Credit Spreads, Consumer Sentiment and Operating Leverage

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Abstract

We provide evidence that bond markets do not fully impound the implications of operating leverage for the impact of consumer sentiment changes on creditworthiness. Changes in consumer sentiment generate the same contemporaneous changes in credit spreads regardless of firms' degree of operating leverage. As a result, credit spreads for firms with high operating leverage drift downward for several months after improvements in consumer sentiment, while (for one specification of operating leverage) drifting upward after decreases in consumer sentiment. In contrast, we find little evidence that credit markets respond inefficiently to information about financial leverage, which has similar economic implications. Our results are consistent with the Incomplete Revelation Hypothesis (Bloomfield, 2002), which predicts that markets react less completely to information that is more difficult to process and is less widely reported (such as information about operating leverage) than to information that is easy to process and widely reported (such as information about financial leverage).

Keywords: Operating Leverage, Fixed Costs, Credit Spreads, Consumer Sentiment, Market Inefficiency.

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1. Introduction

Changes in consumer sentiment are positively correlated with future changes in economic conditions, and should therefore be positively correlated with changes in a firm's creditworthiness. Moreover, the effect of changes in consumer sentiment should be greater for firms that rely on leverage to amplify the relation between changes in sales and changes in net income. This interaction between changes in consumer sentiment and leverage should arise whether the firm's leverage reflects reliance on debt (financial leverage) or reliance on fixed operating costs (operating leverage).

In this study, we provide evidence that bond markets do not fully impound the implications of operating leverage for the impact of consumer sentiment changes on creditworthiness, while they do fully impound the implications of financial leverage. We measure market re-assessments of creditworthiness by changes in firms' credit spreads—the component of bond yields that remains after accounting for factors unrelated to firm-specific credit risk. We find that changes in consumer sentiment generate the same contemporaneous changes in credit spreads regardless of firms' degree of operating leverage. As a result, credit spreads drift downward more for firms with higher operating leverage in the quarters after improvements in consumer sentiment, and drift upward (though less robustly) in the quarters after declines in consumer sentiment. In contrast, changes in consumer sentiment generate larger contemporaneous changes in credit spreads for firms with higher financial leverage, and we find no evidence that future credit spreads react differently to past changes in consumer sentiment for firms with differing financial leverage. Our results are consistent with the Incomplete Revelation Hypothesis (Bloomfield [2002]), which predicts that markets react less completely to information that is more difficult to process and is less widely reported (such as information about operating leverage).

To estimate operating leverage, we first define total operating costs cash sales minus operating cash outflows, excluding interest and taxes but including capital expenditure. These costs represent the firm's total cash commitments to fund operations. We then estimate the variable component of total costs by conducting firm-specific regressions of the change in total costs in the last four quarters onto the change in reported sales during the same period. We multiply the regression coefficient by firm sales in each quarter to estimate variable costs, and subtract those from total costs to calculate fixed costs. In light of the varied definitions of operating leverage in the literature, we capture this construct with two different measures. We define fixed cost leverage as the ratio of capitalized fixed costs to total market value, and define cost structure leverage as the ratio of fixed costs to total costs.

We begin our analysis by verifying that future changes in firm revenues are positively associated with changes in our measure of consumer sentiment, the Michigan Consumer Sentiment Index. We also verify that firm-specific business risk, measured by the variability in Return on Assets, is determined by the interaction between changes in consumer sentiment and our measures of operating leverage. As expected, variability in ROA is negatively correlated with changes in consumer sentiment, and this relationship is more negative for firms with higher operating leverage, whether measured by fixed costs or cost structure leverage. This result suggests that credit investors should price firm-specific credit risk as a function of the *interaction* between operating leverage and changes in consumer sentiment.

To assess the debt market's pricing of credit risk, we use data drawn from the Trade Reporting and Compliance Engine (TRACE) database from the National Association of Securities Dealers (NASD). Following Collin-Dufresne et al. [2001], we estimate credit spreads by subtracting from bond yields an interpolated Treasury bond yield that reflects a rate nearly free of credit risk. We then regress changes in credit spreads on contemporaneous changes in consumer sentiment, the levels of financial and operating leverage, and the interaction between the changes in consumer sentiment and each form of leverage. We also control for a variety of secular factors known to affect credit spreads, such as the shape of the Treasury bond yield curve. We find that the changes in credit spreads are insensitive to the interaction between changes in sentiment and operating leverage, whether the latter is measured using fixed cost leverage or cost structure leverage. In contrast, changes in credit spreads are more sensitive to changes in sentiment for firms with higher financial leverage.

Analyses of future credit spreads changes indicate that contemporaneous reactions to changes in sentiment are inefficient because they fail to incorporate the implications of operating leverage, but we find little evidence of such inefficient reactions to financial leverage. Changes in credit spreads two and three quarters ahead are significantly more sensitive to changes in consumer sentiment for firms with higher operating leverage, whether the latter is measured using fixed costs or cost structure leverage. In contrast, we find such an association for higher financial leverage only two (but not three) quarters ahead, and then only when operating leverage is measured using fixed costs.

We conduct two supplementary analyses. First, we regress changes in credit spreads onto the levels of operating and financial leverage (along with control variables) separately for the most positive, most negative and neutral changes in consumer sentiment. The results indicate that the levels of operating leverage do not significantly affect contemporaneous credit spread changes for any of these subsamples, whether operating leverage is measured by fixed cost leverage or cost structure leverage. However, the two measures show different patterns of changes in credit spreads over subsequent quarters. Firms with higher fixed costs experience larger increases in future credit spreads after sentiment decreases and larger decreases in future credit spreads after sentiment increases. In contrast, only the latter effect is observed for firms with higher cost structure leverage. In our second supplementary analysis, we demonstrate that our results are robust to including changes in firms' credit ratings as a control variable in our regressions of contemporaneous and future credit changes.

Overall, our results suggest that prices for bonds do not efficiently incorporate information about firms' cost structures and their implications for firms' exposure to macroeconomic trends. This inefficiency may not serve as the basis for a profitable trading strategy, in part because the efficiency arises primarily in the form of overpricing when consumer sentiment improves, and bonds are difficult to sell short. However, the results are consistent with Bloomfield's [2002] Incomplete Revelation Hypothesis, with asserts that markets respond less strongly to information that is difficult to process or otherwise available to only a limited fraction of traders. Financial reports provide detailed and highly-emphasized disclosures about financial leverage, which is also subject to intense scrutiny and publicity by analysts and the popular press. In contrast, disclosures about cost structure are relatively sparse (FASB [2010]), and we find limited evidence that analysts and investors focus on operating leverage. Even if the markets' dismissal of operating leverage is understandable, our empirical evidence suggests that it is inappropriate. Fixed costs are difficult to avoid in troubled times, and form a predictable source of credit risk, leading to poor operating performance that the market eventually incorporates into prices.

Our results provide an interesting contrast to the literature on operating leases, which generally shows that equity and credit prices respond as if investors capitalize the cost of operating leases (see, for example, Abdel-khalik et al. [1978] , Ely [1995] , Andrade et al. [2009], Ge et al. [2008]). Like most of the studies on operating leases, ours uses a 'value relevance' methodology, by examining associations between disclosed information and market prices. The key difference lies not in our method, but in our results. Studies on operating leases show that investors do see those obligations as value relevant. This result has somewhat unclear implications for standard setting, in part because the market already reacts to the information in question (See Holthausen and Watts [2001], and the response by Barth et al. [2001], for more about value relevance research).

In our case, however, we find that information contained in operating leverage is *not* fully priced by the market, but it should be because it can predict future creditworthiness. In line with the Incomplete Revelation Hypothesis, we conjecture that markets respond efficiently to operating lease information because the imputed debt is relatively easy to estimate from existing disclosures, and such adjustments are made and widely publicized by credit rating agencies, doubtless educating many investors and encouraging them to do likewise. The Enron debacle heighten attention to off-balance-sheet financing, causing operating leases to have even more price impact (Andrade et al. [2009]). We predict that similar improvements in operating leverage disclosures and published analyses by information intermediaries would make it easier for credit investors to incorporate such information into their assessments of firm-specific credit risk.

