Inflation Risk and Yield Spread Changes

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Abstract

Inflation risk explains a significant share of the systematic variation in yield spread changes beyond credit factors and intermediation frictions. Movements in expected inflation directly affect the real value of debt and, consequently, bond prices. I show that shocks to inflation expectations, volatility, and cyclicality—derived from inflation swap prices—are important determinants of yield spread movements. Loading patterns become more pronounced with higher ex-ante default risk and cash-flow flexibility but weaken with refinancing intensity. To rationalize the findings, I show that the same patterns emerge in a model of debt rollover risk with stochastic inflation and sticky cash flows.

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I. Introduction

Corporate yield spread changes are empirically challenging to explain. Collin-Dufresne, Goldstein and Martin (2001) (hereafter CDGM) show that fundamental credit risk variables play a role, yet a significant amount of unexplained variation persists. Much of this unexplained systematic variation is tied to a common component, suggesting the presence of potential unidentified factors alongside standard credit risk variables. As inflation rises, the real value of nominal debt decreases, which reduces firms' default risk. Given the overwhelming presence of nominal debt in the U.S. corporate sector, a natural conjecture is that inflation risk constitutes a substantial piece of the puzzling unexplained variation.

In this paper, I investigate the ability of inflation risk to explain the large systematic unexplained variation in yield spread changes. In particular, I refer to inflation risk as a combination of three proxies: (1) a proxy for innovations in expected inflation that captures nominal rigidities associated with long-term nominal debt, (2) an inflation uncertainty proxy reflecting cash-flow volatility due to price uncertainty, and (3) a proxy for inflation cyclicality that reflects state-dependent effects of inflation. In yield spread changes regressions, inflation risk accounts for roughly a quarter of the unexplained systematic variation beyond standard credit risk and intermediation variables.

I begin the analysis by showing that the unexplained variation in yield spread changes, along with its significant residual commonality, persists in the most recent U.S. corporate bond market data from 2004 to 2021. Similar to previous studies (see, e.g., CDGM, Friewald and Nagler (2019); He, Khorrami and Song (2022); Eisfeldt, Herskovic and Liu (2024)), credit risk variables have limited explanatory power for monthly yield spread changes, with a mean adjusted R^2 of 35.5% in time-series regressions. Using principal component analysis (PCA), I confirm that the regression residuals are highly cross-correlated, with 79.4% of systematic residual variation explained by the first principal component, highlighting a significant common factor not captured by credit proxies.

The main contribution of this paper is to examine whether the systematic residual variation is related to inflation risk. Existing research suggests that inflation impacts firms' outcomes and credit spreads (e.g., David (2008); Kang and Pflueger (2015); Bhamra, Dorion, Jeanneret and Weber (2022)). However, it lacks a detailed understanding of how various aspects of inflation contribute to yield spread changes, as well as a robust method for measuring these effects, which complicates empirical analysis. To address this gap, I propose inflation risk proxies grounded in theory, along with a market-based approach for their measurement.

I create the inflation risk proxies by employing zero-coupon inflation swaps—forward contracts whereby the inflation buyer pays a predetermined fixed nominal rate and receives an inflation-linked payment from the seller. Zero-coupon inflation swaps are among the most liquid over-the-counter (OTC) inflation-linked derivative products and, along with nominal Treasuries, offer an alternative measure of real yields (e.g., Fleming and Sporn (2013); Fleckenstein, Longstaff and Lustig (2016); Diercks, Campbell, Sharpe and Soques (2023)).[1] Since these swaps are based on market contracts related to inflation views, they directly link asset prices with longer-duration cash flows to market participants' inflation expectations. Additionally, to account for the heterogeneous durations of bonds, I match the swap maturity to each bond's duration, using the corresponding swap rates as a proxy for expected inflation and as a basis for constructing inflation risk proxies.

Several theories link inflation to default risk through a sticky leverage channel (e.g., Bhamra, Fisher and Kuehn (2011); Gomes, Jermann and Schmid (2016); Bhamra, Dorion, Jeanneret and Weber (2022)). When expected inflation rises, the real value of debt decreases, reducing default probabilities and narrowing yield spreads. Furthermore, over the past two decades, inflation has been positively correlated with real growth, which further lowers default probabilities by increasing expected cash flows. In yield spread changes regressions, innovations in expected inflation—proxied by changes in inflation swap rates—account for 19.7% of the systematic variation in residuals.

In addition to inflation's direct effect on default risk, inflation uncertainty contributes by

[1]See Christensen, Lopez and Rudebusch (2016) and Fleckenstein, Longstaff and Lustig (2017) for an application of inflation swaps and options to study the nature of deflation risk.

increasing the volatility of firm's cash flows (e.g., David (2008); Kang and Pflueger (2015)). Inflation uncertainty creates unpredictability in future prices, which, in turn, increases uncertainty in expected cash flows, raising default risk and widening yield spreads. To measure this effect, I use the monthly standard deviation of the inflation swap rate, which, in yield spread changes regressions, explains 18.1% of the systematic residual variation.

Finally, inflation cyclicality captures the risk of low-inflation recessions, where firms face increased default risk due to higher real debt values and weakened repayment ability (e.g., Kang and Pflueger (2015); Cieslak and Pflueger (2023)).[2] This cyclical risk leads to wider yield spreads beyond the effects of expected deflation. I capture this effect using the stock-bond correlation, which has been shown to be inversely related to the correlation between inflation and real growth (e.g., Campbell, Pflueger and Viceira (2020); Fang, Liu and Roussanov (2023); Bonelli, Palazzo and Yamarthy (2025)). The effect of inflation cyclicality, although smaller, explains 4.6% of the systematic residual variation in yield spread changes.

Next, I evaluate the aggregate impact of the inflation risk proxies on yield spread changes. Collectively, these proxies explain 37.5% of the unexplained systematic variation beyond credit risk variables, increasing the mean adjusted R^2 in CDGM's model by 8.6 percentage points, accounting for approximately one-fifth of the model's explained variation. Building on these findings, I examine whether inflation risk is significantly related to the puzzling common component in yield spread changes. This common component represents a systematic factor that traditional credit risk variables cannot fully explain, and understanding it is essential for gaining deeper insight into bond pricing dynamics. By regressing this common component on the inflation risk proxies, I find that inflation risk explains 21.4% of its variation. These findings highlight inflation risk as a key driver of bond market dynamics and provide new insights into bond pricing.

Other recent studies have explored the systematic unexplained variation in yield spreads changes, with a particular focus on frictions arising from intermediation in the OTC corporate

[2] Additionally, Chen (2010) and Bhamra, Dorion, Jeanneret and Weber (2022) argue that recovery rates vary with the state of the economy, being lower in low-inflation states.

bond market. Specifically, Friewald and Nagler (2019) looks at OTC market-based frictions, He, Khorrami and Song (2022) at intermediary risk factors, and Eisfeldt, Herskovic and Liu (2024) at dealers' risk aversion. Inflation risk is not subsumed by intermediation frictions and continues to significantly contribute to explaining yield spread changes. In the most stringent model specification, inflation risk explains 24% of residual systematic variation after controlling for both CDGM and intermediation-related variables.

To better understand the mechanisms through which inflation risk operates, I next examine the heterogeneity across bonds. The impact of inflation risk is more pronounced for firms with high leverage or low credit ratings, supporting a default risk channel where riskier firms benefit more from debt deflation. Firms with distant refinancing needs are also more sensitive to inflation risk, as they face higher default risk (e.g., Friewald, Nagler and Wagner (2022)) and less immediate pressure to adjust coupon payments. A related pass-through channel emerges when examining firms' cash-flow structures. Firms with floating-rate debt are less impacted, as their coupon payments automatically adjust to interest rates. In contrast, firms with flexible cash flows show greater sensitivity to inflation, as higher pass-through from inflation to cash flows increases their exposure. These findings highlight two key channels through which inflation risk affects firms: the default risk channel, where riskier firms benefit more from debt deflation, and the pass-through channel, where firms with flexible cash flows or inflexible coupon payments face greater sensitivity due to higher inflation pass-through.

To rationalize the findings, I provide a debt rollover model featuring stochastic inflation and sticky cash flow and show that it accounts for the empirical patterns. In the model, the real value of debt decreases with expected inflation because debt is issued in nominal terms. This decline in real debt value reduces default risk and narrows yield spreads. The central driver of the negative relationship between expected inflation and yield spreads is the stationarity or stickiness in leverage, i.e., firm's leverage not adjusting one-to-one with expected inflation. Uncertainty about inflation raises asset volatility, making the firm riskier and increasing its default probability. Lastly, the correlation between inflation and real asset innovations reflects the cyclicality of inflation, that is, the risk of low-inflation recessions when low real assets and high real liabilities coincide. In such cases, the rise in real leverage further amplifies default risk. Finally, the model matches the empirical evidence by predicting that firms with higher default risk and more flexible cash flows are more vulnerable to inflation risk.

In additional tests, I confirm that the findings are robust to various inflation-related controls, including unemployment, real consumption and income, and monetary policy proxies. I also ensure that the results are not affected by how inflation proxies are constructed—whether using swaps, TIPS, or CPI forecasts, which are free of risk premia concerns—or by different methods for aggregating regression residuals. Across all robustness checks, inflation risk consistently proves to be a significant factor, maintaining its explanatory power despite these controls.

Overall, this paper offers new insights into how inflation-related risks are priced in credit markets. Shocks to inflation expectations, volatility, and cyclicality— captured through inflation swap prices—are significant drivers of yield spread movements. These findings imply that inflation plays a central role in shaping debt dynamics in asset pricing and corporate finance.

This paper primarily contributes to the empirical literature linking inflation to asset prices. While the role of inflation risk is well established in equity markets (see, e.g., Fama (1981); Chen, Roll and Ross (1986); Weber (2014); Eraker, Shaliastovich and Wang (2016); Fleckenstein et al. (2017); Boons, Duarte, de Roon and Szymanowska (2020)), empirical research on its relevance to corporate credit remains limited. A related study by Kang and Pflueger (2015) shows that inflation volatility and cyclicality significantly impact aggregate credit spreads across developed economies. Similarly, Ceballos (2021) finds a negative inflation volatility risk premium based on the cross-sectional response of corporate bond returns to realized inflation volatility. However, unlike their focus on credit spread indices and realized inflation, I link yield spread changes and their systematic residual variation to expected inflation risk. By doing so, I shift the focus from past realized inflation to inflation expectations, offering a forward-looking understanding of how these expectations affect corporate credit markets, where yields are inherently driven by expectations. Additionally, I use cross-sectional variation in the U.S. corporate bond market to highlight the default risk channel, where riskier firms benefit from debt deflation, and the pass-through channel, where firms with flexible cash flows or inflexible coupon payments are more sensitive to inflation.

Conceptually, the analysis builds on the theoretical literature on structural models of credit risk, which I further discuss in Section III.B. Bhamra, Fisher and Kuehn (2011), Gomes, Jermann and Schmid (2016), and Bhamra, Dorion, Jeanneret and Weber (2022) examine the effect of long-term nominal debt as a transmission mechanism for inflation through a sticky leverage channel. Along similar lines, David (2008) and Kang and Pflueger (2015) link inflation uncertainty to broader uncertainties about fundamental values. In the context of these structural models, the unexplained common factor in yield spread changes represents a canonical puzzle, first documented in CDGM and more recently studied by Friewald and Nagler (2019), He, Khorrami and Song (2022), and Eisfeldt, Herskovic and Liu (2024). I provide a novel perspective on the common driver of yield spread changes by emphasizing the role of inflation risk and providing empirical support for structural models that incorporate inflation.

The remainder of the paper is organized as follows. Section II outlines the data sources. Section III introduces the inflation risk proxies and presents the main results. Section IV discusses the heterogeneity results, while Section V provides additional evidence. Section VI introduces the model explaining the qualitative relationships between yield spreads and inflation risk and Section VII concludes the paper.

II. Data

I rely on several data sources to analyze the impact of inflation risk on yield spread changes. The sample of corporate bond transactions comes from the Academic Trade Reporting and Compliance Engine (TRACE) maintained by the Financial Industry Regulatory Authority (FINRA). I follow the cleaning steps from Dick-Nielsen and Poulsen (2019), thus cleaning same-day corrections and cancellations, removing reversals, as well as double counting of agency trades. Then, I apply a median filter and a reversal filter to eliminate further potential data errors following Edwards, Harris and Piwowar (2007). The median filter identifies potential outliers in reported prices within a specific time period, while the reversal filter captures unusual price movements.[3] The sample period is September 2004 to December 2021. I merge corporate bond pricing data from the Mergent Fixed Income Securities Database (FISD) to obtain bond characteristics, such as offering amount, offering date, maturity, coupon rate, bond rating, bond option features, and issuer information, as well as firm characteristics from CRSP/Compustat data.[4]

Following the literature on corporate bonds, I restrict the sample to corporate debentures and exclude bonds with variable coupons, convertibility, putability, asset-backed status, exchangeability, private placements, perpetual terms, preferred securities, secured lease obligations, being unrated, or quoted in a foreign currency. I also remove bonds issued by financial firms (Standard Industrial Classification, or SIC, codes 6000 - 6999) or utility firms (SIC codes 4900 - 4999) and bonds with issue sizes under $10 million or a time to maturity of more than 30 years or less than one month.[5]

Following CDGM, I obtain market and firm-specific variables that, according to structural models, determine yield spread changes. In particular, I obtain market variables such as the

[3] The median filter eliminates any transaction where the price deviates by more than 10% from the daily median or from a nine-trading-day median centered at the trading day. The reversal filter eliminates any transaction with an absolute price change that deviates from the lead, lag, and average lead/lag price change by at least 10%. None of the filtering affects the results.

