to decrease. In the 284 CEO turnovers in which the announcement of the outgoing CEO's departure and the arrival of the new CEO occur on different dates, we find that, following the rise at the announcement of the departure, the CDS spread on average declines by 18 basis points by the time that the new CEO takes office. This decline equals 51% of the rise in spread (35 basis points) at the CEO departure announcement for this sample. If the initial rise in spread reflects the total additional uncertainty brought on by the imminent arrival of new management, then about half of such uncertainty gets revolved by the time the new CEO takes office.

Cross-sectionally, when there is more remaining uncertainty about the incoming CEO's ability, the decline in spreads between the departure announcement and the time the incoming CEO takes over should be smaller. To evaluate this hypothesis, we compare the declines between cases where the incoming CEO is hired from outside the firm and those in which the incoming CEO is promoted from within. When the CEO is hired from outside, the uncertainty about the quality of match between the firm and the new CEO could still be high even after the new CEO's identity is revealed. In contrast, when the firm hires an insider, much of the uncertainty should be revealed by the announcement of this hiring.

In our sample, the CDS spread declines by an average of 16.5 basis points, or 35% of the initial spread increase, between the time of the outgoing CEO's departure and the beginning of the replacement's tenure, when the replacement is an outsider. In contrast, when the incoming CEO is an insider, the spread declines by 18.5 basis points, or 62% of the initial rise in this subsample. Similarly, we find that for younger new CEOs (younger than 50 when taking office), only 38% of the initial spread rise is reversed by the time of the new CEO's inauguration, while for older new CEOs, the fraction is 58%. These differences in magnitudes across turnovers suggest that the pattern of increases and subsequent decreases in CDS spreads around the time of CEO turnover does occur because of the market's uncertainty about the CEO and his future actions.

4.1.2. Evidence from after CEO Turnover

The results in Panels A and B of Table 6 suggest that uncertainty about a new CEO's ability when he takes office is lower for heir-apparent CEOs, and higher for outsider CEOs and younger CEOs. Learning models such as Pastor and Veronesi (2003) predict that learning should be faster when prior uncertainty about ability is higher (see Hermalin and Weisbach (2014) for applications of this idea to governance). A consequence of a faster learning speed is that post turnover, the perceived default risk (and thus CDS spreads) should decline at a higher rate when there is more prior uncertainty about the CEO's ability.

In Panel C of Table 6, we examine whether the sensitivity of CDS spreads to tenure is larger when the uncertainty about the incoming CEO when he takes office is larger. Column (1) includes a term interacting tenure with a dummy variable indicating that the new CEO is not an "heir-apparent". The results suggest that the spread-tenure sensitivity is largely concentrated in non-heir-apparent CEOs. For heir-apparent CEOs, the spread-tenure slope is negative but close to zero, indicating little ex ante uncertainty about them when they take office.

Column (2) presents estimates of a similar equation including a term interacting tenure with a dummy equal to one if the incoming CEO is an outsider. The effect of tenure on CDS spread for outsider CEOs (- 0.079) is substantially and significantly larger than that for insider CEOs. Similarly, Column (3) presents estimates including an interaction term for young (under 50 years old) CEOs. The results indicate that the coefficient for young CEOs is statistically significantly larger than for older CEOs. All these results suggest that the firm's CDS spread is more sensitive to CEO tenure when there is higher prior uncertainty about the CEO.

A potentially important distinction between CEO and CFO is that a CFO's skills, such as experience with financial reporting, tax, and making accounting judgments, are typically more general and transferrable across firms than a CEO's skills.[17] The generality of CFOs' skills could be one reason why we observe more

[17] Ralph Bender, CFO of the Manship Media Group, for example, suggests that a successful CFO should be a technical generalist, rather than specializing in one area: "The key to being a successful CFO is not so much knowing everything, but knowing a little bit about a lot of things, trying to stay abreast of these things." (see Lamoreaux (2009))

outsider successions for CFOs than for CEOs. Comparing the market learning processes for insider and outsider CFOs can also shed light on the degree of generality of managerial skills required by the CFO job. In Column (4) of Table 6, Panel C, we find that the CDS spread to tenure sensitivity is not significantly different between insider and outsider CFOs, suggesting that the prior uncertainty about a new CFO's ability is similar regardless of his succession origin. This finding is different from what we report for insider and outsider CEOs, consistent with the idea that CFO skills are more general than CEO skills.

In summary, the cross-sectional evidence from both the CEO turnover process and the post-turnover time in office suggest that a firm's default risk and CDS spread react to changes in the amount of uncertainty about the new management. Alternative interpretations such as endogenous CEO turnover timing or changes in firms' fundamentals are unlikely to consistently explain these cross-sectional findings.

4.2. Prior Relationships with Lenders

We have presumed to this point that all suppliers of debt capital have access to the same information about the firm's management, so that all have the same assessment of the CEO or CFO's ability or policies at each point in time. However, it is possible that some lenders do in fact have better information about the CEO and the firm than other lenders. This informational advantage underlies the literature on relationship banking, which suggests that a long-term relationship between firms and lenders reduces asymmetric information and consequently the spreads that firms pay on loans.[18] If part of the asymmetric information that contributes to the spread differences between relationship and non-relationship based loans is about the management of the borrowing firm, then the existence of a personal relationship between the manager and the lender should reduce this information asymmetry. Consistent with this idea, Karolyi (2015) finds that firms are more likely to choose the lenders that have a personal relationship with their new executives after executive turnovers. To the extent that such a personal relationship lowers the amount of prior uncertainty

[18] This literature began with Rajan's (1992) analysis. Petersen and Rajan (1994, 1995), Berger and Udell (1995), Schenone (2010), Bharath et al. (2007, 2011), and Karolyi (2015) all document that relationship-based loans have lower spreads than otherwise identical loans in which there is not a prior relationship between the firm and its lender. These studies also suggest that the loan market is competitive enough that the benefit from reduced information asymmetry is at least partly passed onto the borrower.

about the new management from the perspective of a lender, we consider the possibility that it reduces the sensitivity of loan spreads to the manager's time in office.

To test this prediction, we rely on *DealScan* data, together with information on executive job changes from *ExecuComp*, from which we can measure whether a CEO worked for a firm that previously took a loan from a particular lender. We construct an indicator variable "*Prior CEO-Lender Relationship*", which equals one if at least one of the lead bank(s) of the current new loan was a lead bank in a loan of the CEO's employer in the five years before he became the CEO of the current firm, and zero otherwise. We expect such a prior relationship to reduce the lender's initial uncertainty about the new CEO's ability, leading to lower sensitivity of spreads to the new CEO's tenure. The interpretation of this variable depends on whether a CEO was an internal or external hire; for internal hires, the prior relationship would exist whenever the current firm had taken a loan with the lender, while with an external hire, it would exist if his *prior* firm had taken the loan. Panel A of Table 1 reports summary statistics of this variable.

We estimate the way in which the effect of tenure on loan spreads varies with previous lending relationships in Column (1) of Table 7, focusing on the first three years of a CEO's tenure. The estimated direct effect of CEO tenure on loan spread is -10.396 and is statistically significant, while the interaction effect between CEO tenure and prior CEO-lender relationship is 6.543 and also is statistically significant. These estimates imply that when there is no prior relationship, the spread declines by about 10 basis points per year of CEO tenure. However, the existence of a prior relationship between the new CEO and the lead bank(s) reduces the spread-tenure sensitivity by about 63% (=6.543/10.396).

The estimates using our full sample pool CEOs who were internal hires together with those who were external hires. For each case, the prior lending relationship likely resolves some uncertainty perceived by the lenders. However, when the new CEO is an internal hire, a prior relationship with the lender(s) reduces uncertainty about both the current firm and the CEO, while when the new CEO is an external hire, a prior relationship reduces only uncertainty about the CEO. To isolate the extent to which the personal

relationship with the lender leads to lower uncertainty perceived by the lender about the management, we re-estimate this equation on the subsample of CEOs who were hired from outside the firm.

Column (2) reports the estimates for the subsample of outsider CEOs. The direct effect of tenure is much larger in absolute magnitude here than in Column (1) (-17.655 vs. -10.396), because there is more uncertainty about outsider CEOs. The interaction effect is 7.711, which implies that if the incoming outsider CEO has worked with the lender before joining the current company, then the loan spread is 44% (=7.711/17.655) less sensitive to the new CEO's time in office. Thus, a personal relationship between a CEO and a lender, even if it occurs prior to the CEO joining his current firm, leads to less uncertainty perceived by a lender, and consequently lower sensitivity of spreads to CEO tenure.