The remainder of the paper is organized as follows, the next section of the paper places this work in the context of prior research. Section 3 describes the data, and section 4 discusses the tests and empirical results. Robustness checks are offered in Section 5. Section 6 summarizes and concludes.

2. Background

2.1. Operational Leverage and Equity Markets

A vast literature documents the implications of financial leverage for equity and credit markets. Stock returns for firms with greater financial leverage respond more strongly to changes in reported income, are more volatile and are generally higher, reflecting the additional systemic risk borne by equity holders. Credit ratings and bond yields for firms with greater financial leverage indicate greater credit risk (Holthausen and Leftwich [1986], Dichev and Piotroski [2001], Kisgen [2006], Faulkender and Petersen [2006]).

Fixed costs do not typically satisfy the FASB's definition of a liability because they are not enforceable claims, but prior research shows that the constancy of fixed costs results in operating leverage that affects equity markets much as financial leverage does. Lev [1974] shows that the CAPM beta is higher for firms with greater operating leverage (lower variable cost per unit of output). Mandelker and Rhee [1984] show how a firm's asset beta can be decomposed into the product of the degree of operating leverage, the degree of financial leverage, and the amount of "intrinsic business risk". They define the degree of operating leverage to be the elasticity of earnings with respect to changes in production. Mensah [1992] conducts a similar decomposition for accounting beta (the association of a firm's earnings with marketwide earnings). Subrahmanyam and Thomadakis [1980] and Booth [1991] endogenize the firm's choice of capital and labor in a formal model and find a negative relationship between the capital-labor ratio and the firm's expected rate of return. Booth shows that in these models the degree of operating leverage (measured by the elasticity of earnings with respect to changes in the output price) is negatively related to the capital-labor ratio, so that the positive relationship between the expected rate of return and the degree of operating leverage is restored. Finally Gulen et al. [2008] show that firms with high book-market ratios, which typically have higher financial leverage and operating leverage, are less flexible in adjusting to worsening economic conditions than growth firms, and that such inflexibility increases the costs of equity in the cross section.

A closely-related literature documents the debt-like effects of one particular fixed cost, the operating lease. Minimum lease obligations on operating leases generally do satisfy the FASB's definition of a liability, but are not recorded as liabilities under current GAAP. To determine whether markets treat operating lease obligations as debt, a typical study multiplies the minimum yearly operating lease payments by eight, and adding that amount to both firm's assets and liabilities. This adjustment to the balance sheet, while ad hoc, is widely used by credit analysts.

Overall, empirical evidence strongly indicates that equity investors view operating leases as debt. Ely [1995] examines the association between risk and unrecorded operating leases by regressing total market risk on the standard deviation of ROA and the debt-equity ratio, adjusted to reflect the present value of operating lease commitments. Ely [1995] finds a significant relation between equity risk and the debt-equity adjustment for operating leases. She also finds that the relation between equity risk and asset risk varies significantly with the adjustment made to the return on assets. Imhoff et al. [1993] perform similar tests within the grocery store and airline industries to keep the asset risk constant. They find that the correlations between the standard deviation of stock returns and the reported debt-to-asset ratio increase when the debt-to-asset ratio is restated to reflect operating leases using either of the two adjustment methods. The authors then compare the two methods described above and find that the ad hoc operating lease adjustment technique appears to explain a greater proportion of equity risk. Ge et al. [2008] also find that the operating lease adjustments to earnings are not positively related to stock returns.[1]

[1] A separate literature defines operating leverage as the ratio of operating liabilities to total operating assets, so that operating leverage is identical to financial leverage but for the source of financing. Firms might use suppliers for financing due to transaction costs (Ferris [1981]), differential access of suppliers and buyers to financing (Schwartz [1974]), and informational advantages and comparative costs of monitoring

2.2. Operating Leverage and Credit Markets

Little research examines the effects of operating leverage on credit markets, in part because reliable data on bond prices and yields was unavailable until recently. The bulk of the relevant research addresses minimum lease obligations. These are likely to influence credit markets because all three credit-rating agencies emphasize that they base their ratings on balance sheets that incorporate capitalized operating leases, and all three indicate that they use a very simple method of capitalization. To adjust total debt for the present value of the lease payments, they simply multiply the Rental Expense by 8 and add it to total assets. EBITDA is adjusted by adding back the implicit interest amount—set to 1/3 of the rental expense. In addition, the necessity of the adjustment has become well publicized as a result of the accounting scandals at the beginning of the decade. Andrade et al. [2009] point out that the market became more aware of the necessary adjustments for operating leases after the Enron debacle.

Altamuro et al. [2009] provide empirical support for the importance of credit rating methodologies. They examine whether banks incorporate operating leases into their bank loan spreads, calculated as the difference between the facility interest rate and the LIBOR. Their findings show that when a firm has an issuer credit rating and the rating is included in the model of loan spreads, there is no additional explanatory power for accounting ratios that adjust for the capitalization of operating leases. For firms that do not have credit ratings, loan spreads are better explained by financial ratios that include operating lease obligations. The authors attribute this outcome to the fact that credit ratings incorporate the presence and magnitude of operating leases.

(Smith [1987], Mian and Smith [1992], Biais and Gollier [1997]). Petersen and Rajan [1997] test these explanations, while Nissim and Penman [2003] examine the predictive power of operating and financing leverage on ROE and price to book ratios.

The importance of operating leases is not limited to traditional debt and equity markets. Andrade et al. [2009] demonstrate that operating leases are incorporated by the credit default swap (CDS) market. They find that the price impact of operating leases on debt spreads is larger than the price impact of on-balance-sheet debt. On average, with the mean log spread of 48.9 basis points as the baseline, a 10-percentage-point leverage increase due to increased balance-sheet debt raises credit spreads by 9.4 basis points, whereas an identical increase in leverage due to an increase in the present value of noncancellable operating lease obligations raises credit spreads by 15.7 basis points. The result is consistent with structural models of debt pricing, since lease obligations have priority claims relative to debt in the event of bankruptcy.

Correia, Richardson and Tuna (2011) provide a rare example of a paper that uses accounting data to assess the efficiency of debt market pricing of firm-specific credit risk. Their study explicitly models default probabilities and uses a option-pricing approach to link the timing and probability of default to credit spreads. However, the broad focus of their paper does not allow it to provide direct insight into the specific effects of operating leverage on appropriate and actual responses bond pricing.

2.3. Why Markets Might (or Might Not) Treat Fixed Costs as a Debt-Like Item

Our measure of fixed costs consists mainly of contractual obligations that are executory in nature. These obligations represent predictable cash outflows that do not decrease in bad times and therefore might increase the risk of short-term liquidity problems that may lead to bankruptcy. Therefore, fixed costs reflect a firms future liability and according to structural models of debt pricing [Merton 1974], should affect the market price of corporate debt.

Given the strong evidence that investors treat operating lease obligations as if they are debt, why might they not treat a firm's aggregate fixed expenses similarly? One possibility is that investors treat operating lease obligations as debt because they meet the formal accounting definition of a liability—they are obligations that can be enforced by an outside party, and therefore the firm cannot use their discretion to avoid payment. In contrast, firms have the legal right to avoid many of their supposedly fixed expenses. Many expenses commonly treated as fixed in managerial accounting textbooks are discretionary, including investments in property, plant and equipment, payroll, heating and maintenance, back-office administration, and certain forms of marketing.

In principle, a firm facing a downturn in demand could sell off depreciable assets, lay off employees who are not subject to long-term contracts, choose not to heat or maintain buildings, slash back-office administration costs and curtail marketing. However, recent empirical evidence on cost structure suggests that such cost cutting not so easily accomplished (Anderson, Banker and Janakiraman [2003], Anderson and Lanen [2007]; Balakrishnan, Labro and Soderstrom [2010], Banker and Chen [2006]). While not all fixed costs are cash outflows, and not all fixed costs are true obligations, this literature suggests that it is possible to estimate a predictable component of outflows that will persist even in the presence of a sales decline.