[4] See the Internet Appendix for detailed construction of TRACE/CRSP merging table.

[5] The results remain robust when all bonds, irrespective of industry or bond type, are included, as detailed in the Internet Appendix.

Standard & Poor's (S&P) 500 index (RM_t) from the Center for Research in Security Prices (CRSP), the VIX volatility index (ΔVIX_t) from the Chicago Board Options Exchange, and the Treasury constant maturity rates (ΔRF_t, ΔRF_t^2 and $\Delta Slope_t$) from daily off-the-run yield curves constructed by Gürkaynak, Sack and Wright (2007). As a systematic proxy for the probability or magnitude of a downward jump in firm value ($\Delta Jump_t$), I construct a measure based on at- and out-of-the-money put options and at- and in-the-money call options with maturities of less than one year, traded on the SPX index. Option-implied volatilities come from OptionMetrics. For the exact procedure for estimating the jump component, I refer to CDGM. I use market leverage as a proxy for firm creditworthiness. Market leverage ($\Delta Lev_{i,t}$) is defined following Friewald and Nagler (2019) as book debt over the sum of book debt and the market value of equity, where book debt is given by the sum of Compustat items Long-Term Debt - Total (DLTT) and Debt in Current Liabilities - Total (DLC). To account for varying time lags between a firm's fiscal year-end and the information becoming publicly available, I apply a conservative lag of six months before updating a firm's debt-related information. The market value of equity is the number of common shares outstanding times the share price, both obtained from CRSP.

Inflation risk proxies are derived from inflation swap rates. I obtain daily bid and ask quotes for the inflation swap from Bloomberg for annual maturities of 1 to 10 years, as well as for 12, 15, 20, and 30-year maturities, from July 2004.[6] In the robustness section, I compute inflation risk proxies from Treasury Inflation Protected Securities (TIPS). Zero-coupon TIPS yields and break-even rates are obtained from Gürkaynak, Sack and Wright (2010), which derive them from TIPS coupon bond yields, for annual maturities from 2 to 19 years. Since both inflation swaps and TIPS are indexed to the seasonally unadjusted Consumer Price Index (CPI-U), I adjust their rates following Fleckenstein, Longstaff and Lustig (2014). I first estimate seasonal weightings for the CPI-U for each month of the year

[6] Bloomberg does not retain inflation swap quotes prior to July 23, 2004, even though trading began earlier. The 1- to 10-year swap maturities started trading in April 2003; the 12, 15, and 20-year inflation swap rates started in November 2003; and the 30-year inflation swap rates started in March 2004. I disregard other maturities as deemed illiquid and their quotes appear to be stale.

by regressing the CPI-U index values for the January 1980 to December 2021 period on monthly indicator variables. The estimated weights are normalized to ensure that there is no seasonal effect for full-year swaps (TIPS) rates and then used to adjust the interpolated inflation swap (TIPS) curve.[7] I then match the cash flow structure of each bond and obtain cash-flow matched swap (TIPS) rates by performing a spline interpolation between provided maturities whenever necessary and use the cash-flow matched rates to compute the inflation risk proxies. I create the cyclicality proxy, as the change in rolling three month correlation between the 10-year Treasury yields and S&P 500 returns.

Lastly, Producer Price Index (PPI) and input-output tables, used to estimate cash-flow flexibility, come from the U.S. Bureau of Labor Statistics, while data on realized inflation, unemployment, real consumption and income data come from the Federal Reserve Bank of St. Louis. I construct intermediation proxies using the intraday Academic TRACE data following Friewald and Nagler (2019) and Eisfeldt, Herskovic and Liu (2024). To construct the distress factor of He, Khorrami and Song (2022), I use the intermediary capital ratio from Zinghuo He website and noise measure from Jun Pan website. For the exact procedures, I refer to Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024).

The main variable in the empirical analysis is the yield spread. Using TRACE intraday data, I first eliminate transactions with when-issued, lock-in, special trades, or primary trades flags. Then, I calculate the daily clean price as the volume-weighted average of intraday prices to minimize the effect of bid-ask spreads in prices, following Bessembinder, Kahle, Maxwell and Xu (2009). I consider the observation closest to the last trading day of the month, within a five-day trading window, as the month-end observation.[8] I compute the end-of-month corporate bond yield from the volume-weighted price and define the yield

[7] I begin the seasonal adjustment with the shortest available maturity, hence 1-year for the zero-coupon inflation swap rates and 2-years for the TIPS break-even rates. I detail the full procedure in the Internet Appendix.

[8] The results remain robust considering only bonds with the end-of-month price, as detailed in the Internet Appendix.

spread as the difference between the bond yield and the yield of a risk-free bond with the same cash-flow structure as the corporate bond. I use the U.S. Treasury yield curve estimates obtained from the Federal Reserve Board as the risk-free benchmark. Next, I compute the monthly changes and returns of all variables. To avoid asynchronicity issues, I match the dates of any variable available at the daily frequency (e.g., VIX) to the dates on which the end-of-month bond prices are measured. Following CDGM, I consider only bonds having at least 25 observations of monthly yield spread changes.

Table I Panel A reports the summary statistics of the sample of corporate bonds. The sample consists of 449788 observations of monthly yield spread changes of 6826 bonds issued by 936 firms. The average yield spread is 2.38%, with a standard deviation of 3.09%. The average offering size is 741 million dollars, and the average time to maturity is 9 years. Around 21% of the observations are high-yield bonds.

Table I about here

III. Inflation Risk and Yield Spread Changes

In this section, I first outline the advantages of using swap rates to measure inflation risk, particularly in comparison to the more commonly known Treasury Inflation-Protected Securities (TIPS). Next, I define the empirical proxies and investigate the extent to which inflation risk explains variations in yield spread changes. I begin by analyzing the effect of each proxy separately within the CDGM framework, and then assess their joint impact.

A. *Inflation Swaps*

In 1997, the U.S. Treasury started issuing Treasury Inflation-Protected Securities, fixed coupon bonds whose principal amount is adjusted daily based on the Consumer Price Index (CPI) for All Urban Consumers in the third preceding calendar month. Beginning with the first TIPS auction, market participants began to make markets in inflation derivatives as a way of hedging inflation risk. Zero-coupon inflation swaps quickly became one of the most liquid inflation derivatives in the over-the-counter market. These swaps are forward contracts in which the buyer pays a fixed nominal rate and receives an inflation-linked payment from the seller. They are quoted with maturities ranging from 1 to 30 years and, along with nominal Treasuries, offer an alternative means of measuring real yields.

I use inflation swap rates as a more reliable reflection of market participants' inflation expectations for several reasons. First, inflation swaps tend to predict future inflation rates more accurately than surveys. As shown by Diercks, Campbell, Sharpe and Soques (2023), inflation swaps align more closely with realized inflation rates than survey forecasts, which exhibit less variation. Although inflation swaps display higher variance than survey expectations, they remain less volatile than realized inflation.[9] Second, at medium to long horizons, inflation swaps carry only a minimal risk premium component. Bahaj, Czech, Ding and Reis (2023) utilize transaction-level data from UK inflation swaps and show that the supply of long-term inflation protection is highly elastic, reflects economic fundamentals, and rapidly adjusts to new information. Finally, compared to TIPS, inflation swaps offer a more unbiased and reliable measure of inflation expectations due to several key differences. The TIPS inflation adjustment is bounded below at its issuance value providing an embedded put option that protects investors against deflation on the bond's principal payment (e.g., Grishchenko, Vanden and Zhang (2016); Christensen, Lopez and Rudebusch (2016)). Because this option has a nonnegative value, it lowers TIPS yields compared to bonds that are fully indexed to inflation. Zero-coupon inflation swap contracts do not contain this option. Therefore, all else equal, the break-even inflation rate (Treasury rate minus TIPS rate) based on a TIPS principal strip should be higher than the equivalent maturity inflation swap rate. In addition to the deflation option, studies by Elsasser and Sack (2004), Fleckenstein, Longstaff and Lustig (2014), D'Amico, Kim and Wei (2018), and Andreasen, Christensen and Riddell (2021) consistently show that TIPS break-even inflation rates fall

[9] In the Internet Appendix, I show, consistent with Diercks, Campbell, Sharpe and Soques (2023), that, compared to the actual realized inflation, surveys tend to cluster most forecasts around 2%, while inflation swap rates generally show more variation.

below survey-based inflation expectations and that Treasury bonds are almost always overvalued relative to inflation-swapped TIPS. This mispricing narrows as additional capital flows into the markets and as liquidity increases.[10] Therefore, TIPS yields contain a liquidity premium because, like other bonds, they are held in buy-and-hold investors' portfolios, causing break-even inflation rates to diverge further from inflation swap rates.

Overall, these factors motivate the use of inflation swaps as a more accurate and less biased measure of inflation expectations compared to alternative instruments.

B. Inflation Risk Proxies

Multiple theories, such as Bhamra, Fisher and Kuehn (2011), Gomes, Jermann and Schmid (2016), and Bhamra, Dorion, Jeanneret and Weber (2022), are based on the observation that corporate debt is denominated in nominal dollars and firms have sticky leverage, as they do not adjust their leverage in response to expected inflation movements. As a result, an increase in expected inflation reduces the real value of debt, lowering the default risk and yield spreads, even in the presence of flexible prices and wages. Moreover, over the past two decades, inflation has consistently shown a positive relationship with real growth (e.g., Campbell, Pflueger and Viceira (2020); David and Veronesi (2013)), which further amplifies the reduction in default risk, as firms benefit from increases in expected cash flow. From an opposing viewpoint, a decline in expected inflation can create a debt overhang, which, as Gomes, Jermann and Schmid (2016) demonstrates, leads to financial frictions that increase yield spreads by distorting investment and production decisions. To capture all these effects, I measure changes in expected inflation with changes in the cash-flow-matched swap rate ($\Delta E[\mu^S]_{i,t}$). Changes in expected inflation should be negatively associated with changes in

[10]Even in the most recent sample, the pattern is consistent with previous studies; the inflation swap rate minus TIPS implied break-even rate exhibits time variation, with a positive average and peaking during periods of low liquidity. This evidence is consistent with Campbell, Shiller and Viceira (2009) and Haubrich, Pennacchi and Ritchken (2012), who attribute the spike in TIPS yields after Lehman Brothers' bankruptcy to Lehman's extensive use of TIPS for collateralizing its repo borrowings and derivative positions and with Fleckenstein, Longstaff and Lustig (2014) which finds that the price difference narrows when the U.S. auctions nominal Treasuries or TIPS, and it widens when dealers have difficulty obtaining Treasury securities, such as during a period of increased repo failures. Detailed figures are provided in the Internet Appendix.

yield spreads.

In the models of David (2008) and Kang and Pflueger (2015), the defaultable bond price can be regarded as a risk-free bond price minus the price of a put option on the nominal asset value of the firm. Inflation uncertainty increases the likelihood of defaults by raising cash-flow volatility—driven by uncertainty in future prices—and increasing the firm's default threshold, i.e., the value of the put option.[11] To capture this effect, I define the volatility of expected inflation ($\Delta\sigma^S_{i,t}$) as the change in the monthly standard deviation of the cash-flow-matched swap rate. This proxy should be positively correlated with yield spreads.

Lastly, beyond the direct effect of expected deflation, default risk further increases when firms experience lower growth alongside higher real liabilities (e.g., Kang and Pflueger (2015); Bhamra, Dorion, Jeanneret and Weber (2022)). To measure inflation cyclicality, I use the stock-bond correlation, which has been shown to be inversely related to the inflation-growth relationship (e.g., Campbell, Pflueger and Viceira (2020); Fang, Liu and Roussanov (2023); Bonelli, Palazzo and Yamarthy (2025)). I compute the stock-bond correlation as the three-month rolling correlation between the 10-year Treasury bond and the S&P 500 return, and create a proxy (ΔCor^{SB}_t) as the monthly change in this correlation. Since the stock-bond correlation is inversely related to inflation-growth dynamics, changes in this measure are expected to be negatively correlated with yield spreads changes.