In Columns (3) and (4), we repeat this exercise for CFOs. Similar to the estimates for CEOs, the existence of a prior relationship between the CFO and the lender(s) significantly reduces the sensitivity of the firm's loan spreads to the CFO's time in office by 52% for the full sample of CFOs (=4.257/8.222) and 31% for outsider CFOs (=4.321/14.122). The magnitude of this sensitivity for CFOs is smaller than for CEOs, consistent with the view that uncertainty about firm-CEO match quality is more important than that about firm-CFO match quality, as CFOs' ability is more general and transferable.

Overall, the results in Tables 6 and 7 suggest that the CDS spread and loan spread to tenure relations are affected by the amount of prior uncertainty about the new CEO. This pattern is consistent with the argument that the declining interest rate over CEO tenure is driven by the decrease in the amount of uncertainty about the new management over time.

4.3. The Risk of the Debt Claim

Another cross-sectional prediction is that the effect of management uncertainty should be larger when the debt is more risky. When the firm is closer to default, the incremental effect of any additional risk on default probabilities is higher. For this reason, default risk premiums should be more sensitive to CEO tenure for speculative grade issuers than for investment grade issuers, for highly levered issuers than for moderately levered issuers, and for subordinated debt than for senior debt.

We evaluate these predictions in Table 8. In Column (1), we re-estimate the CDS equation from Table 2, Column (2), but also include interaction terms between tenure and a dummy variable indicating whether the firm has a speculative credit rating (below BBB-) at the time of the turnover, and between tenure and a dummy variable that equals 1 if the firm's leverage ratio is in the top quartile of the sample distribution (above 36%) at the time of turnover.[19] The coefficient on the interaction with "Speculative Grade" is close to zero and insignificant, but the coefficient on the interaction with high leverage is negative, large in magnitude, and significantly different from zero. The sensitivity of CDS spread to CEO tenure in highly leveraged firms more than doubles the level in moderately leveraged firms.

In Columns (2) and (3), we estimate a similar equation for the loan and bond samples. For the loan equation, we also compare term loans and lines of credit, since term loans are more risky for banks than are lines of credit. Similarly, for the bond equation, we compare subordinated bonds and senior bonds.[20,21] The estimates presented in Column (2) document that loan spreads are significantly more sensitive to CEO tenure for highly leveraged firms and for term loans. Similarly, Column (3) shows that the bond yield spreads are significantly more sensitive to CEO tenure when firms are highly leveraged and bonds are more junior. Overall, tenure-spread sensitivities appear to be higher when debt is more risky.

In summary, the cross-sectional evidence about the relation between the spreads on the firm's debt and its CEO's time in office is consistent with the view that the observed decline in spreads over tenure is driven by a reduction in uncertainty about management. The default risk implicit in the pricing of the firm's debt appear to be more sensitive to CEO tenure when there is higher prior uncertainty about the CEO's

[19] In the firms with speculative grades in our loan sample, the majority (more than 96%) have an issuer credit rating between BB- and B, so the vast majority of our sample firms are not in default.

[20] Almost all of the loans in our sample are senior, so we cannot consider the effect of seniority using the loan sample.

[21] The other differences in the specifications between the columns come from the features of the different markets. For firms with a traded CDS, we have daily values for the CDS, so we estimate our equation using daily data. With daily data, we choose to include firm-CEO fixed effects, so the direct effects of speculative grade and high leverage cannot be estimated since these firm characteristics are measured at the time of each turnover. Using the loan and bond data, we only have one observation for each time a firm takes out a loan or issues a bond, so we measure tenure in years and use firm fixed effects rather than firm-CEO fixed effects, and the direct effects of firm characteristics such as speculative grade and high leverage can be estimated because a firm may have multiple turnovers.

ability, when there is no prior relationship between the new CEO and the lender, and when the debt claim is more risky.

5. Implications of Management Uncertainty for Financial Management

When a new CEO takes office, the uncertainty about his ability and policies affects the total risk of the firm and therefore the interest it must pay on its debt. The additional risk is likely to be idiosyncratic rather than systematic since the uncertainty about an incoming CEO's skills is unlikely to co-vary with the overall state of the economy. For this reason, management risk should not affect the expected return on a firm's debt, and therefore should not affect its capital budgeting decisions. However, higher management risk will increase the likelihood of a cash flow shortfall and therefore increase the precautionary demand for holding cash.

To evaluate whether management risk does affect precautionary savings, we consider the way firms' cash holdings vary over their CEOs' first three years in office. In Panel A of Table 9, we estimate equations predicting firms' cash holdings as a function of its CEO tenure.[22] In addition to the controls employed in prior specifications, we also control for the uses of cash: actual investment expenditures (capital expenditures, acquisitions, change in net working capital), debt obligations (measured by leverage ratios), and dividend payouts. The estimated cash-tenure sensitivity therefore reflects the impact of CEO tenure on the firm's cash holdings, netting out the current uses of cash, so it should capture the impact of management uncertainty on precautionary savings.

The estimates in Column (1) indicate that cash holdings are highest when the firm has a new CEO, significantly decrease in the CEO's first three years, and do not vary with CEO tenure after the CEO has been in office for three years. Column (2) estimates imply that the cash to assets ratio decreases by about 0.3 percentage points per year, for a total of almost one percentage point over the first three years of CEO tenure. Given that the median cash to assets ratio in our sample is 7%, a one-percentage-point decline in cash ratio

[22] Cash holdings are defined as cash and short-term marketable securities normalized by the book value of assets. We obtain similar results if we exclude marketable securities when calculating cash holdings.

represents a 13% decline, a nontrivial drop. Column (3) documents that there is a similar decline in cash holdings over CEO tenure following turnovers that are not likely to be performance-motivated (turnovers that satisfy any of the criteria in Rows (2)-(5) of Table 1, Panel C). Similar to the decline in the spreads on debt, the estimated decline in cash over the first three years of tenure does not appear to be a consequence of CEO turnovers occurring at times of high non-management-related uncertainty.

If the decline in cash holdings over the first three years of CEO tenure occurs because of uncertainty about the new CEO, then this sensitivity should vary with the amount of uncertainty there is about the new CEO. Panel B of Table 9 presents tests of this hypothesis. The results suggest that when the prior uncertainty about the CEO is relatively high, i.e., the new CEO is young, not an heir apparent, or is an outsider, cash holdings are more sensitive to CEO tenure. The coefficients on the interaction between tenure and "Young CEO" (Column (1)), "Non-heir-apparent CEO" (Column (2)), and "Outsider CEO" (Column (3)) are all negative and significant, increasing the effect of tenure on cash ratios.

Overall, the results in Table 9 are consistent with the view that the additional cash holdings at the beginning of a CEO's tenure reflect precautionary savings, most likely because of incremental uncertainty during this period about management's future actions.

6. Conclusion

A central feature of financial markets is that the interest rate a firm pays on debt increases with the market's perception of the firm's risk. This risk occurs because of factors that affect the value of the firm's underlying assets, and also because of uncertainty about how these assets will be managed. Consequently, a rational market should incorporate managerial-generated uncertainty into its assessment of a firm's risk when pricing its securities. Holding constant a firm's fundamental risks, when there is more uncertainty about a management team's abilities or its future choices of actions, creditors should increase the interest rates they charge the firm. This paper provides evidence that such management risk is an important component in the pricing of corporate debt.

Uncertainty about management is likely to be highest when there is a new management team and decreases over time as the new management's strategies, talent, as well as the quality of the match between the manager and the firm, become better known to the market. Our empirical analysis suggests that CDS spreads on a firm's debt, loan spreads at origination, and the bond yield spreads at issuance are all significantly higher when the firm's CEO and/or the CFO are new in office, than when they have been in office for three years. This pattern persists regardless of whether the turnover occurred for non-performance-related reasons or not. The sensitivity of the borrowing cost to CEO tenure is more pronounced when the prior uncertainty about the manager is higher: if the CEO is not an heir-apparent, is an outsider, is younger, or has no prior relationship with the lender(s). Finally, we also find that firms adjust their financial management policies as a response to changes in management risk around CEO turnovers. In particular, firms tend to hold more precautionary savings when they face higher management risk.