From an economic perspective, we see little reason for justification for investors to ignore the debt-like nature of this component of aggregate outflows, other than the costs of processing the relevant information. However, markets may not efficiently treat fixed costs as a form of debt because too few investors have the ability or inclination to estimate them and incorporate them into their financial analyses. Unlike the case with operating leases, credit analysts do not appear to consider aggregate fixed costs in their methodologies, perhaps because the only way to estimate them (to our knowledge) is to conduct fairly complicated econometric estimations. Because so many investors, like credit analysts, typically avoid large sample econometric methods, we believe it is plausible that market prices will fail to fully reveal the information such methods can provide about firms' fixed costs and operating leverage. Such a result would be consistent with the

Incomplete Revelation Hypothesis (Bloomfield [2002]), which predicts that information that is more difficult to extract from publicly available data will be less completely revealed in market prices.

Information about fixed costs is particularly difficult to extract from public reports. Using the terms of standard setters in the Financial Statement Presentation project (FASB [2010], paragraphs 47-50), costs can differ by function, nature or measurement basis. *Function* refers to the activities in which an entity is engaged, such as selling, transporting or storing goods. *Nature* refers to the economic characteristics of attributes of financial statement items, including whether expenses are fixed or variable. *Measurement basis* refers to the method by which the item is measured (such as allocated historical cost or fair value), but could easily be broadened to include whether the item reflects a cash flow item or an accrual item.

Financial statements frequently label items by function or measurement basis, so trading strategies based on function or measurement basis are relatively easy to implement. Nevertheless, such trading strategies frequently generate excess returns, due to the relationship between the function or measurement basis of financial statement item to its nature. For example, Sloan [1996] effectively argues that accruals and cash flows (which have different measurement bases, and are therefore easily distinguishable) also have different natures because they reverse more quickly than cash flows, and uses this difference to formulate a profitable trading strategy. Similarly, Lev and Sougiannis [1996] effectively argue that R&D investments (easily identifiable by function) have a nature that leads the market to underreact to their long-term implications.

In contrast, financial statements make it very difficult to distinguish between expenses with a fixed nature and expenses with a variable nature. Incomplete revelation of operating leverage information would therefore be less surprising than incomplete revelation of accruals or investment in R&D—much less underreactions to undifferentiated net income (as in Bernard and Thomas [1989, 1990]).

3. Sample, Variable Definitions and Descriptive Statistics

3.1 The Sample

Our tests require data on corporate bond prices and quarterly accounting data. We remove financial institutions (SIC codes 6000–6999) and utilities (4800-4999) due to the unusual nature of the industries and the inelasticity of consumer demand for energy. Corporate bond data are obtained from the Trade Reporting and Compliance Engine (TRACE) database from the National Association of Securities Dealers (NASD). The TRACE data set covers 2002 to 2010. We obtain issue- and issuer-specific information from the Fixed Investment Securities Database (FISD). We eliminate trade cancelations and trade reversals from our data and focus only on investment grade bonds that have more than three years but less than ten years to maturity. We disregard short maturity bonds to avoid bond trades at maturity. We eliminate extreme yield observations - a yield higher than 50 or a yield lower than the yield of the Treasury curve at the same maturity (negative credit spread). To calculate the daily yield we value-weight the yields of the different transactions that occurred within each day, by the quantity[2]. Merging TRACE data set with Compustat yields a sample of 925,932 observations, which corresponds to 8,200 bond quarter observations or 3,777 firm quarter observations (each firm might have more than one traded bond).

3.2 Estimating capitalized Fixed Cost Leverage

Because many fixed costs are non-cash items that seem unlikely to be debt equivalents (depreciation and amortization, for example), we estimate the fixed component of total *cash*

[2] In untabulated tests, we use equally weighted spreads. This does not alter any of our inferences.

expense. We calculate the cash expense based on the difference between cash sales and cash flow from operations, excluding extraordinary items, interest and taxes, and including capital expenditure. Cash sales are estimated as sales for the quarter (CompuStat item SALEQ) plus the change in accounts receivable (CompuStat item ΔRECCHY). Cash flow from operations, before extraordinary items, interest and taxes is defined as the change in CompuStat item OANCFY, adjusted for interest and taxes[3]. As firms do not report the cash flow for the quarter, we estimate this amount to the difference between the reported numbers in consecutive quarters.

To make our analysis as transparent as possible, we use a univariate linear regression to estimate the fixed component of total cash outflow. For each firm and quarter, we estimate the variable component of cash expense by regressing the change in cash expense on the change in sales. Specifically, we run the following regression:

$$\Delta Cash\ Exp_{t,t-4} = \beta_0 + \beta_1 \Delta Sales_{t,t-4} + \varepsilon_t \qquad (1)$$

where $\Delta CashExp_{t,t-4}$ is the change in cash expense of the firm relative to four quarters previously, $\Delta Sales_{t,t-4}$ is change in total sale revenue relative to four quarters previously. Our analysis is likely to understate the variable component if costs are “sticky”, declining less in response to sales declines than they increase in response to sales increases, as argued by Anderson et al [2003]. We maintain the simpler specifications due to doubts about the robustness of estimates of cost stickiness expressed by Anderson and Lanen [2007], and the ambiguity about whether to classify costs that respond asymmetrically to sales changes as either fixed or variable.

We run Regression (1) for each firm-quarter using data the previous 40 quarters. Because this is a change specification, we expect β_0 to be zero. We estimate the variable component of the

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[3] CompuStat collects interest and taxes paid in cash for companies that report these. However, these variables contain many missing values. We therefore use interest expense from the income statement (XINTQ) as a proxy for interest paid in cash. We use and total income taxes from the income statement (TXTQ) and adjust them for deferred taxes (The change in TXDCY) and taxes payable (the change in TXACHY) that are reported on the statement of cash flows.

total cash expense as the product of sales and the β_1. The fixed component is calculated as the residual of the cash expense, $Cash\ Exp_{t,t-4} - \beta_1 \times SALES_{t,t-4}$. If the variable component is larger than the total expense, the variable component is set to equal the entire cash expense, while the fixed component is set to zero. If the slope coefficient is lower than zero, the variable component is set to zero, while the fixed component is set to equal the entire cash expense.

Once the fixed costs have been estimated, we estimate the implied liability they create and the resulting leverage adjustment. We capitalize the fixed component of the cash expense by multiplying the yearly outflow by 8, much as many researchers and credit analysts have done for operating leases (Moody's Investors Service [1996], Ely [1995], Imhoff et al. [1993], Altamuro et al. [2009], Ge et al. [2008]) -. We estimate the capitalized fixed cost leverage, FCLEV, as the ratio of the capitalized total cash expense to market value:

$$FCLEV = Capitalized\ fixed\ \cos ts_t \,/\, Market\ value\ of\ equity_t \tag{2a}$$

Our measure of (capitalized) fixed cost leverage captures capital intensity, as traditional fixed costs usually do, but in addition includes costs incurred as a result of long term supplier contracts or long term contracts with employees.

In our tests, we also decompose FCLEV into two terms by the equation

$$FCLEV = TOTCOST \times STRUCLEV \tag{2b}$$

where TOTCOST is total costs, calculated as the total cash expense defined above multiplied by 8, and divided by the market value of equity by the end of the fiscal year, and STRUCLEV is the cost structure leverage, calculated as the ratio of estimated fixed costs to total cash expense.[4]

[4] An alternative definition of operating leverage is the elasticity of earnings before interest and taxes in response to changes on sales. (e.g., Mandelker and Rhee [1984]). This specification raises two estimation problems: First, it cannot be used in the case of losses. Second, it ignores potential differences in growth trends between sales and operating earnings (O'Brien and Vanderheiden [1987]).

Table 1 reports the industry mean of the firm specific coefficients estimated using firm-specific regressions as well as the average total cash expense and the operating leverage ratio. The sample used to create Table 1 is the entire quarterly Compustat and not just the firms in our sample. The lowest variable-expenses slope coefficient (β_1 = 0.225) is reported for the Precious Metals, Non-Metallic, and Industrial Metal Mining industry. The highest coefficient is reported for wholesale (β_1 = 1.069). The resulting operating leverage ratio is inversely correlated with the variable expense slope coefficient, and is lowest for wholesale (0.140) and highest for the mining industry (0.671).