In Table I Panel B, I present the unconditional correlations between the changes in yield spreads and the inflation risk proxies, as well as among the proxies themselves. The pairwise correlations are relatively low and comparable to those typically observed in nominal Treasury rates, with the highest correlation of -34.6% occurring between $\Delta\sigma^S i,t$ and $\Delta E[\mu^S]i,t$. I also report the standard deviations of the variables to facilitate the interpretation of their economic impact in subsequent regression analyses.

[11] A more indirect effect can be found in the model of Fischer (2016), which suggests that long-term inflation uncertainty can affect the value of bonds by delaying or misallocating investments due to price uncertainty. As in Baldwin and Ruback (1986), increasing uncertainty makes short-lived assets relatively more valuable, ceteris paribus, leading to higher yield spreads.

C. Baseline Results

I begin the analysis by demonstrating that recent U.S. corporate bond market data still exhibits substantial unexplained variation and significant commonality in yield spread changes. To establish a baseline, I replicate the results from CDGM using firm-specific and macroeconomic determinants of yield spread changes motivated by structural models 'a la Black and Scholes (1973) and Merton (1974). These baseline findings serve as a reference for the subsequent analysis.

I define the vector of CDGM proxies as $\boldsymbol{\Delta S}_{i,t}$ and estimate the following regression model for each bond i with yield spread changes $\Delta YS_{i,t}$:

$$\Delta YS_{i,t} = \alpha_i + \boldsymbol{\beta}_i^T \boldsymbol{\Delta S}_{i,t} + \varepsilon_{i,t}. \tag{1}$$

I report the results in column (1) of Table II.[12] The explanatory power is low and comparable to CDGM, with an adjusted mean R^2 of 35.5%, indicating that about two-thirds of the variance remains unexplained. In Panel B, I investigate whether the unexplained variance exhibits systematic commonality. Following the empirical procedure of CDGM, I assign each bond to one of 18 cohorts based on time to maturity (under five years, five to eight years, and more than eight years) and leverage (below 15%, 15%–25%, 25%–35%, 35%–45%, 45%–55%, and above 55%). For each cohort, I compute the average of the regression residuals $\boldsymbol{\varepsilon}_{g,t}$ across the bonds in the cohort for each month t and then perform a PCA on these residuals to capture the properties of the remaining variation.[13]

Table II about here

Importantly, there is a strong systematic factor structure of the regression residuals. The total unexplained variance is 115 basis points, with 79.4% captured by the first principal component (PC1), whereas the second component (PC2) explains only 5.3%. These results are in line with the findings of CDGM and He, Khorrami and Song (2022), which report an

[12] Detailed results of the baseline regression and PCA estimation are available in the Internet Appendix.

[13] Notably, the above 55% leverage group accounts for the majority of variation, summing across all maturities, it constitutes 45% of the overall variation. This is in line with He, Khorrami and Song (2022) findings.

explanatory power of PC1 of 75% and 80%, respectively, while they are significantly higher than Friewald and Nagler (2019) and Eisfeldt, Herskovic and Liu (2024), reporting only 48.4% and 57.2%.

In columns (2) to (8), I expand the baseline specification to assess the impact of inflation risk on yield spread changes. I define the vector of inflation risk proxies as $\boldsymbol{\Delta I}_{i,t}$ and run the following time-series regression for each bond $\boldsymbol{i}$:

$$\Delta YS_{i,t} = \alpha_i + \boldsymbol{\beta}_i^T \boldsymbol{\Delta S}_{i,t} + \boldsymbol{\theta}_i^T \boldsymbol{\Delta I}_{i,t} + \boldsymbol{\Gamma}_i^T \boldsymbol{\Delta C}_{i,t} + \nu_{i,t} \tag{2}$$

where $\boldsymbol{\Delta S}_{i,t}$ represents the CDGM variables, and $\boldsymbol{\Delta C}_{i,t}$ includes additional proxies for OTC market frictions as defined by Friewald and Nagler (2019), intermediary risk factors from He, Khorrami and Song (2022), and interdealer price dispersion from Eisfeldt, Herskovic and Liu (2024).

The results, including average coefficients, t-statistics, and mean and median $\boldsymbol{R}^2$ values, are reported in Panel A of Table II. The t-statistics are computed from the cross-sectional variation in the coefficient estimates within each cohort; the average coefficient is divided by the standard deviation of the coefficient estimates and scaled by the square root of the number of bonds in each cohort.[14] In columns (2) to (4), each inflation risk proxy is tested individually, while in columns (5) to (8), they are tested jointly, with additional intermediation controls.

Each inflation risk proxy is statistically significant, both individually and jointly, with t-statistics ranging from 38 to 7. Yield spreads narrow with increases in expected inflation and widen with inflation volatility and cyclicality. Overall, adding these proxies increases the mean and median adjusted $\boldsymbol{R}^2$ by 8.6 and 8.1 percentage points, respectively. This represents a substantial improvement, especially considering that the analysis focuses on changes in yield spreads rather than their levels. In columns (6) to (8), I further control for

[14]This standard error calculation method is commonly used in the literature (e.g., CDGM; He, Khorrami and Song (2022); Friewald and Nagler (2019); Eisfeldt, Herskovic and Liu (2024)).

variables related to OTC market intermediation. The inflation risk effect remains significant, consistent, and robust across all specifications.

To evaluate the general explanatory power of the inflation risk proxies on yield spread changes, I measure the fraction of the total variation in the residuals explained by each new proxy, following He, Khorrami and Song (2022). Specifically, for each cohort, I compute the total unexplained variation of yield spread residuals after adding each proxy ($\sigma_{\nu}^2 = \frac{\sum_{t=1}^{T}(\nu_{g,t}-\overline{\nu}_g)^2}{T-1}$), and then calculate the fraction of variation explained as

$$\text{FVE} = 1 - \frac{\sum_g^{18}\sigma_{\nu_g}^2}{\sum_g^{18}\sigma_{\varepsilon_g}^2}, \tag{3}$$

where g represents the 18 cohorts by leverage and maturity, and ε_g are the cohort g residuals from the model without inflation risk. On average, each of the inflation risk proxies reduces the unexplained variance by 21 basis points, and collectively, they account for 37.5% of the total variation in the residuals of yield spread changes. This explanatory power is substantial, particularly in comparison to previous studies. For example, at a quarterly frequency, He, Khorrami and Song (2022) finds that dealer inventory and an intermediary distress factor explain 43% of the systematic variation in residuals, while Friewald and Nagler (2019) shows that OTC market frictions account for about 45% of the variation. The large explanatory power is also evident when controlling for intermediation variables. In column (8), where all intermediation-related variables are accounted for, inflation risk still accounts for 24% of the remaining variation.

Next, to better understand the effect of inflation risk, I analyze the remaining variation. I calculate the average of the regression residuals $\nu_{g,t}$ for each cohort g, defined by three maturity and six leverage groups, in month t after adding a new variable and then run a PCA on these residual series. Inflation risk proxies decrease the proportion of unexplained variance associated with the common component, PC1, by 3.2 percentage points on average, and overall by 9.1 percentage points, that is, from 79.4% in the CDGM benchmark to

70.3%. To test for the significance of the reduction in unexplained variance, I run a time series regression of PC1 on the inflation risk variables.[15] Panel C reports the R^2 values, as well as the F-statistics and corresponding Wald test p-values. Overall, the inflation proxies are significantly related to the common component. Columns (2) to (4) assess the relative importance of each proxy. The resulting R^2 value reflects the relative variance of PC1 explained by each proxy. Changes in inflation volatility have the highest explanatory power for PC1, with a R^2 value of 15.7%. When all inflation risk measures are included, the adjusted R^2 increases to 21.4%, with an F-statistic of 19.8, significant at the 1% level. This suggests that inflation risk accounts for more than one-fifth of the original common component.

Although I have established that the proxies are statistically significant and that their explanatory power is substantial, their economic importance also warrants discussion. I rely on the full model in column (8) and analyze the implied yield spread change resulting from a one-standard deviation change in each proxy. For instance, $\Delta E[\mu^S]_{i,t}$ has a price impact of 7.5 basis points, while $\Delta\sigma^S_{i,t}$ of around 3.3 basis points and ΔCor^{SB}_t has the smallest price impact of around 1.7 basis points. These price impacts are considerable, especially when compared to the impact of a one-standard deviation change in the 10-year Treasury rate, which is around 9 basis points—close to the effect of changes in expected inflation. Moreover, the price impact is substantial compared to the mean and median yield spreads. In fact, a one standard deviation change in the swap rate decreases the mean yield spread of 3.1% and the median of 4.9%.

In Table II, I used the standard CDGM methodology where the coefficient estimates are the cross-sectional averages of bond-level time-series regressions. However, Eisfeldt, Herskovic and Liu (2024) points out that one limitation of this methodology is the potential noise in the time-series beta estimates, which could affect the standard errors of the average coefficients.

[15] Since the expected inflation and volatility proxies are bond-month level variables, I use their monthly averages across bonds. This aggregation does not affect the results, as the findings remain consistent when using 10-year swap rates instead.

To mitigate this concern, I re-estimate the specifications in Table II using a panel regression approach with bond fixed effect, clustering standard errors at both bond and month level. Specifically, I estimate the following model:

$$\Delta YS_{i,t} = \eta_i + \boldsymbol{\beta}^T \boldsymbol{\Delta S}_{i,t} + \boldsymbol{\theta}^T \boldsymbol{\Delta I}_{i,t} + \boldsymbol{\Gamma}_i^T \boldsymbol{\Delta C}_{i,t} + \nu_{i,t}, \tag{4}$$

where $\boldsymbol{\eta}_i$ represents the bond fixed effect, and $\boldsymbol{\Delta S}_{i,t}$, $\boldsymbol{\Delta I}_{i,t}$, and $\boldsymbol{\Delta C}_{i,t}$ are the previously defined vectors of explanatory variables. The results of this estimation are reported in Table III.

Table III about here

The main distinction between this panel specification and the CDGM approach is that the panel model estimates coefficients that are common to all bonds, rather than bond-specific slopes. This adjustment leads to a notable difference in the fit of the model. While the CDGM approach allows for a more flexible structure and achieves a higher overall fit, with an average R^2 of 35.5%, the panel regression produces a lower fit with an average R^2 of 15.6%. Despite this difference in model fit, the coefficients in the panel regression remain statistically and economically significant, and are consistent in magnitude with those reported in Table II.

In sum, the baseline analysis demonstrates that (1) inflation risk significantly affects yield spreads, (2) the three proxies collectively explain more than a quarter of the previously unexplained variation in yield spread changes after accounting for structural factors and intermediation frictions, and (3) a substantial portion of the latent factor is associated with time-varying inflation risk.

IV. Heterogeneity of Inflation Risk

In this section, I investigate the potential heterogeneity effects of inflation risk across various bond characteristics. To this end, I estimate regression coefficients for different bond cohorts.[16] Each bond is assigned to a cohort based on specific criteria: average leverage ratios (less than 15%, 15%–25%, 25%–35%, 35%–45%, 45%–55%, and greater than 55%), bond ratings (AAA-AA, A, BBB, BB, and B-C), industry characteristics such as cash-flow flexibility, refinancing intensity, and the proportion of floating-rate debt (greater than 5%). To ensure consistency, I focus on bonds with at least 25 monthly observations within each cohort. Figure 1 presents the average coefficients with the 5% coefficients intervals (bars) and the median coefficients (dots) in each cohort, divided into three panels.[17] Panel A presents results for inflation expectations, Panel B for inflation volatility, and Panel C for cyclicality. Figure 1 about here

The first graph from the left displays results for the leverage cohorts, while the second shows results for credit ratings. In all three panels, coefficients are increasing in leverage and decreasing in bond ratings, consistent with the effect of inflation risk being dependent on the ex-ante default risk. Intuitively, an increase in expected inflation will significantly reduce the real debt-to-equity ratio for highly leveraged firms as it lowers the real value of their debt. This reduction in real leverage leads to a further decrease in the yield spread for these firms. A similar logic applies to credit ratings. Even after accounting for the large ex-ante differences in yield spreads, the impact in the above 55% (B-C) group is greater than in the below 15% (AAA-AA) group. For instance, a one standard deviation increase in expected inflation results in a 5.6% (4.3%) decrease in the average yield spread for the above 55% leverage (B-C) cohort, compared to only a 5.2% (1.8%) decrease in the below 15% (AAA-AA) cohort.

The third figure focuses on cash-flow flexibility, measured using an industry-wide proxy. To construct the cash-flow flexibility proxy, I begin by calculating the output flexibility of each industry (defined as 3-digit NAICS code), as the average absolute variation in the industry's Producer Price Index (PPI). Next, I adjust the measure by scaling it according to the output flexibility of the input industries, weighted by the total value of those inputs,

[16] In unreported results, I show that the heterogeneity results are consistent when using fixed-effects regressions with interactions.