Overall, our study suggests that uncertainty about management affects firms' default risk and consequently the pricing of their debt. Such an observation has implications for management as well as for financial markets. First, management risk should affect the way that academics and practitioners model credit risk. Such models could be meaningfully improved by explicitly incorporating managerial characteristics likely to be associated with the market's uncertainty about the policies the management will adopt. Second and more generally, the paper's results suggest that risk should not be viewed monolithically: a firm's risk comes from many sources, including both the fundamentals of its business and its choice of management team. Third, it emphasizes the importance of transparency in managerial policies and communicating them to the marketplace, since predictability of managerial strategies appears to lower firms' default risk premiums. Overall, management risk appears to be an important component of a firm's overall risk; understanding its implications for both the pricing of securities and for financial management is likely to be a useful topic for future research.

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Appendix: Variable Definitions

Loan spread (in basis point)	All-in-Drawn Spread (AIS) over LIBOR at the origination date, from the current pricing file. Winsorized at 1% in the *Deal Scan/Compustat* merged data base.
Loan maturity (in months)	A calculation of how long (in months) the facility will be active from signing date to expiration date, from the facility file.
Loan size (in $ millions)	The amount of the facility, from the facility data set.
Secured	An indicator variable that equals one if the loan is secured, from the facility file.
Number of lenders	Total number of lenders in a loan, from the lender file.
Number of loan covenants	The total number of covenants in six categories (therefore this variable ranges from 0 to 6): equity sweep, debt sweep, asset sweep, financial, dividend and secured, following Bradley and Roberts (2015)
Performance Pricing	A loan feature that ties the interest rate of the loan to an indicator (e.g., leverage, interest coverage ratio) of the firm's performance, from the performance pricing file.
Loan Type	Type of the loan (facility): term loan, revolver, etc.
Loan Purpose	Purpose of the loan (facility): takeover, working capital, debt repayment, etc.
Lead Bank	Following Bharath et al. (2007), we focus on lead bank(s) in the syndicate in relationship lending. Any lender characterized as "lead arranger", "lead bank", "lead manager", or have an allocation of more than 90% of the total committed amount to the facility is characterized as a lead bank. Any bank that is described as "participant" is not a leading bank.
Prior CEO (CFO)-Lender Relationship	A binary variable that equals 1 if the lead bank(s) of the current new loan was a lead bank in a loan of the CEO's employer in the five years before he became the CEO of the current firm, and zero otherwise.
Dummy (Loan Initiation or Bond Issuance)	An indicator variable that equals 1 if the firm takes at least one loan or issued one bond in the fiscal year.
Yield spread (in basis point)	Offering yield spread. The difference between the offering yield at issuance and the yield of the benchmark treasury bond, calculated only for fixed coupon bond (about 78% of the *Mergent* sample).
Bond size (in $ millions)	Offering amount, the par value of debt at issuance (in $ millions)
Bond maturity (in months)	Maturity date – offering date (in months).
Subordinated	An indicator variable that equals 1 if the bond is junior, junior subordinate, subordinate, senior subordinate, and 0 otherwise (senior or senior secured).
CDS Spread (in basis point)	The amount paid by the Protection Buyer to the Protection Seller, typically denominated in basis points, with an annualized quote but paid quarterly. We use the five-year spreads because these contracts are the most liquid and constitute over 85 percent of the entire CDS market. To maintain uniformity in contracts, we only keep CDS quotations for senior unsecured debt with a modified restructuring (MR) clause and denominated in U.S. dollars.
CDS(Departure)-CDS(Pre-departure)	The rise in CDS spreads between the average CDS spreads from three months before the departure announcement (month -3 to

	month -1; with month 0 being the departure month) and the departure announcement.
CDS(Inauguration)-CDS(Departure)	The drop in CDS spreads between the dates of the previous CEO's departure announcement and when the new CEO takes office.
Recovery Rate (in percentage)	Reported by data contributors. Most pricing methodologies estimate recovery rates in a very simplistic way: a percentage is assigned to the seniority of the debt of a company. For investment grade issuers, recovery is generally assumed to be 40% (as the probability of default is low, the recovery rate is at best an estimate). For distressed issuers however, where the probability of default is higher, recovery tends to be more precisely defined.
Credit Spread (in basis point)	The difference between AAA corporate bond yield and BAA corporate bond yield (data source: Federal Reserve Board of Governors) measured in the month prior to loan initiation.
Term Spread (in basis point)	The difference between the 10-year Treasury yield and the 2-year Treasury yield (data source: Federal Reserve Board of Governors) measured in the month prior to loan initiation.
VIX (in percentage)	CBOE volatility index, which shows the market's expectation of 30-day volatility. It is constructed using the implied volatilities of a wide range of S&P 500 index options. This volatility is meant to be forward looking and is calculated from both calls and puts.
Firm Age	Age of the firm since IPO, using the first day appear in CRSP (or the IPO date in *Compustat* if missing), constructed for each firm-year.
Log(Assets)	Logarithm of the total book assets (assets are measured in $ millions)
Leverage	(Long-term debt + debt in current liabilities)/total assets
M/B	Market value of equity (closing price at the fiscal year end times shares outstanding) divided by book value of equity
Q	(Market value of equity + the book value of total debt)/book value of total assets
ROA	Earnings before interest, tax, and depreciation scaled by the total book assets
Tangibility	Net property, plant and equipment/total assets
CF Volatility	Residual volatility of the AR(1) process of ROE, following Pastor and Veronesi (2003)
Payout Ratio	(Dividend/Earnings) per share
Cash Ratio	Cash and short-term marketable securities scaled by (contemporaneous) book assets
Capx	Capital expenditure scaled by total book assets, with missing or negative Capx set to 0.
Acquisition	Value of acquisitions scaled by total book assets. Acquisitions include completed deals covered in *SDC* with the deal form of "Acquisitions of Assets", "Acquisitions of certain Assets", "Acq. Maj. Int.", "Acq. Part. Int.", "Acq. Rem. Int.", "Acquisition" or "Merger" (as the acquirer").
Change in NWC	Change in net working capital without cash, scaled by total assets
Speculative Grade	An indicator variable that equals 1 if the firm has a rating below BBB-, and 0 otherwise (investment grade)

Highly Levered	An indicator variable that equals 1 if leverage is greater than 36% (corresponds to the 75% of the leverage distribution, as well as the mean of the speculative grade firms).
Total time in office	Equals 0 if the CEO (or CFO) came into office and left office in the same year; 1 if he left the year after he became CEO (or CFO); etc.
Management Ability	CEO's ability, relative to their industry peers, in transforming corporate resources to revenues (see Demerjian, Lev, and McVay (2012) for details). We use the second stage residual of regressing the raw ability scores on firm-level characteristics.
Long-term CEO	CEOs with at least 3 years in office.
Outsider CEO	An indicator that equals 1 if the CEO is hired from outside (i.e., with the firm for less than three year when becoming CEO)
Heir-apparent CEO	An indicator variable that equals 1 if the new CEO was an heir apparent. An executive with the title "president" or "chief operating officer (COO)" or both, who is distinct from the CEO and the chairman is designated as the "heir apparent"
Young CEO	An indicator variable that equals 1 if the CEO who was younger than 50 when taking office.
Turnovers Due to Health or Illness	Include cases where a) news searches revealed that the CEO departure was related to a health condition or death (from Fee et al. 2013), or b) turnover reason provided in *Execucomp* is "deceased".
Turnovers Due to Retirement of Departing CEO	This sample includes turnovers where a) news searches revealed that the CEO departure was related to a health condition or death (from Fee et al. 2013), b) turnover reason provided in *Execucomp* is "deceased", c) departing CEOs older than 65 years. We exclude the "suspicious" retirements by focusing on retirements at good performance. This means that the cumulative monthly industry-adjusted stock return during the 12-months before the new CEO's inauguration month (see the variable definition for *Cum. Industry-adj. Return month [-12,-1]* below) is greater than 0.
No Management Shakeup	CEO turnovers not accompanied by management (top-4 highest paid non-CEO executives) changes during the turnover year and the year after turnover
Cum. ind.-adj. return month [-12,-1]	Cumulative industry (Fama-French 49)-adjusted return during the 12 months before the inauguration month
Median monthly IVOL month[-12,-1]	The median of the monthly industry (Fama-French 49)-adjusted idiosyncratic volatility during the 12 months before the inauguration month
Good pre-turnover performance (Pre-turnover Ind-adj. IVOL<=0 & stock return>=0 & ROA>=0)	Turnovers that satisfy the following three conditions: 1) the median of the monthly industry-adjusted idiosyncratic volatility during the 12-months before the inauguration month (see the variable definition for *Median Monthly IVOL month [-12,-1]* above) is less or equal to 0.2) the cumulative monthly industry-adjusted stock return during the 12-months before the inauguration month (see the variable definition for *Cum. Industry-adj. Return month [-12,-1]* above) is no less than 0.3) the ind-adj. ROA in the fiscal year prior to the inauguration month is no less than 0. ROA is defined as the earnings before interest, tax, and depreciation

	scaled by the beginning of fiscal year total book assets.
No Pre-turnover run-up in CDS spread	To capture the change in the CDS spread before turnover, we run firm-CEO specific regressions of daily CDS spread on event days [-730, -30], with day 0 being the day when the CEO takes office. We require at least 250 trading day data on CDS spread. Turnovers with non-positive (or insignificant) tenure-time slope are classified as not preceded by an increase in the CDS spread.
Outright Forced	Outright forced turnovers include the "overtly forced" group from Fee et al. (2013) with cases for which news searches indicated that the CEO was forced to leave or left under pressure.