Table 2 demonstrates that the firms in our sample tend to be relatively large, with mean (median) market values of $18 billion ($10.26 billion). The mean ROA per quarter is 3.3%. The sample firms are levered on average, with a mean of 0.29 of financial leverage. The fixed cost leverage (FCLEV) distribution is skewed to the right with a mean of 0.293 and a median of 0.037. When decomposed into total costs and cost structure leverage, total costs has a mean (median) of 1.90 (1.48), which suggest that the capitalized total cash expense of the firm is larger on average than its total debt. The cost structure leverage distribution is similarly skewed to the right with a mean of 0.182 and a median of 0.035.

3.3 Consumer Sentiment

For simplicity, we use MCSI (*Michigan Consumer Sentiment Index*) as our sole macroeconomic indicator. The index is based on a survey of consumer confidence conducted by the University of Michigan. MCSI uses telephone surveys to gather information on consumer expectations regarding the overall economy. The preliminary report, which includes about 60% of total survey results, is released around the 10^{th} of each month. A final report for the prior month is released on the first of the month. The index gives a snapshot of whether consumers feel like spending money, and therefore provides useful information about future changes in consumer demand.

Our focus on *consumer* sentiment is quite different from the recent focus on investor sentiment in the finance literature. Baker and Wurgler [2007] use MCSI as one input into their model of investor sentiment as a way of understanding the behavior of stock returns and prices. However, in this paper we are interested in the predictive ability of sentiment for *accounting* data, specifically revenue. Baker and Wurgler document that “stocks of low capitalization, younger, unprofitable, high-volatility, non-dividend paying, growth companies or stocks of firms in financial distress are likely to be disproportionately sensitive to broad waves of investor sentiment” (Baker and Wurgler [2007]). However, firms whose revenues are more likely to be affected by *consumer* sentiment are those whose products (rather than financial situation) are more susceptible to the vicissitudes of the business cycle.

Figure 1 provides a graph of the MCSI over our sample period. Table 3, panel A, demonstrates that consumer sentiment (COSENT) is fairly persistent from quarter to quarter, with a coefficient of 0.790 in a regression of consumer sentiment onto the prior quarter’s value.

3.4 Changes in Consumer Sentiment and Future Firm Performance

To statistically test the ability of the change in the consumer sentiment index to predict future revenue, we form deciles based on the change in consumer sentiment to create a variable, ΔCOSENT, which takes a value of 10 for the observations with the largest increase in consumer sentiment and 1 for the observations with the largest decrease consumer sentiment. We then regress the changes in sales and change in income in the next four quarter (i=1-4) on the change in consumer sentiment index:

$$SALES_{i,t+n} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 R\Delta COSENT_t + \varepsilon_{it} \quad (3)$$

Panel B of Table 2 shows that consumer sentiment predicts sales growth two quarters ahead and onwards.

3.5 Credit Spreads Descriptive statistics

Credit spreads are defined as the difference between the yield of bond *i* and the associated yield of the treasury curve at the same maturity. We calculate the daily yield for each bond as the average of the yield of all daily transactions weighted by the quantity bought or sold. To calculate the credit spread, CS_{ti}, for bond *i* at day *t*, we use benchmark Treasury rates from the Federal Reserve Bank of Saint Louis for maturities of 3, 5, 7, 10, and 30 years and estimate the entire Treasury yield curve by linear interpolation schemes.

Table 4 Panel A shows descriptive statistics for credit spreads. The mean (median) spread is 183.4 (133.9) basis points. The mean (median) change in spread is 1.4 (-0.5) basis points. Panel B presents the persistence of credit spreads. The last column ("All") reports the persistence of spreads for all of the bonds in our sample. As expected, spreads exhibit a high and significant persistence. We further report the persistence by the contemporaneous spread level. The level of contemporaneous spread level is indicative of credit quality. Higher credit spreads are indicative of poorer credit quality, while lower credit spreads suggest higher credit quality. We find that the spreads persistence is lower for higher spreads than for lower spreads.

4. Associations between Consumer Sentiment, Operating Leverage and Credit Spreads

4.1 Business Risk and Operating Leverage

To validate our measures of operating leverage, we test whether it can explain the operating risk of the firm, measured as the standard deviation of the quarterly earnings before interest and taxes (Compustat OIADP), deflated by the beginning of the year total assets. We also interact fixed cost leverage with the change in sentiment because a fundamental feature of leverage (whether operating or financial) is that it amplifies the effects of both good and bad economic times. We estimate the following regressions:

$$\sigma_{ROAi,t+n} = \alpha_{IND} + \beta_1 \sigma_{\text{Revenue}i,t-n} + \beta_2 R\Delta COSENT_t + \beta_3 FCLEV_t + \beta_4 FCLEV_t \times R\Delta COSENT_t + \varepsilon_{it} \quad (4a)$$

$$\sigma_{ROAi,t+n} = \alpha_{IND} + \beta_1 \sigma_{\text{Revenue}i,t-n} + \beta_2 R\Delta COSENT_t + \beta_3 TOTCOST_t + \beta_4 STRUCLEV_t + \beta_5 TOTCOST_t \times R\Delta COSENT_t + \beta_6 STRUCLEV_t \times R\Delta COSENT_t + \varepsilon_{it} \quad (4b)$$

$\sigma_{ROAi,t+n}$ is the standard deviation of ROA over the next n quarters, where n=8 or 12. $\sigma_{REVENUEi,t-n}$ is the standard deviation of total revenue (in billions) in the past n quarters, where n=8 or 12. α_{IND} are industry fixed effects. Equation (4) estimates the relation between business risk and fixed cost leverage, while equation (4a) decomposes fixed cost leverage to total costs and cost structure leverage.

We expect a positive relation between the standard deviation of total revenue and the standard deviation of ROA. Higher standard deviation of total revenue could be driven by the underlying business risk as well as the seasonality in revenue. We control for industry fixed effects because business risk varies considerably with industry. Both fixed cost leverage and total costs are deflated by total assets, because we are estimating the operating risk of the firm. The results, shown in Table 5, indicate that the interaction between fixed cost leverage and sentiment is negative and statistically significant, suggesting that an increase in consumer sentiment has a more positive effect (namely, reduction in risk) when fixed cost leverage is high. Moreover, the main effect of fixed cost leverage is positive, consistent with operating leverage increasing the overall business risk of the firm.

We further decompose fixed cost leverage into total costs and cost structure leverage. As expected, we find that the interaction between cost structure leverage and the change in sentiment is negative and significant while the interaction between total costs and the change in sentiment is not. This suggests that business risk stems from the cost structure leverage effect and not from overall costs.

4.2 The Pricing of Contemporaneous Credit Risk

Having established the association between our measures of operating leverage, economic indicators and operating risk in Table 5, we now examine whether the credit-risk component of bond prices reveal this information.

To examine the contemporaneous association of changes in credit spreads with changes in consumer sentiment, the levels of leverage and the sentiment-leverage interaction, we estimate the following equations:

$$\begin{aligned}\Delta CS_{i,t} = \alpha_{IND} + \beta_1 FINLEV_t + \beta_2 FCLEV_t + \beta_3 R\Delta COSENT_t + \beta_4 FINLEV_t \times R\Delta COSENT_t + \\ \beta_5 FCLEV_t \times R\Delta COSENT_t + \beta_6 \Delta r_t^{10} + \beta_7 (\Delta r_t^{10})^2 + \beta_8 \Delta SLOPE_t + \varepsilon_{it}\end{aligned} \tag{5a}$$

$$\begin{aligned}\Delta CS_{i,t} = \alpha_{IND} + \beta_1 FINLEV_t + \beta_2 TOTCOST_t + \beta_3 STRUCLEV_t + \beta_4 R\Delta COSENT_t + \\ \beta_5 FINLEV_t \times R\Delta COSENT_t + \beta_6 TOTCOST_t \times R\Delta COSENT_t + \beta_7 STRUCLEV_t \times R\Delta COSENT_t + \\ + \beta_8 \Delta r_t^{10} + \beta_9 (\Delta r_t^{10})^2 + \beta_{10} \Delta SLOPE_t + \varepsilon_{it}\end{aligned} \tag{5b}$$