[17] The relative tables are reported in the Internet Appendix.

which accounts for differences in input costs across industries. Then, I assign each bond to a cohort based on the average cash-flow flexibility of the industry during the life of the bond. The coefficient magnitudes increase with cash-flow flexibility, suggesting that industries with more flexible cash flows are more sensitive to inflation risk. As cash flows are more closely tied to real prices, the friction between nominal debt and real cash flow is amplified, leading to greater sensitivity of yields to inflation risk. Specifically, a one standard deviation increase in inflation expectations results in a 5.6% decrease in the average yield spread for flexible cash-flow bonds, compared to a 5.4% decrease in the sticky cash-flow cohort.

Figure four examines the effect of refinancing intensity, defined as the percentage of debt maturing within three years. Coefficients decline with refinancing intensity, indicating that firms with distant financing needs are more sensitive to inflation risk. Two mechanisms underlie this relationship: (1) leverage and refinancing intensity have opposing effects on default probabilities (e.g., Friewald, Nagler and Wagner (2022)), with lower refinancing intensity correlating with higher default risk, and (2) the fixed nominal nature of bond coupon payments makes firms with low refinancing intensity less likely to adjust these payments in the short term, increasing their debt's sensitivity to inflation.[18] The final figure presents coefficients for firms with a high proportion of floating-rate bonds compared to those that predominantly issue fixed-rate bonds.[19] Firms with floating-rate bonds show lower sensitivity to inflation risk as their coupon payments adjust with interest rate movements, thereby mitigating the friction between nominal debt and real cash flow.

Overall, I find significant heterogeneous effects of inflation risk on yield spreads. Higher leverage and lower credit ratings heighten exposure to inflation risk, while floating-rate debt and higher refinancing needs mitigate it by adjusting payments to interest rate changes.

[18]In the Internet Appendix, I report heterogeneity tests examining the effect of debt growth (the average change in debt over the bond's life). While coefficients decline with refinancing intensity, they increase with debt growth, suggesting that firms with greater debt expansion are more exposed to inflation risk. Raising debt might not only increase default risk but also the real value of debt, offsetting the inflation-induced erosion of its value.

[19]Given that the majority of firms issue only fixed-rate bonds, I define a firm as having a large share of floating-rate bonds if more than 5% of its total bond issuance includes instruments that are not strictly fixed-rate.

Similarly, industries with more flexible cash flows are more sensitive to inflation due to their stronger ties to real prices. These findings underscore the key role of firm- and bond-specific characteristics in shaping the impact of inflation risk on corporate bond markets, highlighting the default risk and pass-through channels, and emphasizing the need to account for heterogeneity in its effects.

V. Additional Evidence and Robustness

In this section, I show that the results are robust to alternative variables related to yield spread changes, to different inflation risk proxies, and are not influenced by the specific method of aggregating residuals.

A. Robustness

First, I establish the robustness of the results by controlling for alternative variables affecting yield spread changes. In Table IV, I run time-series regressions of yield spread changes onto inflation proxies, controlling for different measures. For each group, the first column presents baseline results, while the second adds the inflation risk proxies. I first control for inflation volatility risk (IVR) from Ceballos (2021), followed by broad macroeconomic variables such as changes in real consumption, income, and unemployment, all of which may be related to inflation risk. Finally, I include variables linked to monetary policy and its uncertainty, specifically changes in the FED funds rate and the Monetary Policy Uncertainty (MPU) measure from Bu, Rogers and Wu (2021). Across all specifications, the effect of inflation risk remains significant and economically meaningful, with explanatory power consistent with the baseline results.

Table IV about here

B. *Different Inflation Risk Proxies*

The baseline analysis in Table II uses inflation risk proxies derived from zero-coupon inflation swap rates, primarily due to liquidity concerns and the deflation option in TIPS (e.g., D'Amico, Kim and Wei (2018)). I show that the results are robust when using TIPS rates or non-cash-flow-matched swap proxies, such as the 10-year inflation swap rate, or CPI-based proxies.

First, I construct TIPS-based inflation risk proxies using off-the-run, seasonally adjusted TIPS break-even rates as an alternative to inflation swap rates. The off-the-run TIPS rates come from Gürkaynak, Sack and Wright (2010), who derive them from TIPS coupon bond yields for maturities ranging from 2 to 20 years. I seasonally adjust these rates following the procedure outlined in Section III and replicate the baseline results from Table II using the new proxies. Second, I construct non-cash-flow matched inflation proxies, using for all bonds the 10-year swap rate. Finally, I follow Boons, Duarte, de Roon and Szymanowska (2020) to construct CPI-based measures derived from the residuals and volatility of an ARMA(1,1) model applied to realized monthly CPI. Jointly with these new proxies, I use the stock-bond correlation as a cyclicality proxy since it does not rely on a specific inflation measurement. In the final column, I test an alternative growth-inflation correlation measure. Specifically, I compute firm asset values monthly following Bharath and Shumway (2008) and calculate the 3-year rolling correlation between monthly asset growth and the one-year inflation swap rate for each firm. The proxy is then the change in the average correlation across firms.

Table V presents time-series regressions of yield spread changes on these alternative inflation proxies. Column (1) shows the baseline results with all controls. Columns (2) to (4) report results using TIPS, non-cash-flow-matched swaps, and CPI-based proxies, respectively. Regardless of the proxies used, the results are consistent with the baseline, with inflation proxies explaining 24%, 24.2%, and 25.3% of the residual variance, compared to 24% for the baseline swap proxies. The final column presents consistent results using the different growth-inflation proxy. Yield spreads increase with the aggregate correlation of

Table V about here

asset growth and inflation, in line with the results from the stock-bond correlation measure.

These results show that using different inflation proxies leads to similar conclusions, reinforcing the robustness of the baseline analysis and the importance of inflation risk in explaining yield spread changes.

C. Different Residual Groups

The baseline result on the explanatory power of inflation risk may be influenced by the selection of the variable used to aggregate residuals. To address this concern, I show that the results are robust to different methods of aggregating the residuals. Specifically, I follow the approach of He, Khorrami and Song (2022) and aggregate time-series residuals into five distinct cohorts. First, I use the baseline cohorts defined by time to maturity, leverage, and rating as shown in Figure 1. Second, I create new cohorts based on quintile sorts of bond dollar trading volume, and stock market and VIX betas. The dollar trading volume is based on the sum of all trades in each bond over the previous month, while the stock market and VIX betas are derived from regression betas on the S&P 500 and the VIX, respectively, as in the baseline CDGM regression. I then run time-series regressions and assign residuals to the different cohorts based on time to maturity and each of these variables (leverage, volume, stock market beta, or VIX beta). Depending on the variables, the residuals are divided into 18 or 15 cohorts. For each cohort, I calculate the average residual and extract the principal components from the covariance matrix. I then repeat this process including all inflation risk proxies. The results are reported in Table VI.

Table VI about here

For each pair of grouping variables, I report the variance explained by the first and second principal components (PC1 and PC2), as well as the fraction of variance explained (FVE). The first row presents results from the model with all control variables, while the second row shows the model including inflation risk proxies. These rows match the results from Table II column (8).

On average, the fraction of variance explained is 23.5%, with little variation across tests, which is consistent with the baseline results. The smallest fraction of variance explained is seen with the time to maturity and VIX beta sort (21.7 percent), while the time to maturity and volume sort shows the largest fraction (25 percent). Including inflation risk proxies reduces the explanatory power of PC1 by 4.1 percentage points, confirming that the results are independent of how residuals are aggregated. Overall, these additional tests reinforce the conclusion that inflation risk is a major driver of yield spread dynamics.

VI. Motivating Model

In this section, I introduce a structural model of default incorporating debt rollover, stochastic inflation and sticky cash flow, and I explore its implications for yield spreads.[20]

In the model, a representative firm issues nominal debt while facing real cash flow and inflation risks. The friction between nominal debt and real cash flow is the driving force of the relationship between yield spreads and inflation risk. The resulting implications rationalize the key empirical findings of the analysis in Section III: yield spreads (1) decrease with expected inflation, (2) increase with inflation uncertainty, and (3) increase with the correlation between inflation and real asset innovation. In addition, the model generates heterogeneity in the inflation risk effects. The sensitivity of yield spreads to inflation risk increases with default risk and cash-flow flexibility, and decreases with refinancing intensity. I next introduce the setup for the structural model by first discussing the sources of inflation risk, then the debt structure, and lastly the resulting yield spreads implications.

A. *Inflation Risk*

To value nominal debt, I specify a price index P_t that follows a Geometric Brownian Motion under the physical probability measure, $\mathbb{P}$, with expected inflation μ_P and inflation volatility σ_P. Let r_r denote the constant real interest rate. Consider a firm with time t real asset value

[20] I extend the approach to other structural models in the Internet Appendix.

A_t^r. The A_t^r dynamics under $\mathbb{P}$ follow

$$\frac{dA_t^r}{A_t^r} = \mu_{A^r} d_t + \sigma_{A^r} dW_t^{P,A^r}, \qquad A^r > 0, \tag{5}$$

with μ_{A^r} and σ_{A^r} constants, and W^{P,A^r} a standard Brownian motion. Because the firm issue nominal securities and pay taxes in nominal terms, investors primarily focus on changes in nominal cash flows and, consequently, nominal assets. The nominal value of the firm's assets at time t is given by $A_t^n = A_t^r P_t^{\phi}$, where ϕ reflects the extent of inflation's impact on nominal asset growth. Assets are sticky when $\phi < 1$.[21] The real asset and price processes are correlated with an real asset inflation innovation correlation of $\mathbb{E}^{\mathbb{Q}}[dW_t^{P,A^r}, dW_t^{P,P}] = \rho_{A^r P}$. Thus, under the nominal risk-neutral measure $\mathbb{Q}^n$, the nominal asset process satisfies

$$\frac{dA_t^n}{A_t^n} = \left[r_r + \phi\left(\mu_P + \frac{1}{2}(\phi - 1)\sigma_P^2\right)\right] dt + \sigma_{A^n} dW_t^{n,A^n} \tag{6}$$

where

$$\sigma_{A^n}^2 = \sigma_{A^r}^2 + \phi^2\sigma_P^2 + 2\phi\rho_{A^r P}\sigma_{A^r}\sigma_P. \tag{7}$$

B. *Debt Structure and Yield Spreads*

The firm commits to a stationary debt structure by issuing consol bonds to optimally set its total debt D. Following Leland (1998), the firm continuously retires a fixed fraction mP of its outstanding debt at par, where P represents the total face (book) value of debt and m denotes the refinancing intensity, where $0 < m \leq 1$. Retired debt is immediately replaced with newly issued debt of the same maturity, coupon, principal, and seniority, ensuring a continuous rollover process.

Debt issuance provides a tax advantage $\tau_{tax}C$, where τ_{tax} is the corporate tax rate and C is the constant coupon, but increases bankruptcy costs borne by equity holders. The

[21] I utilize cash-flow stickiness and asset stickiness interchangeably, as in structural models of default assets are affine functions of cash flows.

coupon flow needs to be paid either with cash flow plus the tax advantage of debt or out of the equity holders' own pockets. Default occurs when equity holders deem the firm's asset value too low to justify further payouts. Upon liquidation, debt holders receive the residual value of the firm after accounting for bankruptcy costs, determined by the recovery rate, R. Consequently, the equity value, E, is determined as the difference between the levered firm value, v, and the debt value, D. The equity holders default if A_t^n declines to a critical endogenous threshold, A_B^n. Define τ the first time the assets hit A_B^n

$$\tau = \inf\{t \mid A_t^n \leq A_B^n\}. \tag{8}$$

Let r_n be equal to $r_r + \phi(\mu_P + \frac{1}{2}(\phi - 1)\sigma_P^2)$. The value of a unit claim at default is

$$\begin{aligned} P_B(A^n) &= \left(\frac{A^n}{A_B^n}\right)^{-\gamma}, \\ \gamma &= \frac{r_n - \frac{\sigma_{A^n}^2}{2} + \sqrt{(r_n - \sigma_{A^n}^2)^2 + 2(r_n m)\sigma_{A^n}^2}}{\sigma_{A^n}^2}. \end{aligned} \tag{9}$$

The debt value follows

$$D(A^n; A_B^n, P, C) = \frac{(C + mP)}{(r_n + m)}\Big[1 - P_B(A^n)\Big] + RA_B^n P_B(A^n), \tag{10}$$

where the first term on the right hand side is the value of the coupon flow up until time τ and the second term is the recovery value in case of bankruptcy. The default boundary, A_B^n, is characterized by the "smooth-pasting" condition, $E'(A_B^n) = 0$. Then, the yield spreads, $y - r_n$, are given by

$$y - r_n = \frac{C*}{D(A^n; C*, P)} - r_n, \tag{11}$$

where $C*$ is the optimal coupon found by maximizing the firm value.