Table 1: Summary Statistics

Panel A: Loan, Bond, and CDS Attributes

This table reports the summary statistics of loan, bond, and CDS attributes during the first 10 years of CEO tenure. Loan level and bond level variables, such as the loan spread and yield spread, are calculated when loans are initiated or when bonds are issued for the sample period that we have loan or bond data (1987 – 2012). The CDS variables are measured at the daily frequency for the sample period that we have CDS data (2001 – 2012).

Variables	Obs.	sd.	mean	p25	p50	p75
5-Year CDS Spread	955,103	229.24	159.12	38.53	75.66	174.67
3-Year CDS Spread	883,751	232.92	135.51	25.33	53.73	134.92
1-Year CDS Spread	851,911	223.61	103.97	12.65	31.19	87.01
Recovery Rate	950,007	3.09	39.61	39.43	40	40
Loan Spread	17,076	126.89	157.93	50	125	225
Loan Maturity	16,478	26.74	44.28	20	48	60
log(Loan Size)	17,075	1.45	5.30	4.53	5.37	6.21
Number of lenders	17,063	9.71	9.97	3	7	14
Number of covenants	3,112	1.84	4.41	3	5	6
Performance Pricing	17,076	0.50	0.45	0	0	1
Refinancing	12,450	0.38	0.82	1	1	1
Secured	10,568	0.49	0.60	0	1	1
Prior CEO-lender Relationship	11,039	0.48	0.35	0	0	1
Speculative Grade	11,259	0.49	0.39	0	0	1
Yield Spread	8,525	194.77	182.49	62.94	121.27	233
Bond Maturity	8,520	125.62	144.24	61	120	144
log(Bond Size)	8,525	1.74	5.43	5.01	5.70	6.21
Subordinated	8,525	0.37	0.16	0	0	0

Panel B: CEO Turnovers

This table reports the distribution of CEO turnovers over time for CEOs in three samples. Information on CEO turnover is obtained from *Execucomp* for the sample period 1987-2010. Although *Execucomp*'s coverage starts in 1992, some of the CEOs in the database took office before 1992, leading to some CEO turnovers from the late 1980s being in our sample. The CDS data is available only from 2001. Therefore, the turnovers in the CDS sample from early periods tend to be later years of a long-term CEO's tenure and are scarce.

Became CEO Year	# of turnovers in the loan Sample	# of turnovers in the bond Sample	# of turnovers in the CDS Sample
1987 - 1991	532	344	
1992 - 1996	834	454	103
1997 - 2001	988	580	288
2002 - 2006	892	461	303
2007 - 2012	568	348	263
Total	3,814	2,187	957

CEO Time in Office

This table reports the distribution of CEO's total time in office (in years) for CEOs in the union of the above three samples.

	Obs.	Mean	25th percentile	Median	75th percentile
CEO Total Time in Office (in years)	4,294	6.14	3	5	9

Panel C: CEO Turnover Types and CEO Characteristics

This table reports the number of various CEO turnovers based on turnover reason (see appendix for more details), succession origin, and CEO age at turnover, for the CEO sample in Panel B.

	# of Turnovers
(1) Health/Death	119
(2) Health/Death/Retirement at good performance	242
(3) No Mgt. Shakeup	495
(4) Good pre-turnover performance	728
(5) No Pre-turnover run-up in CDS spread	185
(6) Outright Forced	246
(7) Non-Heir-apparent CEO	3,653
(8) Outsider CEO	1,194
(9) Young CEO	1,651

Panel D: Firm and macro-level Attributes

This table reports the summary statistics of firm attributes (yearly, 1987-2012) for all *Execucomp* firms that had turnovers between 1987 and 2012, as well as the credit market conditions (daily, 1987-2012 for credit and term spread, 1990-2012 for VIX).

Variables	Obs.	sd.	mean	p25	p50	p75
Credit Spread	6,533	40.37	98.15	72	90	113
Term Spread	6,505	90.95	109.75	26	103	190
VIX	5,794	8.13	20.45	14.73	18.87	23.96
Log(Assets)	35,260	1.94	7.27	5.96	7.21	8.53
Leverage	34,503	0.22	0.24	0.06	0.21	0.36
M/B	34,119	4.30	2.90	1.33	2.04	3.34
ROA	33,962	0.16	0.11	0.07	0.12	0.18
Tangibility	33,349	0.24	0.28	0.08	0.20	0.42
CF Volatility	30,563	0.96	0.56	0.25	0.29	0.42
Payout Ratio	35,528	0.45	0.22	0.00	0.00	0.31
Cash Ratio	35,168	0.18	0.14	0.02	0.07	0.20
Capx	35,192	0.06	0.05	0.01	0.04	0.07
Acquisition	35,192	0.07	0.02	0.00	0.00	0.00
Change in NWC	34,526	0.07	0.00	0.00	0.00	0.00

Table 2: The Effect of CEO Tenure on CDS spread

This table reports the changes in CDS spread (daily) over CEO tenure. The sample period is 2001-2012. CEO tenure is measured by days since the CEO takes office. Column (1) reports the results using a piecewise linear specification for all CEOs (no matter how long they stayed in office) from year 0 to year 10. Columns (2) to (4) report the results for the first three years of CEOs who stay in office for at least three years. Columns (1) and (2) use the 5-Year CDS spreads as the dependent variable, while (3) and (4) use 3-Year and 1-Year CDS spreads, respectively. All the control variables are measured contemporaneous to the CDS spreads. The definitions of all variables are in Appendix. Standard errors are clustered at the firm-year level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Years [0,10]	Years [0,2]		
	5-Year CDS Spread		3-Year CDS Spread	1-Year CDS Spread
Tenure (years 0-2)	-0.032***			
	(0.011)			
Tenure (years 3-5)	-0.015			
	(0.011)			
Tenure (years 6-10)	-0.002			
	(0.011)			
Tenure (in days)		-0.031**	-0.050***	-0.070***
		(0.015)	(0.019)	(0.021)
Recovery Rate	-12.817***	-10.784***	-16.765***	-21.073***
	(1.225)	(1.416)	(2.065)	(2.318)
Credit Spread	0.478***	0.443***	0.546***	0.693***
	(0.039)	(0.066)	(0.082)	(0.098)
Term Spread	-0.02	-0.05	-0.036	0.017
	(0.029)	(0.043)	(0.055)	(0.061)
VIX	2.098***	2.443***	2.331***	2.100***
	(0.134)	(0.259)	(0.304)	(0.328)
Log(Assets)	-44.778***	42.382	50.402	76.452*
	(12.259)	(30.398)	(37.072)	(41.416)
Leverage	209.408***	76.313	129.382*	100.950
	(46.637)	(61.511)	(76.949)	(82.463)
M/B	-6.977	13.347	29.221**	36.193***
	(6.049)	(8.938)	(12.322)	(13.855)
ROA	-487.058***	-509.336***	-606.647***	-632.129***
	(74.297)	(118.529)	(141.388)	(152.415)
Tangibility	36.79	4.283	98.273	138.704
	(77.583)	(111.459)	(138.973)	(153.043)
CF Volatility	16.036***	4.654	3.669	3.971
	(4.381)	(7.087)	(8.142)	(9.651)
Payout Ratio	-23.384***	-6.306	-10.947*	-12.432*
	(5.167)	(5.110)	(6.232)	(6.673)
Firm-CEO and Year FE	x	x	x	x
Observations	770,255	270,124	244,917	238,308
Adjusted R-squared	0.758	0.833	0.804	0.740