ΔCS is the change in credit spreads for the fiscal quarter. For quarters 1-3, ΔCS is the difference between the spread 45 days after the end of the previous quarter and 45 days after the end of the current quarter (when the 10-Q is filed); For the 4th quarter, ΔCS is the difference between the spread 45 days after the end of the previous quarter and 90 days after the end of the current quarter (when the 10-K is filed); *FINLEV, FCLEV, TOTCOST, STRUCLEV* and *RΔCOSENT* were previously defined. We include several control variables used by Collin-Dufresne et al. [2001] to account for macroeconomic factors that influence spreads but are unlikely to be driven by credit risk. r^{10} is the 10-year (long term) yield on a treasury bond. To capture potential nonlinear effects due to convexity, we also include the squared level of the term structure $(r^{10})^2$. *SLOPE* refers to the *Slope of Yield Curve,* defined as the difference between a long yield (10-year) and a short yield (2-year) on a treasury bond. All variables appear in a change form, as in Collin-Dufresne et al. [2001]. We do not include three control variables used by Collin-Dufresne et al. [2001]: the market spread by using Moody's information for AAA minus BBB rates, the S&P 500 return, and the change in the VIX index (which corresponds to a weighted average of eight implied volatilities of near-the-money options on the OEX (S&P 100) index. We omit these because they are correlated with our consumer sentiment measure, and are also indicators of credit risk, and therefore would muddy our inferences about whether the credit risk component of credit spreads are driven by an interaction of leverage and changes in the economic outlook.

Equation (6) is estimated at the bond level and not at the firm level. As each firm might issue multiple bonds, the residuals of bonds issued by the same firm might exhibit cross-correlation, as exogenous shocks affecting the firm will affect the spreads of all of its bonds. To account for this, the regression specification uses robust standard errors that are clustered by firm (see Rogers [1993], Petersen [2005]).

Table 6 shows the estimation results of the contemporaneous determinants of the credit risk component of credit spreads. Column I reports the estimation of regression (5a), while Column II reports the estimation of regression (5b). The main effects of each form of leverage and the change in consumer sentiment are included only to allow a clear interpretation of the leverage-sentiment interactions that are the focus of our analysis. We do not attempt to interpret these main effects, because they are typically qualified by significant interactions, and are therefore not particularly meaningful on their own. It is even harder to interpret the main effects of leverage, because they are capture levels, rather than changes, and are therefore particularly susceptible to omitted-variables biases.[5]

Both Columns I and II show strong evidence that credit spreads are contemporaneously influenced by the interaction between financial leverage and changes in sentiment. As predicted, changes in credit spreads are more negatively associated with changes in sentiment when financial leverage is higher. In contrast, the results provide no evidence that investors consider operating leverage in responding to changes in consumer sentiment. The interaction between fixed cost leverage and sentiment changes is insignificant in Column I, while the interactions of the operating leverage ratio with sentiment changes are insignificant in Column II.

4.3 Pricing of Future Changes in Credit Risk

Despite the evidence in Table 5 linking operating risk to the interaction of operating leverage and sentiment changes, Table 6 shows no evidence linking market assessments of credit risk to that interaction. To determine whether that non-result reflects incomplete revelation, we estimate the following models:

$$\Delta CS_{i,t+n} = \alpha_{IND} + \beta_1 FINLEV_t + \beta_2 FCLEV_t + \beta_3 R\Delta COSENT_t + \beta_4 FINLEV_t \times R\Delta COSENT_t + \beta_5 FCLEV_t \times R\Delta COSENT_t + \beta_6 \Delta r_t^{10} + \beta_7 (\Delta r_t^{10})^2 + \beta_8 \Delta SLOPE_t + \varepsilon_{it} \quad (6a)$$

$$\Delta CS_{i,t+n} = \alpha_{IND} + \beta_1 FINLEV_t + \beta_2 TOTCOST_t + \beta_3 STRUCLEV_t + \beta_4 R\Delta COSENT_t + \beta_5 FINLEV_t \times R\Delta COSENT_t + \beta_6 TOTCOST_t \times R\Delta COSENT_t + \beta_7 STRUCLEV_t \times R\Delta COSENT_t + \beta_8 \Delta r_t^{10} + \beta_9 (\Delta r_t^{10})^2 + \beta_{10} \Delta SLOPE_t + \varepsilon_{it} \quad (6b)$$

$\Delta CS_{i,t+n}$ is the cumulative change in credit spreads in the next n quarters. We consider 2 and 3 quarters ahead. All control variables are as described above. As in Table 6, we focus the

[5] Similar to previous findings by Longstaff and Schwartz [1995] and Collin-Dufresne, Goldstein, and Martin [2001], r^{10} lowers the credit spread for all bonds.

discussion on the interactions between the leverage measures and the change in sentiment, and do not attempt to interpret coefficients on the main effects of levels variables.

The results, presented in Table 7, provide strong evidence credit spreads fail to incorporate the interaction between operating leverage and sentiment changes in a timely manner. Columns I and II report results for regressions (6a) and (6b) for credit spread changes two quarters after the sentiment change, while Columns III and IV report the corresponding results three quarters ahead. Columns I and III show a negative and statistically significant coefficient on the interaction between the lagged change in sentiment and fixed cost leverage, indicating that prices initially underreacted to the exacerbating effect of greater operating leverage. The contemporaneous reaction to the lagged change in sentiment was too small for firms with high fixed costs, and/or too large for firms with low fixed costs. Results are analogous in Columns II and IV, which show a negative and statistically significant coefficient on the interaction between the lagged change in sentiment and operating leverage ratios. The contemporaneous reaction to the lagged change in sentiment was too small for firms with high operating leverage ratios, and/or too large for firms with low operating leverage ratios.

The results also suggest that the contemporaneous market reactions appropriately reflect the exacerbating effect of financial leverage. The coefficient on the interaction between financial leverage and sentiment changes is significant only in Column I, which uses fixed costs to measure operating leverage and examines credit spread changes two quarters after the sentiment changes. We are reluctant to conclude that the market responded inefficiently to information about financial leverage given such mixed evidence.

Fixed costs leverage has a significant economic impact on the future change in spreads. According to Model I, increasing fixed cost leverage from 0 to 0.413 (the interquartile range that is presented in Table 2) results in an overall reduction in changes of credit spreads in the next two quarters of 11.3 basis points (0.113×0.413-0.043×9×0.413) when the increase in sentiment is the highest, and an increase in spreads of 4.7 basis points (0.113×0.413-0.043×0×0.413) when the decrease in sentiment is the highest basis points (-0.022×0×0.413). Given that the average spread interquartile range for the change in spreads in our sample is 49.1 basis points (Table 2), these are substantial numbers.

5. Supplemental Analyses

5.1 Results by Consumer Sentiment and Credit Spread Terciles

To provide insight into whether subsequent predictability of credit spread changes are driven by increases or decreases in consumer sentiment, we divide our sample into three equal groups (terciles) according to the change of consumer sentiment, and run regressions separately. These results are more difficult to interpret than the interactions in Tables 6 and 7, because they reflect coefficients on levels of leverage within each tercile. However, the analysis does allow us to identify differences in how the forms of leverage moderate responses to positive and negative changes in consumer sentiment

Table 8 Panel A presents the results for the contemporaneous spreads. We find that financial leverage is priced contemporaneously in all three terciles, while fixed cost leverage and cost structure leverage are not priced contemporaneously in any of the terciles. Results for future spread changes indicate that pricing inefficiencies are generally concentrated in the tercile with large increases in credit spreads. We observe that firms with higher fixed costs or cost structure ratios exhibit larger declines in spreads over the two and three quarters after a large increase in consumer sentiment. In contrast, firms with higher cost structure ratios do not exhibit significantly larger increases in spreads after large decreases in sentiment. Firms with higher fixed costs do exhibit larger increases in spreads after large decreases in sentiment, but the coefficient is approximately half that observed after large increases in sentiment. These results suggest that bond prices are more susceptible to overpricing than underpricing, which is consistent with the observation that bonds are difficult to sell short. However, we reiterate that the results should be interpreted with caution, given their reliance on levels of leverage that are not interacted with changes. The need for caution is reinforced by statistically-significant coefficients on financial leverage two quarters after large increases in sentiment under both specifications of operating leverage, and three quarters after any change in leverage, with the exception of the specification including operating leverage ratios after large decreases. Given the weak evidence of inefficient reactions to financial leverage in Tables 6 and 7, these results seem more likely to reflect omitted variables biases than true inefficiencies. Nevertheless, the differences in coefficients across the terciles are easier to interpret, and suggest that overpricing errors are more prevalent than underpricing errors.