C. Model Implications

To illustrate how yield spreads relate to inflation risk, I simulate the model 1000 times drawing parameter values for expected inflation, μ_P, inflation volatility, σ_P, and the correlation between inflation and asset growth, $\rho_{A^r,P}$, from reasonable parameter intervals. Expected inflation ranges from -2% to 10%, inflation volatility from 0.5% to 10%, and the correlation between inflation and assets from -1 to 1. All other parameters are fixed according to existing literature, as summarized in Table VII.[22]

Table VII about here

C.1. Implications for Yield Spreads

Figure 2 shows the effect of inflation risk on yield spreads with the relative regression lines. Blue (red) dots are observations where the inflation asset growth correlation, ρ_{A^rP}, is positive (negative). Panel A shows that yield spreads decrease in expected inflation. An increase in expected inflation lowers the real value of debt, as debt is denominated in nominal terms. This decline in real debt reduces default risk, leading to narrower yield spreads.

Figure 2 about here

Panel B shows the effect of inflation volatility on yield spreads. The main effect of inflation uncertainty is to increase the asset volatility making the firm riskier, and increasing its probability of default. The magnitude of this effect depends on the correlation between inflation and asset growth. In positive correlation cases (blue dots), both the drift and the volatility of the nominal asset are increasing functions of inflation volatility, with opposite effects on yield spreads. The asset volatility effect dominates, leading to yield spreads increasing with the volatility of inflation.[23] In the other cases (red dots or negative inflation asset growth correlation), the negative correlation reduces the effect of inflation volatility in both drift and asset volatility, making the relationship between yield spreads and inflation volatility flatter.

[22] The stickyness parameter ϕ is set to 0.4 as in Bhamra, Dorion, Jeanneret and Weber (2022), while recovery rate R and tax rate τ_{tax} are set respectively to 0.5 and 0.35 as in Leland (1998) and Du, Elkamhi and Ericsson (2019).

[23] As in the considered sample the inflation-growth correlation has been unconditionally positive, this case is likely the most relevant case.

Lastly, Panel C highlights the effect of the correlation between inflation and real asset innovations, which reflects the cyclicality of inflation risk. In case of a positive correlation, low real assets and high real liabilities tend to occur at the same time, increasing default risk, as in Kang and Pflueger (2015). Yield spreads increase in the correlation between inflation and asset growth, as it magnifies the effect of inflation volatility. In the empirical analysis, I proxy this effect using the stock-bond correlation, which is inversely related to the inflation-growth correlation, and in section V.B, I ensure consistency with the model by using the aggregate asset-inflation correlation.

C.2. Heterogeneity Implications

The model also generates predictions about heterogeneity, particularly regarding asset volatility, cash-flow stickiness, and refinancing intensity. It suggests that the impact of inflation risk on a firm varies based on its default risk and cash-flow flexibility.[24] Within the model, the impact of inflation risk is greater for firms with higher default risk. When asset volatility is high, sensitivity to inflation risk increases. Since leverage in the model is largely driven by asset volatility, firms with higher leverage experience a stronger effect from inflation risk.

Additionally, as in the model of Friewald, Nagler and Wagner (2022), leverage and refinancing intensity have opposing relationships with default probabilities, with lower refinancing intensity being associated with higher default risk. Thus, for a given leverage level, when refinancing intensity is low, default risk tends to be higher, making increases in expected inflation have a more significant impact.

Cash-flow or asset stickiness influences the extent to which inflation risk passes through to both asset growth and volatility. As shown in Eq. 6, expected inflation increases the drift of nominal assets based on the stickiness parameter, ϕ. In case of perfectly flexible assets ($\phi = 1$), inflation risk fully passes through to yield spreads, whereas in the sticky

[24]Detailed figures on heterogenous effects can be found in the Internet Appendix.

cash-flows case ($\phi < 1$), the effect is dampened. Consequently, a firm with flexible cash flows experiences greater decreases in yield spreads following an increase in expected inflation. The same mechanism applies to asset volatility, with firms having flexible cash flows being more sensitive to inflation risk than those with sticky cash flows.

Although stylized, the model incorporates all necessary features to capture the effect of inflation risk on yield spreads. In summary, the model rationalizes yield spreads decreasing in expected inflation and increasing in inflation volatility and in cyclicality. Additionally, consistent with the empirical findings, it suggests that inflation risk has a greater impact on yield spreads for firms with higher default probability (leverage and rating), low refinancing intensity and more flexible cash flows.

VII. Conclusion

I investigate the role of inflation risk in explaining corporate yield spread changes, particularly the unexplained common variation. I find that inflation risk-measured using market-based proxies for expected inflation, uncertainty, and cyclicality—explains about a quarter of the residual variation in yield spread changes that traditional credit risk and intermediation variables fail to capture.

Conceptually, I show that the empirical findings are consistent with a structural model of default incorporating debt rollover, stochastic inflation and sticky cash flows. The model emphasizes three key aspects of inflation risk: innovations in expected inflation lower the real value of nominal debt, reducing default risk and narrowing yield spreads. Inflation uncertainty increases firm volatility, leading to higher default risk and wider spreads, while inflation cyclicality captures state-dependent effects.

Additionally, I find significant heterogeneity in the impact of inflation risk, with more pronounced effects for firms with high leverage or low credit ratings, supporting the default risk channel. Firms with distant refinancing needs also show greater sensitivity, driven by higher default risk and delayed adjustments in coupon payments. Similarly, industries with flexible cash flows are more exposed to inflation, while firms with floating-rate debt experience less impact, as their payments adjust to interest rate changes.

These findings also suggest several avenues for future research beyond the scope of this paper. For instance, future research could examine whether the heterogeneous effects of inflation risk, particularly concerning refinancing needs, extend to equity prices—for example, by building on the work of Bhamra, Dorion, Jeanneret and Weber (2022) to incorporate a debt maturity structure. Another potential research direction is to examine how firms' corporate financing and issuance choices respond to different inflation scenarios, both empirically and theoretically, thereby extending the framework of Gomes, Jermann and Schmid (2016) and Gomes and Schmid (2021).

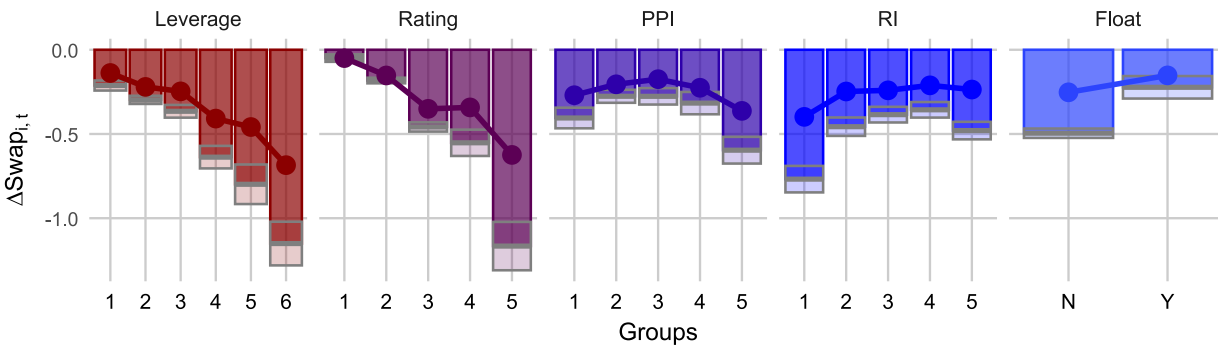
In conclusion, inflation risk accounts for a significant share of the residual variation in yield spread changes and sheds light on the common component that standard credit risk variables fail to capture. These findings have important implications for bond pricing, highlighting inflation as a key driver of credit spreads and supporting structural models that incorporate inflation dynamics.

Figure 1: **Heterogeneity in Inflation Risk**

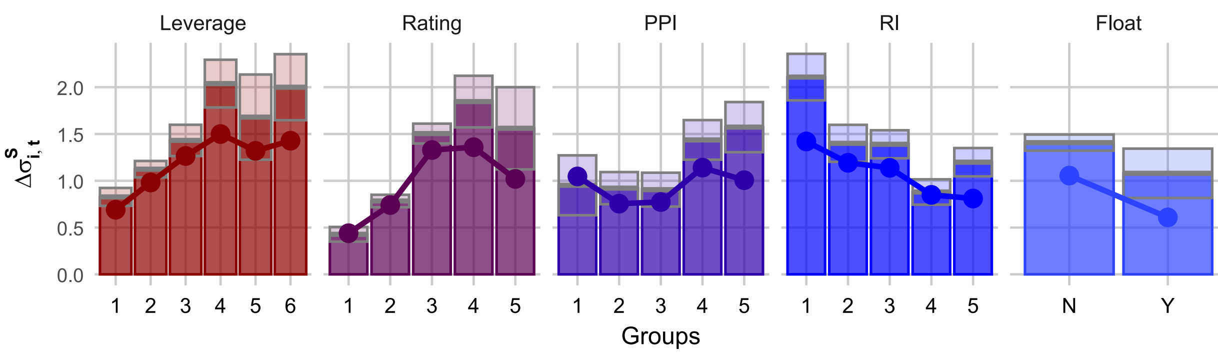
For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \nu_{i,t},$$

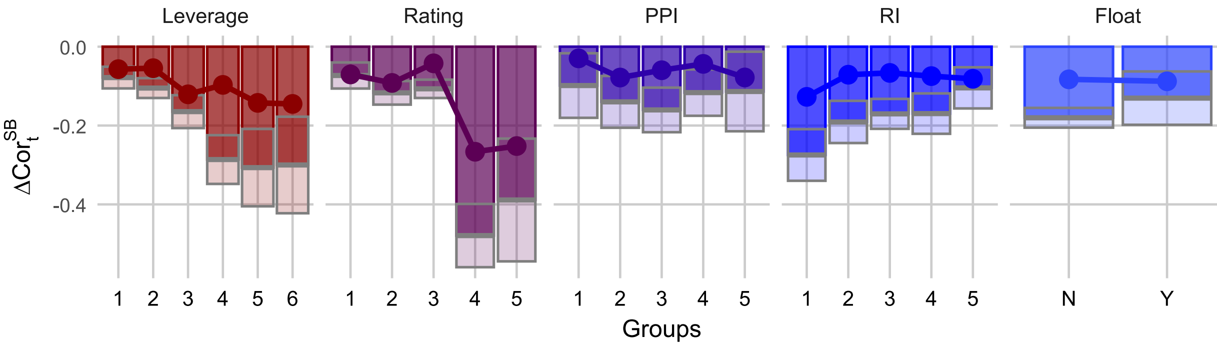
where $\Delta S_{i,t}$ is the vector of structural model variables, and $\Delta I_{i,t}$ refers to the inflation risk proxies. I assign each bond to cohorts based on average leverage ratios (less than 15%, 15%–25%, 25%–35%, 35%–45%, 45%–55%, and greater than 55%), bond ratings (AAA-AA, A, BBB, BB, and B-C), industry cash-flow flexibility (PPI), refinancing intensity (RI), the proportion of debt in floating bonds (greater than 5%). I plot average coefficients by group with its 5% confidence interval. Panel (a) reports results for expected inflation, Panel (b) for inflation volatility and Panel (c) for the correlation. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.



(a) Expected Inflation



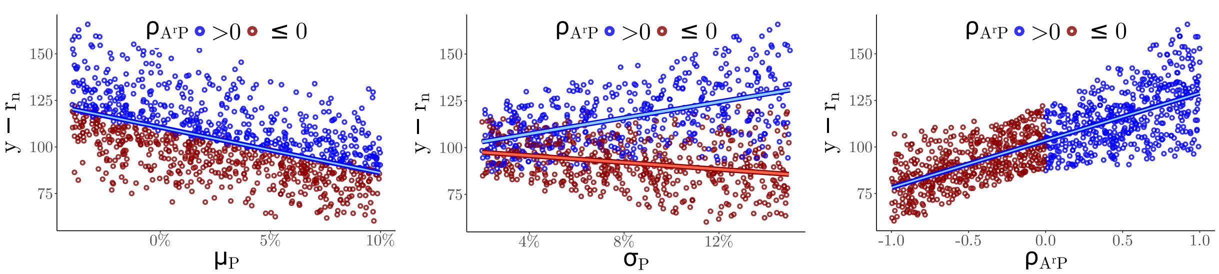
(b) Inflation Volatility



(c) Correlation

Figure 2: **Model Simulation**

This figure shows the yield spread implications of inflation risk. I simulate the model 1000 times where I fix all parameters except the expected inflation rate (μ_P), inflation volatility (σ_P), and the correlation between inflation and assets (ρ_{A^rP}). I uniformly draw these parameters from reasonable intervals: expected inflation varies between -2% and 10%, inflation volatility between 0.5% and 10%, and correlation between inflation and real assets between -1 and 1. Table VII provides the details about all parameter choices. I also report regression lines. In Panel (b), the regression line is conditional on the correlation between inflation and real assets.