Table 3: Tenure-CDS Spread Relations Following Likely Non-performance Driven Turnovers

This table reports the changes in CDS spread (daily) over the first three years of CEO tenure for various turnover subsamples that are likely to be non-performance driven, as well as outright forced turnovers. We control for the same set of CDS, firm or macro level variables as in Table 2, but do not report the coefficients for brevity. We report the number of turnovers for each subsample, in addition to the number of firm-day observations. The definitions of turnover types are in Appendix. Standard errors are clustered at the firm-year level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CDS Spread, Years [0,2], Long-term CEOs						
	Health/ Death	Health/ Death/ Ret. at good perf.	No mgt. shakeup	Good pre-turnover perf.	No pre-turnover run-up	Union (2)-(5)	Outright forced
Tenure (in Days)	-0.037*	-0.042*	-0.035*	-0.029*	-0.043*	-0.026**	-0.132**
	(0.020)	(0.022)	(0.019)	(0.016)	(0.022)	(0.013)	(0.050)
Firm-CEO F.E. and year F.E.	x	x	x	x	x	x	x
Obs.	5,928	14,541	38,566	119,125	84,777	164,501	25,864
# of turnovers	10	24	53	178	114	232	42
Adj. R^2	0.871	0.876	0.787	0.780	0.814	0.762	0.910

Table 4: Borrowing Rates over CEO Tenure

Panel A: Loan Spread

This table reports the changes in loan spread at origination over CEO tenure. Column (1) uses piecewise linear regressions, for all the CEOs from year 0 (turnover year) to year 10. Columns (2) to (4) report the results for the first three years of long-term (in office for at least three years) CEOs' tenure. Further, Column (3) reports the results for 961 likely non-performance driven turnovers only (union of the four types of turnovers in Columns (2)-(5) in Panel C of Table 1 in the loan sample). Column (4) reports the results for loans that are classified as "refinancing" by *DealScan*. Lagged firm-level control variables, such as firm age, firm size, leverage, M/B, ROA, tangibility, cash flow volatility, payout ratio, are included in all the regressions, but omitted in the table for brevity. Standard errors are clustered at the loan level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	Years [0,10]	Years [0,2], Long-term CEOs		
	(1)	(2)	(3) Likely non-performance driven turnovers	(4) Refinancing
Tenure (years 0-2)	-6.454***			
	(1.521)			
Tenure (years 3-5)	-0.949			
	(0.913)			
Tenure (years 6-10)	-0.329			
	(0.731)			
Tenure (in years)		-6.246***	-5.236*	-5.115**
		(1.873)	(2.592)	(2.417)
Credit Spread	0.358***	0.296***	0.448***	0.337**
	(0.053)	(0.093)	(0.133)	(0.136)
Term Spread	0.161***	0.122*	0.218***	0.094
	(0.031)	(0.062)	(0.081)	(0.081)
log(Debt Maturity)	-6.251**	-4.164	-4.346	-13.465*
	(2.744)	(4.964)	(5.979)	(7.115)
log(Debt Size)	-12.028***	-11.596***	-10.259***	-9.752***
	(1.118)	(1.985)	(2.947)	(2.664)
Performance Pricing	-16.779***	-24.207***	-16.022***	-27.900***
	(2.100)	(4.160)	(6.139)	(5.678)
Firm Age	-3.715*	-0.913	-2.843	-9.177*
	(1.918)	(4.320)	(10.356)	(5.323)
Tranche Type and Loan Purpose	x	x	x	x
Firm-level Controls	x	x	x	x
Firm and Year F.E.	x	x	x	x
Observations	12,843	4,881	2,140	3,062
Adjusted R-squared	0.690	0.716	0.748	0.751

Panel B: Bond Yield Spreads over CEO Tenure

This table reports the changes in the bond yield spread at issuance over CEO tenure. Column (1) uses piecewise linear regressions, for all the CEOs from year 0 (turnover year) to year 10. Columns (2) to (3) report the results for the first three years of long-term CEOs' tenure. Further, Column (3) reports the results for 439 likely non-performance driven turnovers only (union of the four types of turnovers in columns (2)-(5) in Panel C of Table 1 in the bond sample). We control macro-level credit conditions, bond characteristics, and lagged firm-level characteristics (firm age, firm age, firm size, leverage, M/B, ROA, Tangibility, cash flow volatility, payout ratio). Standard errors are clustered at the firm level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	Years [0,10]	Years [0,2]	
	(1)	(2)	(3) Likely non-performance driven turnovers
Tenure (years 0-2)	-7.519**		
	(3.677)		
Tenure (years 3-5)	-3.107		
	(2.754)		
Tenure (years 6-10)	1.205		
	(2.139)		
Tenure (in years)		-9.600**	-7.465*
		(4.845)	(3.849)
Credit Spread	1.107***	1.335***	1.265***
	(0.103)	(0.154)	(0.203)
Term Spread	0.110	0.116	0.118
	(0.072)	(0.149)	(0.198)
log(Debt Maturity)	-9.553	-7.735	9.119
	(6.939)	(9.238)	(8.079)
log(Debt Size)	-4.710	-18.150	-15.261
	(8.635)	(16.074)	(15.605)
Firm-level Controls	x	x	x
Firm and Year F.E.	x	x	x
Observations	5,921	2,326	1,207
Adjusted R-squared	0.531	0.593	0.599

Table 5: CFO Turnovers and Default Risk

The CFO turnover data is assembled based on the news announcements from 2001 to 2009 in Capital IQ database. Panel A reports the summary statistics of CFO turnover, tenure, and total time in office (in years) for CFOs whose employers took loans or issued bonds or are in the CDS sample during their first 10 years of tenure. "CFO Turnovers with long-term successors" include CFO successions with incoming CFOs that stay in office for at least 3 years. "CFO Turnovers (with long-term successors) not accompanied by CEO turnovers within +/-12 months" also include long-term CFOs only. Further, in this sample, there is no CEO turnover in the 12 months before or the 12 months after a CFO turnover. "Outsider CFO Succession (with long-term successors)" means that the new long-term CFO comes from outside the company. Panel B reports changes in a firm's CDS spread during its CFO's tenure. The CFO tenure is measured by the number of days since the CFO takes office. Column (1) reports the results using a piecewise linear specification for all CFOs from year 0 to year 10. Columns (2) to (5) report the results for the first three years of long-term CFOs. Panel C reports changes in a firm's loan/bond spread during the first three years of its long-term CFO's tenure. In both Panels B and C, we include the usual set of controls as in Tables 2A and 3A, but for brevity we do not report the coefficient estimates of some of those variables. All variable definitions are in Appendix. Standard errors are clustered at the firm-year level in Panel A, at the loan level in the loan regression in Panel B, and at the firm level in the bond regression in Panel B. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Summary Statistics of CFO Turnover and CFO Tenure

	# of turnovers 2001-2009
CFO Turnovers	1,857
CFO Turnovers with long-term successors	1,033
CFO Turnovers (with long-term successors) not accompanied by CEO turnovers within +/-12 months	722
CFO Turnovers (with long-term successors) accompanied by CEO turnovers within +/-12 months	311
CFO turnovers (with long-term successors) due to death/health/retirement at good performance	68
CFO turnovers (with long-term successors) due to death/health/retirement at good performance, and not accompanied by CEO turnovers within +/-12 months	43
Outsider CFO succession (with long-term successors)	380

CFO Time in Office

	Obs.	Mean	25th percentile	Median	75th percentile
CFO Total Time in Office (in years)	1,857	3.96	1.58	3.42	5.83

Panel B: Uncertainty about CFO and CDS Spread

	(1)	(2)	(3)	(4)	(5)
	Years [0, 10]	Years [0,2], Long-term CFOs			
			Accompanied by CEO turnovers within +/-12 months	Not accompanied by CEO turnovers within +/-12 months	Health/death/ retirement at good perf., not accompanied by CEO turnovers
	CDS Spread				
CFO Tenure (years 0-2)	-0.027***				
	(0.009)				
CFO Tenure (years 3-5)	-0.004				
	(0.009)				
CFO Tenure (years 6-10)	-0.009				
	(0.012)				
Tenure		-0.022**	-0.059**	-0.017*	-0.021*
(in days)		(0.011)	(0.029)	(0.009)	(0.011)
Controls	x	x	x	x	x
Firm-CFO and Year F.E.	x	x	x	x	x
Observations	611,823	288,831	107,909	180,922	12,116
Adjusted R-squared	0.820	0.847	0.843	0.840	0.923