5.2 Controlling for Credit Ratings

After establishing the predictive power of operational leverage on future credit spreads, we examine whether credit agencies take this information into account. Ex-ante, there is little reason to believe rating agencies adjust for this type of leverage, as they do not include it at any of their publications. To examine this empirically, we repeat the analysis in tables 6 and 7 but include the credit ratings on the right hand side. In order to include the ratings in the regression, we convert them into numbers between 2 (for AAA) and 29 (for default), following Compustat manual. If the rating agencies do adjust for operating leverage, then the ratings should subsume the effect of operating leverage. Table 9 presents the results. We find no evidence that credit ratings are priced contemporaneously, after accounting for the other variables in the model (Panel

A), nor does including this variable affect any of our inferences from our main analysis (Panels A, B and C).

6. Summary and Conclusion

This study provides evidence that changes in consumer sentiment increase have predictably greater effects on operating risks for firms with higher operating leverage, but that bond markets fail to incorporate this information into the price of firm-specific credit risk (the credit spread). As a result, credit spreads drift downward more for firms with higher operating leverage in the quarters after improvements in consumer sentiment, and drift upward (though less robustly) in the quarters after declines in consumer sentiment. In contrast, we see little evidence that bond markets make a similar mistake in pricing the implications of financial leverage. The results are consistent with Bloomfield's [2002] Incomplete Revelation Hypothesis, which asserts that markets respond less completely to information that is difficult to process and not widely distributed. Unlike information about leverage arising from debt or operating leases, information about operating leverage must be estimated through large-sample econometric methods, and is rarely emphasized in by firms, credit analysts or the popular press.

While our results indicate that bond prices are informationally inefficient, mispricing primarily reflects the overvaluation of bonds for firms with high operating leverage when consumer sentiment improves. Profitable arbitrage would be difficult to manage, given the high costs of short-selling bonds. However, under-recognition of credit risk in difficult times seems likely to cause both a misallocation of capital and a possible source of systemic risk. As a result, our arguments provide additional motivation for policies that can improve reporting of operating leverage, such as the changes in financial statement presentation that were proposed by standard setters, but are now "on hold" [FASB, 2010].

Our analysis is intentionally quite simple, relying on a single leading economic indicator (consumer sentiment) and very simple measures of operating leverage (drawn from a univariate linear regression). Natural extensions would entail incorporating a broader set of leading economic indicators and more sophisticated measures of operating leverage. We expect that such changes would strengthen the results we report. More challenging extensions could examine whether the extent of mispricing varies with the availability of information about operating leverage. Unfortunately, occasions in which investors have ready access to such information are likely too rare to allow adequate statistical power.

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TABLE 1
Fixed Costs by Industry

The table presents mean total cash expense, operating leverage estimated by firm and averaged by industry. N is the number of firm-quarter observations. β_0 and β_1 are estimated from a regression of the change in cash expense on the change in sales.

Industry (Fama—French 30 industries)	N	Cash Exp	STRUCLEV	β_0	β_1
Food Products	3,896	682	0.217	3.522	0.778
Beer & Liquor	512	1,332	0.302	8.785	0.701
Tobacco Products	191	2,558	0.374	32.530	1.024
Recreation	4,054	147	0.346	1.783	0.691
Printing and Publishing	1,972	336	0.233	2.653	0.795
Consumer Goods	3,021	498	0.195	-0.930	0.862
Apparel	2,578	276	0.228	0.407	0.800
Healthcare, Medical Equipment, Pharmaceutical Products	19,015	221	0.421	1.610	0.678
Chemicals	3,672	451	0.254	0.676	0.819
Textiles	889	188	0.175	1.012	0.862
Construction and Construction Materials	5,880	398	0.215	1.651	0.819
Steel Works Etc	2,550	502	0.175	0.773	0.878
Fabricated Products and Machinery	6,575	347	0.185	0.177	0.874
Electrical Equipment	3,379	228	0.199	1.312	0.913
Automobiles and Trucks	2,446	579	0.148	0.700	0.902
Aircraft, ships, and railroad equipment	1,327	1,030	0.174	4.362	0.843
Precious Metals, Non-Metallic, and Industrial Metal Mining	3,791	121	0.671	4.237	0.225
Coal	226	192	0.410	2.120	0.659
Petroleum and Natural Gas	7,719	384	0.372	2.770	0.874
Personal and Business Services	17,200	213	0.263	-0.503	0.828
Business Equipment	21,048	212	0.284	1.360	0.761
Business Supplies and Shipping Containers	2,922	887	0.159	2.014	0.897
Transportation	4,472	941	0.230	5.307	0.827
Wholesale	6,184	516	0.140	0.819	1.069
Retail	8,307	1,185	0.164	4.590	0.889
Restaurants, Hotels, Motels	3,518	280	0.215	1.936	0.766

TABLE 2
Descriptive Statistics

The table presents descriptive statistics about the bond issuers. All variables are defined in the appendix.

Stat	*MV*	*TA*	*Sales*	*ROA*	*FINLEV*	*FCLEV*	*STRUCLEV*	*TOTCOST*
P5	1,898	2,153	432	0.008	0.063	0.000	0.000	0.365
P25	4,740	4,221	1,051	0.021	0.134	0.000	0.000	0.840
Mean	17,947	13,834	2,690	0.033	0.287	0.293	0.182	1.903
Median	10,259	8,568	1,864	0.030	0.222	0.037	0.035	1.485
P75	20,193	19,844	3,601	0.042	0.371	0.413	0.279	2.383
P95	60,631	37,302	8,044	0.068	0.733	1.245	0.877	5.395
Std	24,709	13,761	2,338	0.023	0.223	0.509	0.270	1.606

TABLE 3
Sales and ROA Growth and Consumer Sentiment

Panel A presents the quarterly persistence of consumer sentiment. Panel B presents regression of the future sales on current sales and ranked consumer sentiment. All variables are defined in the appendix. T statistics are calculated based on heteroskedasticity-corrected standard errors. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

Panel A: The persistence of average consumer sentiment over time

	Dependent = $COSENT_{t+1}$
$COSENT_t$	0.790**
	(80.99)
Constant	16.192**
	(19.79)
R-squared	0.642

Panel B: Consumer sentiment and future Sales Growth

	Dependent Variable =			
	$Sales_{t+1}$	*$Sales_{t+2}$*	*$Sales_{t+3}$*	*$Sales_{t+4}$*
$Sales_t$	0.965**	0.965**	0.965**	0.961**
	(167.2)	(167.1)	(169.1)	(150.4)
RΔCOSENT	-0.000	0.000**	0.001**	0.002**
	(-1.577)	(2.172)	(7.660)	(9.835)
Constant	0.008**	0.006**	0.002	0.001
	(5.075)	(3.595)	(1.232)	(0.630)
R-squared	0.956	0.957	0.957	0.949

TABLE 4

Credit Spreads Descriptive Statistics

The table presents descriptive statistics. Panel A presents descriptive statistics about credit spreads in our sample while panel B presents regressions of the persistence in credit spread by current level of credit spread. High (low) CS is the highest (lowest) tercile of contemporaneous credit spread. All variables are defined in the appendix. T statistics are calculated based on clustered and heteroskedasticity-corrected standard errors. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

Panel A: Credit spreads descriptive statistics

Stat	*CS (%)*	*ΔCS*
P5	0.508	-1.367
P25	0.844	-0.265
Mean	1.834	0.014
Median	1.339	-0.005
P75	2.266	0.226
P95	4.918	1.479
Std	1.585	1.049