(a) Expected Inflation (b) Inflation Volatility (c) Correlation

Table I: **Summary Statistics**

This table reports summary statistics of the data. Panel A reports the number of observations, mean, standard deviation, and 5%, 25%, 50%, 75% and 95% quantiles of bond characteristics, yield spreads ($YS_{i,t}$), and the proxies of inflation risk ($\Delta E[\mu^S]_{i,t}$, $\Delta\sigma^S_{i,t}$, ΔCor^{SB}_t) introduced in Section III. The bond characteristics include the offering amount, the coupon rate, the bond age, the time to maturity, the duration, and the credit rating. The bond's rating is determined as the average of ratings provided by Standard & Poor (S&P), Moody's, and Fitch when more than one are available or as the rating provided by one of the three rating agencies when only one rating is available. Panel B reports the standard deviation and the correlation matrix of changes in yield spreads and changes in the proxies of inflation risk. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.

Panel A: Summary Statistics

	Obs.	Mean	Std.	5%	25%	50%	75%	95%
Offering amount (mil.)	449788	741.84	658.33	200	350	500	1,000	2,000
Coupon (%)	449788	5.39	1.97	2.25	3.88	5.38	6.88	8.62
Age	449788	5.51	5.33	0.52	2.05	3.98	7.06	17.43
Time to Maturity	449788	8.99	8.08	0.96	3.38	6.15	10.00	27.27
Duration	449788	6.49	4.29	1.00	3.32	5.46	8.25	15.54
Rating	449788	8.75	3.47	4	6	9	10	15
Monthly Volume (bil.)	449788	5.37	10.09	0.07	0.71	2.42	6.26	19.83
Leverage	449788	0.31	0.21	0.07	0.16	0.26	0.42	0.75
Yield spread (%)	449788	2.38	3.09	0.31	0.82	1.51	2.81	6.69
$\Delta YS_{i,t}$	449788	0.67	83.40	-65.97	-15.50	-1.22	13.16	68.21
$E[\mu^S]_{i,t}$ (%)	449788	2.09	0.59	1.20	1.79	2.13	2.48	2.89
$\Delta E[\mu^S]_{i,t}$	449788	-0.18	25.10	-30.99	-9.62	0.59	11.61	30.67
$\Delta\sigma^S_{i,t}$	449788	0.07	7.27	-6.83	-2.04	-0.07	1.91	7.70
ΔCor^{SB}_t	449788	-0.01	10.62	-18.25	-5.87	-0.49	5.46	18.44

Panel B: Correlation Matrix

	Std.	$\Delta YS_{i,t}$	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t
$\Delta YS_{i,t}$	0.834	1	-0.301	0.237	0.009
$\Delta E[\mu^S]_{i,t}$	0.251		1	-0.346	-0.056
$\Delta\sigma^S_{i,t}$	0.073			1	-0.047
ΔCor^{SB}_t	0.106				1

Table II: **Inflation Risk and Yield Spread Changes**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \Gamma_i^T \Delta C_{i,t} + \nu_{i,t},$$

where $\Delta S_{i,t}$ represents structural model variables, $\Delta I_{i,t}$ denotes inflation risk proxies, and $\Delta C_{i,t}$ refers to control proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024). Panel A presents average coefficients, t-statistics, mean and median adjusted R^2 values, and sample sizes. Panel B details a principal component analysis on the residuals, reporting the variance explained by the first two principal components and total unexplained variance. Panel C includes R^2 values, F-statistics, and p-value from a Wald-test of the time-series regression of PC1 on inflation risk proxies. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004-2021.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Individual Bond Regressions								
$\Delta E[\mu^S]_{i,t}$		-0.545			-0.499	-0.357	-0.349	-0.297
		(-38.053)			(-37.401)	(-25.886)	(-24.557)	(-20.518)
$\Delta\sigma^S_{i,t}$			1.634		1.413	0.883	0.911	0.462
			(36.958)		(33.459)	(18.949)	(18.739)	(9.027)
ΔCor^{SB}_t				-0.273	-0.178	-0.163	-0.161	-0.166
				(-20.633)	(-14.602)	(-10.301)	(-8.845)	(-7.882)
CDGM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FN	No	No	No	No	No	Yes	Yes	Yes
HKS	No	No	No	No	No	No	Yes	Yes
EHL	No	No	No	No	No	No	No	Yes
Mean R^2	0.355	0.385	0.417	0.354	0.441	0.496	0.505	0.521
Median R^2	0.377	0.408	0.431	0.377	0.458	0.525	0.536	0.552
Obs.	449788	449788	449788	449788	449788	449788	449788	449788
Bonds	6826	6826	6826	6826	6826	6826	6826	6826
Panel B: Principal Component Analysis								
FVE		0.197	0.181	0.046	0.375	0.245	0.248	0.240
PC1	0.794	0.742	0.756	0.787	0.703	0.680	0.674	0.637
PC2	0.053	0.077	0.063	0.056	0.087	0.093	0.101	0.104
UV	1.153	0.926	0.944	1.100	0.720	0.461	0.412	0.334
Panel C: Time-Series Regression of PC1 on Inflation Risk Proxies								
Adj. R^2					0.214	0.084	0.075	0.049
R^2		0.131	0.157	0.018	0.226	0.097	0.088	0.062
F-stat		31.068	38.256	3.774	19.823	7.333	6.600	4.523
p-value		0.000	0.000	0.053	0.000	0.000	0.000	0.004
Obs.		208	208	208	208	208	208	208

Table III: **Inflation Risk and Yield Spread Changes: Fixed Effect Regression**

In this table, I estimate the model:

$$\Delta YS_{i,t} = \eta_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \Gamma_i^T \Delta C_{i,t} + \nu_{i,t},$$

where η_i is the bond fixed effect, $\Delta S_{i,t}$ is the vector of structural model variables, $\Delta I_{i,t}$ refers to the inflation risk proxies, and $\Delta C_{i,t}$ denotes control proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024). I report the coefficients, t-statistics (clustered at bond and month levels), mean and median adjusted R^2 values, and sample sizes. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Individual Bond Regressions								
$\Delta E[\mu^S]_{i,t}$		−0.391			−0.357	−0.385	−0.358	−0.346
		(−4.213)			(−4.489)	(−4.464)	(−4.467)	(−4.497)
$\Delta\sigma^S_{i,t}$			0.855		0.628	0.926	0.899	0.611
			(2.730)		(2.932)	(3.791)	(3.780)	(2.985)
ΔCor^{SB}_t				−0.172	−0.167	−0.161	−0.171	−0.167
				(−1.798)	(−1.946)	(−1.657)	(−1.758)	(−1.977)
CDGM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FN	No	No	No	No	No	Yes	Yes	Yes
HKS	No	No	No	No	No	No	Yes	Yes
EHL	No	No	No	No	No	No	No	Yes
Adj. R^2	0.156	0.199	0.193	0.190	0.201	0.195	0.198	0.204
R^2	0.168	0.211	0.206	0.202	0.213	0.207	0.210	0.216
Obs.	449788	449788	449788	449788	449788	449788	449788	449788
Bonds	6826	6826	6826	6826	6826	6826	6826	6826

Table IV: **Additional Variables**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \boldsymbol{\beta}_i^T \Delta\boldsymbol{S}_{i,t} + \boldsymbol{\theta}_i^T \Delta\boldsymbol{I}_{i,t} + \boldsymbol{\Gamma}_i^T \Delta\boldsymbol{C}_{i,t} + \nu_{i,t},$$

where $\Delta\boldsymbol{S}_{i,t}$ includes structural model variables, $\Delta\boldsymbol{I}_{i,t}$ refers to inflation risk proxies, and $\Delta\boldsymbol{C}_{i,t}$ includes changes in control proxies related to inflation volatility, consumption, income, unemployment, monetary policy uncertainty, and fed fund rates, along with proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022), and Eisfeldt, Herskovic and Liu (2024). Panel A presents average coefficients, t-statistics, mean and median adjusted R^2 values, and sample sizes. Panel B details a principal component analysis on the residuals, reporting the variance explained by the first two principal components and total unexplained variance. Panel C includes R^2 values, F-statistics, and p-value from a Wald-test of the time-series regression of PC1 on inflation risk proxies. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004-2021.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Individual Bond Regressions										
ΔIVR_t	18.358	26.122								
	(6.384)	(4.124)								
$\Delta Consumption_t$			2.875	2.955						
			(3.646)	(3.158)						
$\Delta Income_t$				1.528	1.639					
			(3.202)	(3.411)						
$\Delta Unemployment_t$			0.085	0.052						
			(5.024)	(2.530)						
ΔMPU_t					-0.023	-0.027			-0.023	-0.029
					(-4.381)	(-3.786)			(-4.213)	(-4.244)
$\Delta FED\ Fund_t$							-0.051	-0.079	-0.038	-0.017
							(-1.854)	(-1.317)	(-1.195)	(-0.576)
$\Delta E[\mu^S]_{i,t}$		-0.331		-0.195		-0.302		-0.291		-0.292
		(-14.835)		(-10.721)		(-17.797)		(-17.868)		(-15.542)
$\Delta \sigma^S_{i,t}$		0.457		0.544		0.554		0.487		0.557
		(4.842)		(9.048)		(9.613)		(7.988)		(9.243)
ΔCor^{SB}_t		-0.205		-0.197		-0.195		-0.166		-0.156
		(-7.397)		(-9.199)		(-7.115)		(-6.795)		(-7.233)
CDGM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HKS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Ye	Yes	Yes
EHL	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Mean R^2	0.501	0.521	0.515	0.534	0.503	0.524	0.505	0.522	0.506	0.526
Median R^2	0.528	0.559	0.548	0.574	0.528	0.557	0.531	0.557	0.535	0.561
Obs.	449788	449788	449788	449788	449788	449788	449788	449788	449788	449788
Bonds	6826	6826	6826	6587	6826	6826	6826	6826	6826	6729
Panel B: Principal Component Analysis										
FVE		0.248		0.240		0.241		0.235		0.235
PC1	0.676	0.631	0.675	0.636	0.678	0.636	0.676	0.641	0.677	0.640
PC2	0.099	0.109	0.088	0.099	0.097	0.106	0.097	0.102	0.098	0.104
UV	0.419	0.315	0.369	0.280	0.431	0.327	0.420	0.322	0.412	0.315
Panel C: Time-Series Regression of PC1 on Inflation Risk Proxies										
Adj. R^2		0.054		0.052		0.049		0.040		0.040
R^2		0.067		0.065		0.062		0.054		0.054
F-stat		4.914		4.766		4.518		3.905		3.894
p-value		0.003		0.003		0.004		0.010		0.010
Obs		208		208		208		208		208

Table V: **Alternative Inflation Risk Proxies**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \Gamma_i^T \Delta C_{i,t} + \nu_{i,t},$$

where $\Delta S_{i,t}$ represents structural model variables, $\Delta I_{i,t}$ to the vector of alternative proxies for inflation risk defined in Section V.B, and $\Delta C_{i,t}$ refers to control proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024). Panel A presents average coefficients, t-statistics, mean and median adjusted R^2 values, and sample sizes. Panel B details a principal component analysis on the residuals, reporting the variance explained by the first two principal components and total unexplained variance. Panel C includes R^2 values, F-statistics, and p-value from a Wald-test of the time-series regression of PC1 on inflation risk proxies. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004-2021.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Individual Bond Regressions						
$\Delta E[\mu^S]_{i,t}$		-0.297				-0.273
		(-20.518)				(-16.616)
$\Delta\sigma^S_{i,t}$		0.462				0.489
		(9.027)				(8.244)
$\Delta E[\mu^S]_{10,t}$			-0.253			
			(-9.825)			
$\Delta\sigma^S_{10,t}$			0.771			
			(7.296)			
$\Delta E[\mu^T]_{i,t}$				-0.293		
				(-18.995)		
$\Delta\sigma^T_{i,t}$				0.173		
				(3.367)		
ΔCPI_t					-0.131	
					(-13.388)	
$\Delta\sigma^{CPI}_t$					0.258	
					(6.608)	
ΔCor^{SB}_t		-0.166	-0.163	-0.129	-0.192	
		(-7.882)	(-8.738)	(-6.539)	(-9.320)	
ΔCor^{IA}_t						0.680
						(3.225)
CDGM	Yes	Yes	Yes	Yes	Yes	Yes
FN	Yes	Yes	Yes	Yes	Yes	Yes
HKS	Yes	Yes	Yes	Yes	Yes	Yes
EHL	Yes	Yes	Yes	Yes	Yes	Yes
Mean R^2	0.501	0.521	0.514	0.523	0.502	0.529
Median R^2	0.525	0.552	0.551	0.556	0.535	0.566
Obs.	449788	449788	449788	449788	449788	446492
Bonds	6826	6826	6826	6826	6826	6783
Panel B: Principal Component Analysis						
FVE		0.240	0.242	0.253	0.178	0.243
PC1	0.677	0.637	0.624	0.634	0.645	0.645
PC2	0.097	0.104	0.112	0.103	0.111	0.104
UV	0.439	0.334	0.333	0.328	0.361	0.333
Panel C: Time-Series Regression of PC1 on Inflation Risk Proxies						
Adj. R^2		0.049	0.088	0.090	0.066	0.038
R^2		0.062	0.101	0.104	0.079	0.052
F-stat		4.523	7.664	7.856	5.867	3.677
p-value		0.004	0.000	0.000	0.001	0.013
Obs.		208	208	208	208	205

Table VI: **Different Residual Groups**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \Gamma_i^T \Delta C_{i,t} + \nu_{i,t},$$

where $\Delta S_{i,t}$ is the vector of structural model variables, $\Delta I_{i,t}$ refers to inflation risk proxies, and $\Delta C_{i,t}$ includes control proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024). I assign each month's residuals to cohorts based on maturity (under 5 years, 5-12 years, over 12 years), leverage (less than 15% to greater than 55%), ratings (AAA-AA to B-C), trading volume, and betas on the S&P 500 and the VIX_t. After assigning the residuals to these 18 or 15 cohorts depending on the cohorts, I compute an average residual and extract principal components from the covariance matrix. I report the variance explained by the first and second principal components (PC1 and PC2) for each grouping, comparing baseline results and those including inflation risk proxies. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.