Panel C: Loan Spread and Bond Yield Spread during First Three Years of a CFO's Tenure

	(1)	(2)
	Loan Spread	Yield Spread
Tenure (in years)	-5.271*	-6.155*
	(2.713)	(3.175)
Credit Spread	0.448***	1.091***
	(0.110)	(0.157)
Term Spread	0.305***	0.492***
	(0.101)	(0.182)
log(Debt Maturity)	10.562	-25.310
	(8.155)	(19.464)
log(Debt Size)	-5.113	-19.243
	(3.377)	(14.970)
Performance Pricing	-22.144***	
	(6.623)	
Tranche Type and Loan Purpose	x	x
Firm-level Controls	x	x
Firm and Year F.E.	x	x
Observations	2,390	1,313
Adjusted R-squared	0.732	0.534

Table 6: Cross-Sectional Differences in the Spread-Tenure Relation

Panel A: The Rise in CDS Spread at the Departure Announcement

This table reports the average increase in CDS spread between the average level from month -3 to month -1 and the departure announcement (month 0), for the whole sample, firms with vs. without designated heir apparent, turnovers due to the departing CEO's death/illness vs. the non-death/illness sample, outright forced turnovers vs. non-forced turnovers. We also report the number of observations for each sample, as well as the differences between various pairs of subsamples. *** denotes that the difference is significant at 1%.

	CDS(Departure)-CDS(Pre-departure)	Obs.
Full Sample	40.960	432
Firm Has Heir	19.078	165
Firm Has No Heir	54.485	267
Diff. btw. Has Heir and No Heir	-35.407***	
Death/Illness	53.114	10
Non-Death/Illness	40.672	422
Diff. btw. Death/Illness and Non-Death/Illness	12.422***	
Forced	42.893	31
Non-Forced	40.709	402
Diff. btw. Forced and Non-Forced	2.184	

Panel B: The Decrease in CDS Spread from Departure to Inauguration

This table reports the average drop in CDS spread between the previous CEOs' departure announcements and new CEOs' inaugurations, for the whole sample, firms with outsider vs. insider new CEOs, and firms with young vs. old incoming CEOs. "Young CEO" is a CEO who is less than 50 years old when taking office. We also report the percentage of this drop as a fraction of the initial spread increase at departure, the number of observations for each sample, as well as the differences between various pairs of subsamples. *** denotes that the difference is significant at 1%.

	CDS(Departure)-CDS(Pre-departure)	CDS(Inauguration)-CDS(Departure)	% of the Initial Increase	Obs.
Full Sample	34.845	-17.969	51.6%	284
Outsider New CEO	46.614	-16.502	35.4%	82
Insider New CEO	29.754	-18.564	62.4%	198
Diff. btw. Out- and Insiders	16.806***	2.061***		
Young CEO (<50)	44.167	-16.763	38.0%	70
Old CEO (>=50)	31.743	-18.368	57.9%	210
Diff. btw. Young and Old	12.424***	1.605***		

Panel C: Differences in Prior Uncertainty about CEO (or CFO) and Post-turnover Decline in CDS Spread

This table reports the effect of prior uncertainty about the new CEO (or new CFO) on changes in CDS spread during the first three years of the CEO's (or CFO's) tenure. All CEOs or CFOs in our sample stay in office for at least three years. "Non-Heir-apparent CEO" indicates that the CEO was not an heir-apparent before becoming the CEO. "Outsider CEO (CFO)" indicates that the CEO (CFO) comes from outside the company. "Young CEO" is a CEO who is less than 50 years old when taking office. All variable definitions are in Appendix. Standard errors are clustered at the firm-year level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	CDS Spread			
Tenure (in days)	-0.002	-0.011	-0.019	-0.023**
	(0.020)	(0.016)	(0.017)	(0.011)
Tenure*Non-Heir-apparent CEO	-0.038***			
	(0.013)			
Tenure*Outsider CEO		-0.079***		
		(0.019)		
Tenure*Young CEO			-0.031**	
			(0.014)	
Tenure*Outsider CFO				0.002
				(0.019)
Recovery Rate	-10.922***	-10.425***	-11.382***	-13.041***
	(1.464)	(1.475)	(1.512)	(1.684)
Credit Spread	0.447***	0.460***	0.449***	0.466***
	(0.067)	(0.068)	(0.068)	(0.061)
Term Spread	-0.048	-0.051	-0.044	-0.076*
	(0.044)	(0.044)	(0.045)	(0.045)
VIX	2.362***	2.381***	2.395***	2.312***
	(0.263)	(0.271)	(0.268)	(0.231)
Log(Assets)	18.709	13.808	35.176	-22.288
	(29.133)	(29.271)	(30.918)	(23.211)
Leverage	97.590	70.097	62.883	142.305*
	(62.022)	(61.478)	(61.235)	(81.475)
M/B	11.223	4.612	17.106*	-0.456
	(9.224)	(9.609)	(9.429)	(1.009)
ROA	-492.586***	-490.520***	-524.634***	-522.663***
	(119.798)	(123.376)	(117.712)	(121.474)
Tangibility	51.508	28.684	27.600	205.937*
	(105.597)	(103.968)	(122.724)	(115.476)
CF Volatility	3.822	3.854	3.854	28.344***
	(7.210)	(7.349)	(6.984)	(6.408)
Payout Ratio	-6.759	-8.479*	-6.364	-6.804
	(5.088)	(4.946)	(5.202)	(5.245)
Firm-CEO (CFO) F.E. and Year F.E.	x	x	x	x
Observations	260,297	252,500	253,091	288,831
Adjusted R-squared	0.833	0.835	0.835	0.847

Table 7: Prior Lending Relationship and Spread-Tenure Relations

This table reports the effect of relationship lending on changes in loan spreads during the first three year of CEO's or CFO's tenure. All CEOs and CFOs in our sample stay in office for at least three years. "Prior CEO (or CFO)-lender Relationship" is a dummy variable that equals one if the lead bank(s) of the current new loan was a lead bank in a loan of the CEO's employer in the five years before he became the CEO of the current firm, and zero otherwise. We include the firm-year level controls as in Tables 4A, but for brevity we do not report the coefficient estimates of some of those variables. All variable definitions are in Appendix. Standard errors are clustered at the loan level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1) Full CEO Sample	(2) Outsider CEOs	(3) Full CFO Sample	(4) Outsider CFOs
	Loan Spread			
Tenure (in years)	-10.396***	-17.655***	-8.222*	-14.122*
	(3.039)	(5.312)	(4.251)	(7.284)
Tenure (in years)*Prior CEO (CFO)-Lender Relationship	6.543*	7.711*	4.257*	4.321*
	(3.374)	(3.900)	(2.183)	(2.276)
Prior CEO (CFO)-Lender Relationship	-12.335	-8.054	-7.308	4.498
	(8.132)	(21.012)	(8.746)	(15.917)
log(Debt Maturity)	-2.211	1.063	10.667	7.998
	(5.818)	(9.699)	(8.212)	(13.416)
log(Debt Size)	-10.764***	-14.267***	-5.136	-4.730
	(2.187)	(3.943)	(3.381)	(5.138)
Performance Pricing	-24.972***	-23.402***	-22.220***	-27.334**
	(5.010)	(8.822)	(6.661)	(11.740)
Tranche Type and Loan Purpose	x	x	x	x
Firm-level Controls	x	x	x	x
Firm and Year F.E.	x	x	x	x
Observations	3,965	1,511	2,394	1,034
Adjusted R-squared	0.706	0.699	0.733	0.719