Panel B: The persistence of Credit spreads

	Dependent = CS_{t+1}			
	Lowest CS		*Highest CS*	*All*
CS_t	0.791**	1.119**	0.673**	0.798**
	(12.98)	(20.63)	(20.70)	(54.42)
Constant	0.234**	-0.029	0.950**	0.382**
	(5.161)	(-0.410)	(8.587)	(13.08)
R-squared	0.144	0.207	0.373	0.614
Industry Fixed Effects	Yes	Yes	Yes	Yes

TABLE 5
Operating Leverage and Operating Risk

The table presents regressions of the standard deviation of ROA in the next 8 and 12 quarters on operating fixed cost leverage and ranked change in consumer sentiment. ROA is defined as income after depreciation (and before interest and taxes) deflated by the beginning of the year total assets. Fixed cost leverage is further decomposed to total costs and cost structure leverage. All variables are defined in the appendix. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

	Dependent Variable = $\sigma_{ROA,8}$		Dependent Variable = $\sigma_{ROA,12}$	
	I	*II*	*III*	*IV*
$\sigma_{REVENUE}$	0.325**	0.333**	0.143**	0.136**
	(5.224)	(5.330)	(2.506)	(2.361)
FCLEV	0.218**		0.223**	
	(3.277)		(3.425)	
TOTCOST		0.102**		0.135**
		(3.235)		(4.327)
STRUCLEV		0.276**		0.243**
		(2.302)		(2.051)
RΔCOSENT	-0.013*	-0.016	-0.006	-0.008
	(-1.891)	(-1.304)	(-0.847)	(-0.621)
FCLEV ×RΔCOSENT	-0.044**		-0.044**	
	(-3.597)		(-3.649)	
TOTCOST × RΔCOSENT		0.006		0.004
		(1.090)		(0.819)
STRUCLEV × RΔCOSENT		-0.102**		-0.092**
		(-4.737)		(-4.308)
R-squared	0.211	0.224	0.221	0.236
Industry Fixed Effects	Yes	Yes	Yes	Yes

TABLE 6
Explaining Contemporaneous Credit Spreads

The table presents regressions of contemporaneous changes in credit spreads on financial leverage, fixed cost leverage, the ranked change in consumer sentiment and controls. Fixed cost leverage is further decomposed to total costs and cost structure leverage. All variables are defined in the appendix. T statistics are calculated based on clustered and heteroskedasticity-corrected standard errors. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

	Dependent = ΔCS_t	
	I	*II*
FINLEV	0.972**	0.621**
	(5.331)	(3.052)
FCLEV	-0.062	
	(-1.672)	
TOTCOST		0.067**
		(2.523)
STRUCLEV		-0.058
		(-0.616)
RΔCOSENT	-0.016**	-0.013
	(-1.742)	(-1.208)
FINLEV × RΔCOSENT	-0.223**	-0.174**
	(-6.119)	(-4.583)
FCLEV × RΔCOSENT	0.009	
	(1.142)	
TOTCOST × RΔCOSENT		-0.006
		(-1.177)
STRUCLEV × RΔCOSENT		0.003
		(0.160)
Δr^{10}	-0.656**	-0.653**
	(-16.55)	(-16.22)
Δslope	0.769**	0.763**
	(17.04)	(16.24)
$(\Delta r^{10})^2$	-0.385**	-0.376**
	(-4.352)	(-4.318)
R-squared	0.257	0.254
Industry Fixed Effects	Yes	Yes

TABLE 7
Predicting Future-Changes of Credit Spreads

The table presents regressions of the change in credit spreads in the following two and three quarters on financial leverage, fixed cost leverage, the ranked change in consumer sentiment and controls. Fixed cost leverage is further decomposed to total costs and cost structure leverage. All variables are defined in the appendix. T statistics are calculated based on clustered and heteroskedasticity-corrected standard errors. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

	Dependent = ΔCS_{t+2}		*Dependent = ΔCS_{t+3}*	
	I	*II*	*III*	*IV*
FINLEV	-0.392	-0.421	-1.227**	-0.949**
	(-1.312)	(-1.195)	(-3.080)	(-1.987)
FCLEV	0.113		0.186*	
	(1.656)		(1.915)	
TOTCOST		0.033		-0.034
		(0.771)		(-0.561)
STRUCLEV		0.275		0.408*
		(1.543)		(1.690)
RΔCOSENT	-0.107**	-0.085**	-0.136**	-0.112**
	(-8.440)	(-6.149)	(-7.494)	(-5.624)
FINLEV × RΔCOSENT	-0.084**	-0.057	-0.020	-0.007
	(-2.123)	(-1.290)	(-0.383)	(-0.112)
FCLEV × RΔCOSENT	-0.043**		-0.061**	
	(-2.764)		(-3.093)	
TOTCOST × RΔCOSENT		-0.013*		-0.013
		(-1.886)		(-1.510)
STRUCLEV × RΔCOSENT		-0.087**		-0.107**
		(-2.396)		(-2.479)
Δr^{10}	0.497**	0.493**	0.162**	0.147**
	(8.744)	(8.474)	(2.685)	(2.391)
Δslope	-0.399**	-0.389**	-0.047	-0.029
	(-8.197)	(-8.231)	(-0.977)	(-0.587)
$(\Delta r^{10})^2$	-1.101**	-1.063**	-0.962**	-0.931**
	(-9.835)	(-9.838)	(-11.69)	(-11.40)
R-squared	0.215	0.211	0.164	0.161
Industry Fixed Effects	Yes	Yes	Yes	Yes

TABLE 8

Credit Spreads and Future Changes by Changes in Consumer Sentiment

Panel A presents regressions of contemporaneous changes in credit spread on financial leverage, fixed cost leverage, the ranked change in consumer sentiment and controls. Fixed cost leverage is further decomposed to total costs and cost structure leverage. Increase (Decrease) in consumer sentiment is the highest (lowest) tercile of the change consumer sentiment. Panels B and C repeat the analysis for changes in credit spreads in the following two and three quarters respectively. All variables are defined in the appendix. T statistics are calculated based on clustered and heteroskedasticity-corrected standard errors. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

Panel A: Contemporaneous spread levels

	Consumer Sentiment Decrease				*Consumer Sentiment Increase*	
FINLEV	0.906**	0.578**	-0.458**	-0.662**	-0.607**	-0.472**
	(5.978)	(2.940)	(-3.163)	(-3.566)	(-5.092)	(-3.779)
FCLEV	-0.035		0.014		0.016	
	(-0.911)		(0.298)		(0.470)	
TOTCOST		0.090**		0.056*		-0.016
		(2.357)		(1.842)		(-0.611)
OPERLEV		-0.033		0.041		0.077
		(-0.391)		(0.461)		(1.192)
RΔCOSENT	0.234**	0.230**	-0.212**	-0.213**	-0.117**	-0.115**
	(6.809)	(6.816)	(-6.427)	(-6.301)	(-7.177)	(-6.380)
Δr^{10}	0.144	0.119	-0.596**	-0.586**	-0.448**	-0.444**
	(1.272)	(1.060)	(-4.456)	(-4.403)	(-6.808)	(-6.369)
Δslope	1.119**	1.108**	0.458*	0.461*	0.200**	0.199**
	(16.43)	(16.05)	(1.739)	(1.764)	(2.467)	(2.519)
$(\Delta r^{10})^2$	0.380**	0.367**	-0.354*	-0.369*	-0.586**	-0.594**
	(2.650)	(2.612)	(-1.828)	(-1.910)	(-4.651)	(-4.596)
R-squared	0.404	0.403	0.135	0.140	0.175	0.168
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Future spread changes – Two Quarters Ahead