Group 1	Group 2	Inflation Risk	PC1	PC2	FVE
Time to Maturity	Leverage	No	0.677	0.097	
		Yes	0.637	0.104	0.240
Time to Maturity	Rating	No	0.632	0.124	
		Yes	0.599	0.134	0.240
Time to Maturity	Volume	No	0.729	0.080	
		Yes	0.676	0.097	0.250
Time to Maturity	Market Beta	No	0.632	0.095	
		Yes	0.597	0.101	0.231
Time to Maturity	VIX Beta	No	0.597	0.103	
		Yes	0.549	0.112	0.217

Table VII: **Model Parameters**

This table lists the parameters used to examine how yield spreads relate to inflation risk. I fix all parameters except for expected inflation (μ_p), inflation volatility (σ_P) and the correlation between inflation and asset growth ($\rho_{A^r,P}$). I uniformly draw these parameters in reasonable intervals.

Name	Symbol	Value
Initial Price Level	P_0	1
Initial Asset Value	A_0	100
Stickiness Parameter	ϕ	0.40
Refinancing Intensity	m	0.125
Firm-Specific Volatility	σ_{A_r}	0.30
Real Risk-Free Rate	r_r	0.04
Tax Rate	τ_{tax}	0.35
Recovery Rate	R	0.50
Expected Inflation	μ_P	$\mathscr{U}[-0.02, 0.10]$
Correlation Inflation Asset Growth	$\rho_{A^r P}$	$\mathscr{U}[-1, 1]$
Inflation Volatility	σ_P	$\mathscr{U}[0.005, 0.10]$

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Internet Appendix for: "Inflation Risk and Yield Spread Changes"

Diego Bonelli

This Internet Appendix contains supplemental material for the article "Inflation Risk and Yield Spread Changes".

Section *A* details the procedure for seasonal adjustment of swap and TIPS rates. Section *B* details the construction of the TRACE to CRSP linking table. Section *C* presents the main model solution and alternative structural models motivating the effect of inflation risk. Section *D* and *E* present additional figures and tables.

- Figures IA.1 and IA.2 present additional plots of swap rates.
- Figures IA.3, IA.4 and IA.5 present plots of heterogenity implications of the model.
- Figure IA.6 presents model simulation of all models discussed in Section *C*.
- Figure IA.7 presents additional heterogeneity tests consistets with the alternative structural models discussed in Section *C*.
- Tables IA.1 and IA.2 reports replication tables of CDGM.
- Table IA.3 presents heterogeneity regressions as in Figure 1 and IA.7.
- Table IA.4 presents time-series regressions including all bonds regardless of industry, size, or type of bond.
- Table IA.5 presents time-series regressions including only bonds which trade during the last trading day of the month as in Friewald and Nagler (2019).
- Table IA.6 presents all model parameters needed by all models.

A. *Seasonal Adjustment of Swap and TIPS rates*

TIPS and zero-coupon inflation swaps are both indexed to the non-seasonally adjusted U.S. CPI index, thus seasonal patterns in inflation must be taken into account when matching with corporate bond cash flows for swap maturities that include fractional years (e.g., 7.5 years). I adjust swap and TIPS rates following the procedure of Fleckenstein, Longstaff and Lustig (2014). Specifically, I fit a standard cubic spline through the quoted maturities of both swaps and TIPS using a grid size of one month. I then estimate seasonal components in inflation from the monthly non-seasonally adjusted U.S. CPI index (CPI-U NSA) series between January 1980 and December 2021 by estimating a regression of monthly log changes in the CPI index on month dummies. I obtain an estimate of the seasonal effect in each month. I normalize these seasonal factors so that their product is unity, thus, by construction, there will be no seasonal adjustment for full-year maturities. Next, monthly forward rates are constructed from the interpolated rates, and multiplied by the corresponding adjustment factor. Lastly, I obtain seasonally adjusted rates by converting forward rates into spot rates. As suggested by Fleckenstein, Longstaff and Lustig (2014), since the interpolated rates would then be sensitive to short-term inflation assumptions, I do not interpolate or adjust maturity shorter than the quoted ones, i.e., one year for the swaps and two years for the TIPS, but instead use the shortest quoted maturity rate.

B. *Linking Academic TRACE to CRSP*

I create a linking table to match TRACE CUSIPs to CRSP permco, accounting for firm mergers, delistings, and splits. First, I merge TRACE with Mergent FISD to obtain issuer and parent CUSIPs. For the CRSP merge, I rely on 6-digit CUSIPs and the TRACE-reported trading symbol, which corresponds to a firm's ticker.

I begin by matching CRSP to TRACE using issuer CUSIPs, tracking the issuing firm forward through the CRSP delisting table to account for mergers or spin-offs. Trading symbols help resolve cases where a bond corresponds to multiple firms on the same date, prioritizing matches where the TRACE trading symbol aligns with the CRSP company symbol.

For unmatched bonds, I match them to CRSP firms using parent CUSIPs. By tracing the parent firm back in time to the bond's offering date and utilizing trading symbols, I identify the correct firm path. First, I ensure the path reaches the first symbol match before other firms, and if multiple firm-date matches occur, I prioritize matches where the TRACE trading symbol aligns with the CRSP company symbol at the time. If no valid match exists, I use the symbol match at any point, provided no alternative matches exist.

Next, I match firms using trading symbols, requiring that symbols are active simultaneously in both CRSP and TRACE databases. Matches are valid only when dates overlap, and the longest period of valid symbol matches is retained. After removing six instances of multiple firm-bond matches, I match the remaining bonds using company names, first matching the issuing firm from FISD with CRSP at the offering date, and then matching parent firm names for any remaining bonds.

C. Model Solution

Let A_t^r and P_t denote the firm's real asset and price index processes, respectively. Define $A_t^n = A_t^r P_t^\phi$ as the nominal asset price, where $0 < \phi \leq 1$ captures the sensitivity of nominal asset growth to inflation. I assume that both A_t^r and P_t^ϕ are Geometric Brownian processes under the $\boldsymbol{P}$ measure:

$$\frac{dA_t^r}{A_t^r} = \mu_{A^r} d_t + \sigma_{A^r} dW_t^{P,A^r} \qquad A_0^r > 0, \tag{IA.1}$$

$$\begin{aligned}\frac{dP_t^\phi}{P_t^\phi} &= \phi\left[\mu_P + \frac{1}{2}(\phi-1)\sigma_P^2\right] d_t + \phi\sigma_P dW_t^{P,P} \qquad P_0^\phi > 0, \\ &= \bar{\mu}_P d_t + \bar{\sigma}_P dW_t^{P,P}\end{aligned} \tag{IA.2}$$

Here, μ_{A^r} and $\bar{\mu}_P$ are the constant drift rates, σ_{A^r} and $\bar{\sigma}_P$ are the constant volatilities, and W_{A^r} and W_P are the Wiener processes of the respective stochastic variables. Since risk-free bonds are different in real and nominal terms, the risk-neutrality concept also varies with the pricing denomination (i.e., in either real consumption baskets or nominal dollars). In order to price a real asset in nominal terms, one needs the real asset's dynamics under the nominal measure. To do so, I draw from the foreign exchange literature and use the technique called quanto adjustment or quanto prewashing. Since A_t^n and P_t can be considered as price processes in the nominal world, under the nominal risk-neutral measure $\mathbb{Q}^n$, their drift rates are

$$\delta_{A^n}^n = r_r + \bar{\mu}_P, \qquad \delta_P^n = \bar{\mu}_P, \tag{IA.3}$$

respectively. The reciprocal of P_t can be considered as the real price of one unit of the nominal good. The drift rate of A_t^r and $1/P_t$ under the real risk neutral measure $\mathbb{Q}^r$, are given by

$$\delta_{A^r}^r = r_r, \qquad \delta_{1/P}^r = -\bar{\mu}_P, \tag{IA.4}$$

respectively. I then find $\delta_{A^r}^n$, that is, the drift rate of the price process of the real-denominated asset A^r under the nominal risk neutral measure $\mathbb{Q}^n$. Let the dynamics of A_t^r under $\mathbb{Q}^n$ be governed by

$$\frac{dA_t^r}{A_t^r} = \delta_{A^r}^n d_t + \sigma_{A^r} dW_t^{n,A^r}, \tag{IA.5}$$

where the $\mathbb{Q}^n$-Brownian processes dW_t^{n,A^r}, and $dW_t^{n,P}$ have a correlation of ρ_{A^rP}. Since $A_t^n = A_t^r P_t^\phi$, we then have

$$\delta_{A^n}^n = \delta_{A^r}^n + \delta_P^n + \rho_{A^rP}\bar{\sigma}_P\sigma_{A^r}, \tag{IA.6}$$

and then

$$\delta_{A^r}^n = \delta_{A^n}^n - \delta_P^n - \rho_{A^rP}\bar{\sigma}_P\sigma_{A^r}. \tag{IA.7}$$

Under the nominal risk neutral measure $\mathbb{Q}^n$, the process follows:

$$\frac{dA_t^r}{A_t^r} = (r_r - \rho_{A^rP}\bar{\sigma}_P\sigma_{A^r})dt + \sigma_{A^r} dW_t^{n,A^r}. \tag{IA.8}$$

Since $A_t^n = A_t^r P_t^{\phi}$ from Ito's lemma:

$$\begin{aligned} \frac{dA_t^n}{A_t^n} &= \left(r_r - \rho_{A^r P}\bar{\sigma}_P \sigma_{A^r} + \bar{\mu}_P + \rho_{A^r P}\bar{\sigma}_P \sigma_{A^r}\right) d_t + \sigma_{A^r} dW_t^{n,A^r} + \bar{\sigma}_P dW_t^{n,P} \\ &= (r_r + \bar{\mu}_P) d_t + \sigma_{A^r} dW_t^{n,A^r} + \bar{\sigma}_P dW_t^{n,P}. \end{aligned} \tag{IA.9}$$

Defining the new variance $\sigma_{A^n}^2$ as

$$\sigma_{A^n}^2 = \sigma_{A^r}^2 + \phi^2 \sigma_P^2 + 2\phi \rho_{A^r P} \sigma_{A^r} \sigma_P, \tag{IA.10}$$

the nominal asset process follows

$$\frac{dA_t^n}{A_t^n} = \left[r_r + \phi(\mu_P + \frac{1}{2}(\phi - 1)\sigma_P^2)\right] dt + \sigma_{A^n} dW_t^{n,A^n}. \tag{IA.11}$$

The firm commits to a stationary debt structure by issuing consol bonds to optimally set its total debt D through a constant coupon rate C. Following Leland (1998), the firm continuously retires a fixed fraction mP of its outstanding debt at par, where P represents the total face (book) value of debt and m denotes the refinancing intensity, where $0 < m \leq 1$. The retired debt is immediately replaced by newly issued debt with identical maturity, coupon, principal, and seniority, ensuring a constant rollover process.

Debt issuance provides a tax advantage $\tau_{tax} C$ but increases bankruptcy costs borne by equity holders. The coupon flow needs to be paid either with cash flow plus the tax advantage of debt or out of the equity holders' own pockets. Default occurs when equity holders deem the firm's asset value too low to justify further payouts. Upon liquidation, debt holders receive the residual value of the firm after accounting for bankruptcy costs, determined by the recovery rate, R.