Table 8: Risk of the Debt Claim and the Spread-Tenure Relation

This table contrasts the changes in the CDS spread, loan spread or bond yield spread over the first three years of the CEO's tenure for riskier debt claims and less risky debt claims. All CEOs in our sample stay in office for at least three years. "Speculative Grade" indicates a firm with credit rating below BBB- in the turnover year. "Highly Levered" indicates borrowers with leverage ratio in the top quartile (0.36) in the turnover year. "Subordinated" indicates junior bonds. "Term Loan" indicates (all types of) term loans. We include the usual set of firm, loan, or bond level controls, but for brevity we do not report the coefficient estimates of those variables. All variable definitions are in Appendix. Standard errors are clustered at the firm-year level in Column (1), at the loan level in Column (2), and at the firm level in Column (3). ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	CDS Spread	Loan Spread	Yield Spread
Tenure (in days)	-0.025*		
	(0.013)		
Tenure (in days)*Speculative	-0.015		
	(0.020)		
Tenure (in days)*Highly Levered	-0.033*		
	(0.018)		
Tenure (in years)		-0.454	-4.223*
		(2.180)	(2.413)
Tenure (in years)*Speculative		-5.357	6.014
		(4.328)	(7.354)
Tenure (in years)*Highly Levered		-4.825*	-5.551*
		(2.597)	(2.846)
Tenure (in years)*Term Loan		-10.380**	
		(4.898)	
Tenure (in years)*Subordinated			-6.900*
			(3.508)
Speculative		18.617**	105.042***
		(7.760)	(34.197)
Highly Levered		106.446***	51.787***
		(10.333)	(19.329)
Term Loan		47.466**	
		(22.961)	
Subordinated			6.353
			(24.150)
Firm-level Controls	x	x	x
Loan- or Bond-level Controls		x	x
Firm-CEO and Year F.E.	x		
Firm and Year F.E.		x	x
Observations	248,186	3,451	2,246
Adjusted R-squared	0.832	0.771	0.611

Table 9: Management Risk and Precautionary Savings

Panel A: Cash Ratio over CEO Tenure

This table reports the change in cash ratio over CEO tenure. The dependent variable is the ratio of cash and cash equivalent to book assets in year t. The firm level controls are also measured in year t. Columns (1) reports the results using a piecewise linear specification for all CEOs from year 0 to year 10. Columns (2) and (3) report the results for the first three years of CEOs who stay in office for at least three years. The likely non-performance driven turnover sample includes turnovers that satisfy any of the criteria in rows (2)-(5) of Panel C of Table 1. All variable definitions are in Appendix. Standard errors are clustered at the firm level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	Years [0, 10]	Years [0, 2], Long-term CEOs	
		Cash Ratio	
	(1)	(2)	(3) Likely non-performance driven turnovers
Years (0-2)	-0.003***		
	(0.001)		
Years (3-5)	-0.001		
	(0.001)		
Years (6-10)	0.001		
	(0.001)		
Tenure (in years)		-0.003***	-0.002**
		(0.001)	(0.001)
Firm Age	0.001***	0.001**	0.001
	(0.000)	(0.000)	(0.001)
Log(Assets)	-0.025***	-0.025***	-0.028***
	(0.003)	(0.004)	(0.007)
Leverage	-0.113***	-0.124***	-0.102***
	(0.010)	(0.018)	(0.024)
Q	0.006***	0.008***	0.002
	(0.001)	(0.002)	(0.005)
Capx	-0.152***	-0.210***	-0.222***
	(0.022)	(0.038)	(0.067)
Acquisition	-0.082***	-0.094***	-0.076***
	(0.012)	(0.018)	(0.027)
ROA	0.012	0.035	0.018
	(0.021)	(0.025)	(0.027)
Change in NWC	-0.086***	-0.106***	-0.081*
	(0.015)	(0.025)	(0.042)
Tangibility	-0.349***	-0.346***	-0.316***
	(0.017)	(0.024)	(0.043)
CF Volatility	0.003***	0.003*	-0.002
	(0.001)	(0.002)	(0.004)
Payout Ratio	0.001	0.002	-0.004*
	(0.001)	(0.002)	(0.002)
Firm F.E.	x	x	x
Observations	28,508	10,642	4,486
Adjusted R-squared	0.772	0.797	0.832

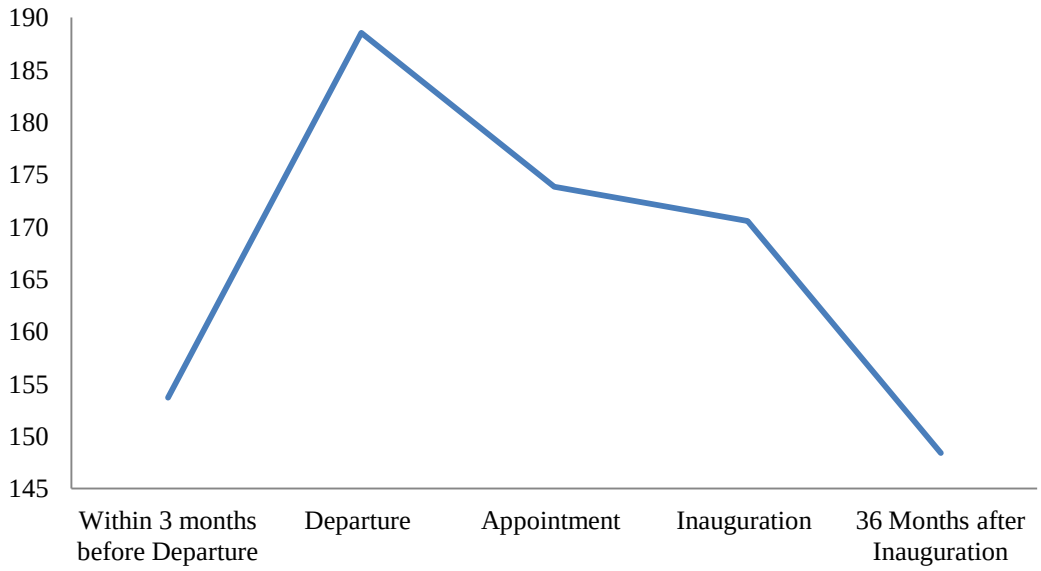
Panel B: Uncertainty about CEO and Cash-Tenure Sensitivity

This table reports the effect of prior uncertainty about a new CEO on the cash-tenure sensitivity during the first three years of the CEO's tenure. The dependent variable is the ratio of cash and cash equivalent to book assets in year t. All CEOs in our sample stay in office for at least three years. "Heir-apparent CEO" indicates that the CEO was the heir-apparent before becoming the CEO. "Outsider CEO" indicates that the CEO comes from outside the company. "Young CEO" is a CEO who is less than 50 years old when taking office. All variable definitions are in Appendix. Standard errors are clustered at the firm level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
		Cash Ratio	
Tenure (in years)	-0.002**	-0.000	-0.002**
	(0.001)	(0.001)	(0.001)
Tenure (in years)*Young CEO	-0.004**		
	(0.002)		
Young CEO	0.005		
	(0.004)		
Tenure (in years)*Non-Heir-apparent CEO		-0.004**	
		(0.002)	
Heir-apparent CEO		-0.014***	
		(0.005)	
Tenure (in years)*Outsider CEO			-0.004**
			(0.002)
Outsider CEO			-0.0002
			(0.005)
Firm Age	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)
Log(Assets)	-0.024***	-0.024***	-0.025***
	(0.004)	(0.004)	(0.004)
Leverage	-0.124***	-0.124***	-0.124***
	(0.018)	(0.018)	(0.018)
Q	0.008***	0.008***	0.008***
	(0.002)	(0.002)	(0.002)
Capx	-0.210***	-0.208***	-0.207***
	(0.039)	(0.038)	(0.039)
Acquisition	-0.092***	-0.093***	-0.092***
	(0.019)	(0.018)	(0.019)
ROA	0.030	0.035	0.030
	(0.028)	(0.025)	(0.028)
Change in NWC	-0.104***	-0.106***	-0.103***
	(0.026)	(0.025)	(0.026)
Tangibility	-0.347***	-0.347***	-0.349***
	(0.024)	(0.024)	(0.024)
CF Volatility	0.003*	0.003*	0.003*
	(0.002)	(0.002)	(0.002)
Payout Ratio	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)
Firm F.E.	x	x	x
Observations	10,447	10,642	10,494
Adjusted R-squared	0.793	0.797	0.793

Figure 1: Average CDS Spreads at Key Events Related to CEO Turnovers

This figure plots the average CDS spreads (measured in basis points) in each event period. The sequence of events starts from the 3 months before the departure announcement of the outgoing CEO, to the departure announcement, to the appointment announcement of the new CEO, to his inauguration, and then 36 months after the inauguration. The CDS spread for "within 3 months before departure" is the average CDS spread in month [-3,-1] before the departure announcement. The turnover sample includes 284 CEO turnovers since 2001, for which the departure announcement and the inauguration occurred in different times.