	Consumer Sentiment Decrease				*Consumer Sentiment Increase*	
FINLEV	-0.433	-0.517	-0.354	-0.410	-0.886**	-0.745**
	(-1.445)	(-1.557)	(-1.348)	(-1.419)	(-5.093)	(-3.764)
FCLEV	0.127**		-0.015		-0.232**	
	(2.339)		(-0.272)		(-3.924)	
TOTCOST		0.045		0.026		-0.065*
		(0.793)		(0.754)		(-1.834)
OPERLEV		0.159		0.090		-0.427**
		(1.089)		(0.964)		(-3.694)
RΔCOSENT	-0.533**	-0.534**	-0.286**	-0.293**	-0.341**	-0.333**
	(-11.18)	(-11.19)	(-8.516)	(-8.752)	(-14.33)	(-13.59)
Δr^{10}	0.046	0.049	0.230**	0.241**	-0.169**	-0.195**
	(0.252)	(0.274)	(2.423)	(2.590)	(-2.365)	(-2.920)
Δslope	-1.064**	-1.045**	0.209	0.219	0.368**	0.354**
	(-10.14)	(-9.731)	(1.515)	(1.633)	(4.381)	(4.328)
$(\Delta r^{10})^2$	-0.642**	-0.639**	-2.330**	-2.295**	-1.072**	-0.922**
	(-2.866)	(-2.883)	(-13.38)	(-13.32)	(-6.640)	(-7.029)
R-squared	0.310	0.307	0.364	0.357	0.272	0.257
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Future spread changes – Three Quarters Ahead

	Consumer Sentiment Decrease				*Consumer Sentiment Increase*	
FINLEV	-0.962**	-0.759	-0.806**	-0.696**	-0.969**	-0.699**
	(-2.185)	(-1.410)	(-3.129)	(-2.513)	(-4.362)	(-3.221)
FCLEV	0.170*		0.052		-0.295**	
	(1.904)		(0.917)		(-3.854)	
TOTCOST		-0.019		-0.017		-0.107**
		(-0.219)		(-0.329)		(-2.461)
OPERLEV		0.334		0.160		-0.435**
		(1.371)		(1.438)		(-3.513)
RΔCOSENT	-0.826**	-0.821**	-0.357**	-0.359**	-0.379**	-0.367**
	(-11.84)	(-11.75)	(-11.18)	(-11.28)	(-11.11)	(-10.55)
Δr^{10}	-1.079**	-1.094**	0.307**	0.305**	-0.380**	-0.411**
	(-4.210)	(-4.235)	(2.658)	(2.602)	(-4.068)	(-4.549)
Δslope	-0.989**	-0.953**	0.985**	0.967**	0.206*	0.178*
	(-6.512)	(-6.125)	(4.735)	(4.702)	(1.933)	(1.742)
$(\Delta r^{10})^2$	-0.967**	-0.979**	-1.879**	-1.861**	-1.034**	-0.863**
	(-3.289)	(-3.367)	(-13.49)	(-13.52)	(-4.969)	(-4.852)
R-squared	0.212	0.207	0.527	0.522	0.303	0.289
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 9
Credit Spreads and Future Changes Controlling for Credit Ratings

The table presents regressions of contemporaneous and future changes in credit spreads on financial leverage, fixed cost leverage, the ranked change in consumer sentiment, controlling for credit ratings. Fixed cost leverage is further decomposed to total costs and cost structure leverage. All variables are defined in the appendix. T statistics are calculated based on clustered and heteroskedasticity-corrected standard errors. Single and double asterisks (* and **) indicate significance at or beyond 5% and 10% levels, respectively (two-tailed tests).

Panel A: Contemporaneous spreads

	Dependent $=\Delta CS_t$	
	I	*II*
FINLEV	0.973**	0.621**
	(5.341)	(3.050)
FCLEV	-0.064*	
	(-1.709)	
TOTCOST		0.068**
		(2.546)
STRUCLEV		-0.067
		(-0.710)
RΔCOSENT	-0.015	-0.012
	(-1.638)	(-1.123)
FINLEV × RΔCOSENT	-0.223**	-0.175**
	(-6.142)	(-4.592)
FCLEV × RΔCOSENT	0.010	
	(1.171)	
TOTCOST × RΔCOSENT		-0.007
		(-1.197)
STRUCLEV × RΔCOSENT		0.004
		(0.210)
r^{10}	-0.654**	-0.651**
	(-16.55)	(-16.22)
slope	0.765**	0.759**
	(16.85)	(16.03)
$(r^{10})^2$	-0.377**	-0.369**
	(-4.273)	(-4.241)
ΔCREDIT RATINGS	-0.033	-0.027
	(-0.433)	(-0.351)
R-squared	0.256	0.253
Industry Fixed Effects	Yes	Yes

Panel B: Future spread changes

	Dependent = ΔCS_{t+2}		Dependent = ΔCS_{t+3}	
	I	*II*	*III*	*IV*
FINLEV	-0.421	-0.445	-1.267**	-0.980**
	(-1.376)	(-1.247)	(-3.109)	(-2.025)
FCLEV	0.106		0.186*	
	(1.561)		(1.895)	
TOTCOST		0.030		-0.038
		(0.705)		(-0.627)
STRUCLEV		0.276		0.432*
		(1.527)		(1.771)
RΔCOSENT	-0.109**	-0.088**	-0.138**	-0.114**
	(-8.366)	(-6.251)	(-7.445)	(-5.669)
FINLEV × RΔCOSENT	-0.079**	-0.053	-0.016	-0.003
	(-1.968)	(-1.174)	(-0.305)	(-0.055)
FCLEV × RΔCOSENT	-0.041**		-0.059**	
	(-2.627)		(-2.998)	
TOTCOST × RΔCOSENT		-0.012*		-0.013
		(-1.840)		(-1.466)
STRUCLEV × RΔCOSENT		-0.083**		-0.105**
		(-2.291)		(-2.417)
Δr^{10}	0.493**	0.489**	0.159**	0.144**
	(8.655)	(8.398)	(2.629)	(2.327)
Δslope	-0.395**	-0.386**	-0.047	-0.028
	(-8.080)	(-8.124)	(-0.977)	(-0.580)
$(\Delta r^{10})^2$	-1.093**	-1.054**	-0.962**	-0.930**
	(-9.849)	(-9.854)	(-11.68)	(-11.37)
ΔCREDIT RATINGS	-0.167	-0.180*	-0.118	-0.132
	(-1.536)	(-1.678)	(-0.903)	(-1.026)
R-squared	0.216	0.211	0.165	0.163
Industry Fixed Effects	Yes	Yes	Yes	Yes

APPENDIX
Variable Definitions

Dependent Variables

Name	*Definition*
ΔCS	The change in credit spreads during the fiscal quarter. Credit spreads are defined as the difference between the yield of bond i and the associated yield of the Treasury curve at the same maturity. For a given quarter, ΔCS is the difference between the spread 45 days after the end of the previous quarter and 45 days after the end of the current quarter. For the first quarter 90 days are used).
$GSales_{t+n}$	Percentage seasonal growth in revenue defined as the difference between the revenue n quarters ahead and the revenue in the corresponding quarter in the previous year.
$\sigma_{ROA\,i,t+n}$	The standard deviation of ROA in the next n quarters. ROA is defined as income after depreciation (and before interest and taxes) deflated by the beginning of the year total assets; n=8 or 12.
$\sigma_{REVENUE\,i,t-n}$	The standard deviation of total revenue in the past n quarters; n=8 or 12.

Independent Variables

Name	*Definition*
r^{10}	10-year (long term) yield on a treasury bond.
SLOPE	The difference between 10 and 2 year treasury yield (captures the slope of yield curve).
$(r^{10})^2$	The squared yield on a treasury bond (captures potential nonlinear effects due to convexity).
AAA-BAA	The spread between AAA and BAA seasoned corporate bond yields.
RCOSENT	Decile rank of MCSI (Michigan Consumer Sentiment Index)
Cash expense	Total cash expense calculated as cash quarterly sales minus income before interest and taxes plus capital expenditure, excluding tax benefit of employee stock options.
FINLEV	Financial leverage, calculated as Short-term debt + Long-term debt divided by the market value of equity by the end of the fiscal year.
TOTCOST	Total costs, calculated as the total cash expense defined above multiplied by 8, and divided by the market value of equity by the end of the fiscal year.
STRUCLEV	Cost structure, calculated as estimated fixed costs / total cash expense.
FCLEV	(Capitalized) fixed cost leverage, calculated as estimated fixed costs multiplied by 8, and divided by the market value of equity by the end of the fiscal year.
CREDIT RATINGS	End of quarter S&P issuer debt rating (COMPUSTAT data item SPLTICRM) converted in rank order to the multinomial debt rating variable (AAA = 2, Default = 29).