Internet Appendix for "How Management Risk Affects Corporate Debt"

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Abstract

This Internet Appendix provides supplementary materials to the paper *How Management Risk Affects Corporate Debt*. The document reports two tables that we mention in the paper but do not report for brevity and is organized as follows. Section 1 and Table IA.1 address the alternative interpretation that the decline in CDS spreads is driven by increases in expected CEO ability over CEO tenure rather than decreases in the uncertainty about CEO ability. The table reports results on the relation between proxies of expected CEO ability and CEO tenure. It also contrasts the relation between CDS spreads and CEO tenure with and without controlling for the expected CEO ability. Table IA.2 reports the relation between non-price loan terms and CEO tenure.

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1. Change in Perceived CEO Ability

Theoretically, the market should update on both the expectation and uncertainty about management's ability. Bayesian learning implies that the market's posterior estimate of the mean of the CEO's ability can either increase or decrease over time, while this estimate continually becomes more precise, so the uncertainty about ability continually declines. Therefore, the natural interpretation of the observed decline in spreads is about the *uncertainty* of CEO ability rather than its mean.

However, if the expected ability does systematically increase over a CEO's tenure, possibly due to on the job learning, then this effect could lead to declining default risk as well. We note that the rise in CDS spread at the time of CEO departures is more likely to reflect the *uncertainty* rather than the *expectation* of the incoming management's ability, since the identity of the new CEO has not been announced in most of these cases. Still, to evaluate this alternative hypothesis, we construct proxies for expected CEO ability and examine whether including those proxies subsumes the effect of CEO tenure on CDS spreads.

We use two proxies for expected CEO ability. The first one is the firm's return on assets (ROA), which is earnings before interest, tax, and depreciation scaled by the total book assets. We control for industry-year median ROA to filter out industry effects, which can be viewed as fundamentals unrelated to management. The second proxy is the management ability measure from Demerjian, Lev, and McVay (2012), which is based on managers' efficiency, relative to their industry peers, in transforming corporate resources to revenues. The correlation between the two proxies is 0.36 in our sample. Although neither variable is a perfect measure of expected CEO ability, both are likely to be correlated with it.

The results are reported in Table IA.1 in the internet appendix. The first two columns examine the relation between the expected ability proxies and CEO tenure in the first three years of tenure in the sample of long-term CEOs, and suggest that there is no significant relation between the two. Next, we compare the estimated effect of CEO tenure on CDS spreads, controlling for Demerjian et al. measure of management ability (Column (4)) and without (Column (3)), and find them to be very similar. Overall, these results suggest that changing CEO ability is unlikely to explain the strong relation between firms' CDS spreads and

their CEOs' tenure. In terms of the economic magnitude, a one-standard-deviation increase (0.249) in management ability is associated with a decrease of 16 basis points (=0.249*64.4) in CDS spread, less than half of the decrease in CDS spreads due to the reduction in management uncertainty over the first three years of a new CEO's tenure.

2. Sensitivity of Non-Price Loan Terms to CEO Tenure

Besides the loan spread, we also observe information on other non-price terms of the loan contracts such as the loan maturity, loan size, number of lenders, whether the loan is secured or not, and the number of total loan covenants. In Table IA.2 we examine whether these non-price loan terms also systematically change over a CEO's tenure. Overall, the results suggest that the main effect of managerial risk on corporate loans is through the loan pricing. The main difference in non-price terms over CEO tenure is that bank loans originated earlier tend to have significantly shorter maturities than those originated later.

Table IA.1: Expected CEO Ability and CEO Tenure

This table reports the changes in two ability measures over CEO tenure -- ROA and Management Ability (as in Demerjian, Lev, and McVay (2012)). It also reports the changes in CDS spread over CEO tenure, with or without controlling for management ability. The sample includes the first three years of tenure for CEOs who are in office for at least three years, for firms with data on CDS spreads. "Management Ability" measures CEO's ability, relative to their industry peers, in transforming corporate resources to revenues. All the control variables are measured contemporaneous to the CDS spreads. The definitions of all variables are in Appendix. Standard errors are clustered at the firm-year level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	ROA	Management Ability	CDS Spread	
Tenure (in years)	0.002	0.005		
	(0.002)	(0.007)		
Tenure (in days)			-0.032**	-0.031**
			(0.015)	(0.015)
Management Ability				-64.428***
				(24.378)
Recovery Rate			-964.090***	-963.979***
			(151.371)	(151.300)
Credit Spread			54.137***	54.192***
			(7.591)	(7.585)
Term Spread			-9.611**	-9.503**
			(4.763)	(4.753)
VIX			2.258***	2.256***
			(0.267)	(0.267)
log(Assets)	-0.104***	-0.174***	-16.205	-9.613
	(0.018)	(0.059)	(29.941)	(30.135)
Leverage	-0.05	0.042	122.718*	127.911*
	(0.045)	(0.125)	(66.248)	(65.932)
M/B	0.0003	0.002*	13.164	14.045
	(0.0003)	(0.001)	(9.476)	(9.387)
ROA		0.449**	-536.001***	-458.059***
		(0.196)	(135.755)	(132.658)
Tangibility	-0.140*	-0.339	159.796	163.507
	(0.082)	(0.274)	(120.461)	(121.571)
CF Volatility	0.0001	-0.009	1.754	1.328
	(0.002)	(0.007)	(7.484)	(7.448)
Payout Ratio	-0.0001	-0.015	-2.294	-4.022
	(0.002)	(0.019)	(5.527)	(5.785)
Industry ROA	0.614***			
	(0.195)			
Firm-CEO and year F.E.	x	x	x	x
Observations	1,256	995	214,139	214,139
Adjusted R-squared	0.871	0.802	0.854	0.854

Table IA.2: Non-Price Terms of Loan Contract over Tenure

This table reports the changes in other components of the loan contract during the first three years after CEO turnovers, including loan maturity, loan size, number of lenders, whether the loan is secured, and the number of total loan covenants. All CEOs in our sample stay in office for at least three years. The loan sample in this table does not condition on the availability of information on loan spread. The definitions of all variables are in the variable definition appendix. Standard errors are clustered at the loan level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	(1) log(Loan Maturity)	(2) log(Loan Size)	(3) Number of Lenders	(4) Secured	(5) Number of Covenants
Tenure (in years)	0.014*	-0.001	-0.297	0.011	-0.024
	(0.008)	(0.020)	(0.241)	(0.011)	(0.090)
Credit Spread	-0.001	-0.002*	-0.011	0	0.002
	(0.000)	(0.001)	(0.010)	(0.000)	(0.007)
Term Spread	-0.001*	-0.001	-0.001	0	0.006**
	(0.000)	(0.001)	(0.007)	(0.000)	(0.003)
Firm Age	0.039*	-0.032	-0.387	0.015	0.176**
	(0.022)	(0.041)	(0.375)	(0.025)	(0.081)
log(Assets)	0.008	0.513***	2.788***	-0.113***	-0.287
	(0.022)	(0.038)	(0.493)	(0.022)	(0.222)
Leverage	-0.104	-0.076	2.418	0.214**	-0.111
	(0.082)	(0.165)	(1.806)	(0.089)	(0.450)
M/B	0.001	0.007*	-0.016	0.001	-0.003
	(0.002)	(0.004)	(0.048)	(0.002)	(0.012)
ROA	0.332*	1.094***	2.711	-0.754***	-3.520**
	(0.172)	(0.336)	(4.025)	(0.181)	(1.472)
Tangibility	-0.116	0.088	5.268	-0.081	2.045
	(0.140)	(0.283)	(4.483)	(0.193)	(1.818)
CF Volatility	-0.002	-0.005	0.153	-0.003	0.015
	(0.010)	(0.018)	(0.209)	(0.008)	(0.064)
Payout Ratio	0.035*	0.055	1.389***	-0.023	-0.481*
	(0.021)	(0.038)	(0.449)	(0.025)	(0.259)
Performance Pricing	0.096***	0.286***	4.271***	-0.069***	-0.135
	(0.022)	(0.043)	(0.484)	(0.023)	(0.094)
Tranche Type, Loan Purpose	x	x	x	x	x
Firm and Year F.E.	x	x	x	x	x
Observations	4,886	5,053	5,047	3,077	855
Adj. R-squared	0.744	0.671	0.301	0.679	0.906