Equity holders are the residual claimants on the firm's cash flows. Consequently, the equity value, E, is determined as the difference between the levered firm value, ν, and the debt value, D. If A_t^n declines to a critical endogenous threshold, X_B, equity holders default. Define τ the first time the assets hit A_B^n

$$\tau = \inf\{t \mid A_t^n \leq A_B^n\}. \tag{IA.12}$$

Let r_n be equal to $r_r + \phi(\mu_P + \frac{1}{2}(\phi - 1)\sigma_P^2)$. The value of a unit claim at default is

$$\begin{aligned} P_B(A^n) &= \left(\frac{A^n}{A_B^n}\right)^{-\gamma}, \\ \gamma &= \frac{r_n - \frac{\sigma_{A^n}^2}{2} + \sqrt{(r_n - \sigma_{A^n}^2)^2 + 2(r_n m)\sigma_{A^n}^2}}{\sigma_{A^n}^2}. \end{aligned} \tag{IA.13}$$

The debt value follows

$$D(A^n; A_B^n, P, C) = \frac{(C + mP)}{(r_n + m)} \left[1 - P_B(A^n)\right] + R A_B^n P_B(A^n), \tag{IA.14}$$

where the first term on the right hand side is the value of the coupon flow up until time τ and the second term is the recovery value in case of bankruptcy. The total value of the firm, v, equals its asset value V, plus the value of tax benefits, less the value of bankruptcy costs: $v = V + TB - BC$. Define as $x = \gamma$ when $m = 0$. Then, the present value of bankruptcy costs is

$$BC(A^n; A^n_B) = (1-R)A^n_B \left(\frac{A^n}{A^n_B}\right)^{-x}. \tag{IA.15}$$

The value of the coupon flow up until time τ may be expressed as $(C/r_n)(1-(\frac{A^n}{A^n_B})^{-x})$, thus implying a tax advantage of debt

$$TB(A^n; A^n_B) = \frac{\tau_{tax}C}{r_n}\left[1-\left(\frac{A^n}{A^n_B}\right)^{-x}\right]. \tag{IA.16}$$

The first term of the debt value is the value of the coupon paid until time τ and the second term is the recovery value in bankruptcy. Given that the firm only has equity and debt outstanding, its value is

$$\begin{aligned} v(A^n; A^n_B, P, C) &= E(A^n; A^n_B, P, C) + D(A^n; A^n_B, P, C) \\ &= A^n + TB(A^n; A^n_B, C) - BC(A^n; A^n_B). \end{aligned} \tag{IA.17}$$

Given that $E = v - D$, the equity value equals

$$\begin{aligned} E(A^n; A^n_B, P, C) =& A^n + \frac{\tau_{tax}C}{r_n}\left[1-\left(\frac{A^n}{A^n_B}\right)^{-x}\right] - (1-R)A^n_B\left(\frac{A^n}{A^n_B}\right)^{-x} \\ & - \frac{(C+mP)}{(r_n+m)}\Big[1-P_B(A^n)\Big] - RA^n_B P_B(A^n). \end{aligned} \tag{IA.18}$$

The initial owners of the assets choose a level of debt that maximizes the firm total value. Since equity owners have a limited-liability asset, they never allow equity value to become negative but rather choose to stop paying coupons and force the firm into bankruptcy. Thus, the optimal default-triggering level satisfies the "smooth-pasting" condition

$$\frac{d}{dA^n}E(A^n; A^n_B, P, C)|_{A^n = A^n_B} = 0, \tag{IA.19}$$

which is solved for $A^n_B = A^n_{B^(C*)}$ where

$$A^n_{B^(C*)} = \frac{\frac{\gamma(C+mP)}{r_n+m} - \frac{\tau_{tax}C}{r_n}}{(1+(1-R)x+R\gamma)}. \tag{IA.20}$$

Plugging this solution into IA.14 yields a closed form solution for total debt value, given coupon C and principal value P. When debt is initially issued, there is typically an additional constraint linking market value, coupon, and principal: the coupon is set such that the market value of debt, D, equals its principal value, P (i.e., the debt is issued at par). This constraint requires C to be the smallest solution to the equation

$$D(A^n; A^n_B, P, C) = P. \tag{IA.21}$$

At time $t = 0$, the initial owners maximize the total firm value by choosing the optimal coupon C^*:

$$C^* = \arg\max_C \nu(A^n; A^n_B(C*), P(C), C) \tag{IA.22}$$

where C^* must be obtained numerically. Therefore, yield spreads are given by

$$y - r_n = \frac{C*}{D(A^n; A^n_B(C*), C*, P*)} - r_n. \tag{IA.23}$$

A. Additional Structural Models

In this section, I study additional structural models, namely the Leland (1994) model, Merton (1974) model and two versions of the Black and Cox (1976) model, while retaining closed-form solutions. The starting point of the models is the nominal asset value under the $\mathbb{Q}^n$ measure as shown in VI:

$$\frac{dA^n_t}{A^n_t} = \left[r_r + \phi(\mu_P + \frac{1}{2}(\phi - 1)\sigma^2_P)\right]dt + \sigma_{A^n} dW^{n,A^n}_t, \tag{IA.24}$$

where

$$\sigma^2_{A^n} = \sigma^2_{A^r} + \phi^2\sigma^2_P + 2\phi\rho_{A^rP}\sigma_{A^r}\sigma_P. \tag{IA.25}$$

A.1. Leland (1994)

The firm issues consol bonds to optimally set debt D through a constant coupon rate C, making the firm's claims "perpetual" in the sense that conditional on not defaulting, no maturity date is set. Debt issuance provides a tax advantage $\tau_{tax}C$ but increases bankruptcy costs borne by equity holders. The coupon flow needs to be paid either with cash flow plus the tax advantage of debt or out of the equity holders' own pockets or by issuing new equity. Default occurs when equity holders deem the firm's asset value too low to justify further payouts. Upon liquidation, debt holders receive the residual value of the firm after accounting for bankruptcy costs, determined by the recovery rate, R. Define A^n_B the level of assets at which default is triggered, and τ the first time the assets hit A^n_B

$$\tau = \inf\{t \mid A^n_t \leq A^n_B\}. \tag{IA.26}$$

Let r_n be equal to $r_r + \phi(\mu_P + \frac{1}{2}(\phi - 1)\sigma_P^2)$. Following Leland (1994), the value of a claim of 1 at the default boundary is

$$
\begin{aligned}
P_B(A^n) &= \left(\frac{A^n}{A_B^n}\right)^{-\gamma_1}, \\
\gamma_1 &= \frac{r_n - \frac{\sigma_{A^n}^2}{2} + \sqrt{(r_n - \frac{\sigma_{A^n}^2}{2})^2 + 2\sigma_{A^n}^2 r_n}}{\sigma_{A^n}^2}.
\end{aligned}
\tag{IA.27}
$$

The present value of bankruptcy costs is

$$
BC(A^n; A_B^n, C) = (1 - R)A_B^n \left(\frac{A^n}{A_B^n}\right)^{-\gamma_1}, \tag{IA.28}
$$

where R is the recovery rate in bankruptcy. The value of the coupon flow up until time τ may be expressed as $(C/r_n)(1 - P_B(A^n))$, thus implying a tax advantage of debt and a value of debt of

$$
TB(A^n; A_B^n, C) = \frac{\tau_{tax} C}{r_n}\Big[1 - P_B(A^n)\Big], \tag{IA.29}
$$

$$
D(A^n; A_B^n, C) = \frac{C}{r_n}\Big[1 - P_B(A^n)\Big] + R A_B^n P_B(A^n), \tag{IA.30}
$$

where τ_{tax} is the corporate tax rate. The first term of the debt value is the value of the coupon paid until time τ and the second term is the recovery value in bankruptcy. Given that the firm only has equity and debt outstanding, its value is

$$
\begin{aligned}
v(A^n; A_B^n, C) &= E(A^n; A_B^n, C) + D(A^n; A_B^n, C) \\
&= A^n + TB(A^n; A_B^n, C) - BC(A^n; A_B^n, C).
\end{aligned}
\tag{IA.31}
$$

The initial owners of the assets choose a level of debt that maximizes the firm total value. Since equity owners have a limited-liability asset, they never allow equity value to become negative but rather choose to stop paying coupons and force the firm into bankruptcy. Thus the optimal default triggering level satisfies the ”smooth-pasting” condition

$$
\frac{d}{dA^n} E(A^n; A_B^n, C)|_{A^n = A_B^n} = 0, \tag{IA.32}
$$

which is solved for $A_B^n = A_B^n(C*)$ where

$$
A_B^n(C*) = \frac{\gamma_1(1 - \tau_{tax})C}{r_n(1 + \gamma_1)}. \tag{IA.33}
$$

Hence, plugging this solution into IA.31, the optimal coupon could be found by maximizing the firm value as a function of C. The solution is

$$
C^* = A^n \frac{r_n(1 + \gamma_1)}{\gamma_1(1 - \tau_{tax})} \left(\frac{(1\gamma_1)\tau_{tax} + (1 - R)(1 - \tau_{tax} * \gamma_1}{\tau_{tax}}\right)^{-\frac{1}{\gamma_1}}. \tag{IA.34}
$$

Therefore, yield spreads are given by

$$y - r_n = \frac{C*}{D(A^n; A_B^{n*}, C*)} - r_n. \tag{IA.35}$$

A.2. Merton (1974)

Assume an elementary capital structure of the firm, where the liabilities of the firm only consist of a single debt with nominal face value F^n. The debt has zero coupons and no embedded option features. The firm does not adjust its liabilities during its life, hence creating stickiness in leverage. At maturity of the debt, the payment to the debt holders will be the minimum of the nominal face value F^n and the nominal firm value at maturity A_T^n. Default can be triggered only at maturity and this occurs when $A_T^n < F^n$, that is, the firm's asset value cannot meet its debt claim. The firm is liquidated at zero cost and all the proceeds from liquidation are transferred to the debt holders. Let r_n be equal to $r_r + \phi(\mu_P + \frac{1}{2}(\phi - 1)\sigma_P^2)$. Since the value of risky debt is the value of default-free debt less the present value of expected loss to the debt holders or the value of the put option granted to the issuer, the yield spread is defined as

$$y - r_n = -\frac{1}{(T-t)} \ln\left[1 - \frac{e^{r_n(T-t)} P_t^n(A_t^r, \phi, P_t, T, t)}{F^n}\right], \tag{IA.36}$$

where the put value on real equity with nominal strike is

$$P_t^n(A_t^r, \phi, P_t, T, t) = F^n e^{-r^n(T-t)} N(-\hat{d}_2) - A_t^r P_t^{\phi} N(-\hat{d}_1), \tag{IA.37}$$

with

$$\hat{d}_1 = \frac{\ln(\frac{A_t^r P_t^{\phi}}{F^n}) + (r_n + \frac{\sigma_{A^n}^2}{2})(T-t)}{\sigma_{A^n}\sqrt{(T-t)}}, \tag{IA.38}$$

and

$$\hat{d}_2 = \hat{d}_1 - \sigma_{A^n}\sqrt{(T-t)}. \tag{IA.39}$$

A.3. Black and Cox (1976)

The Black and Cox (1976) baseline model extends the Merton (1974) model by allowing defaults to occur prior to the maturity of the bond with an exogenous default boundary. Following Feldhütter and Schaefer (2023), I am focusing on two versions of the Black and Cox (1976) model: the constant growth of debt and the constant debt version.

Constant Growth of Debt

In the version of the Black and Cox (1976) model with constant growth of debt, the level of debt is $F_T^n = F_t^n e^{\lambda(T-t)}$, where $\lambda > 0$. In this case, the level of debt increases deterministically over time, a fact that matches the average behavior of firms. The default occurs the first time that the value of the firm hits the default boundary (from above). I assume that the default boundary is a constant fraction, d, of the face value of debt at the time of default, F_t^n, and so τ, the default time is given by:

$$\tau = \inf\{t \leq T \mid A_t^n \leq d \times F_t^n\}. \tag{IA.40}$$

At maturity, debtors receive F_0^n if the firm is solvent and RF_0^n if the firm has defaulted, where $R < 1$ is the recovery rate. Then the cumulative default probability at time T (See Feldhütter and Schaefer (2023)) is

$$\begin{aligned} P_T^{\mathbb{Q}^n} =& N\left(\frac{-\ln\left(\frac{dA_t^n}{F_t^n}\right) - a(T-t)}{\sigma_{A^n}\sqrt{(T-t)}}\right) + \exp\left(\frac{-2\ln\left(\frac{dA_t^n}{F_t^n}\right)a}{\sigma_{A^n}^2}\right) \\ & N\left(\frac{-\ln\left(\frac{dA_t^n}{F_t^n}\right) + a(T-t)}{\sigma_{A^n}\sqrt{(T-t)}}\right), \\ a =& \left(r_r + \phi\left[\mu_P + \frac{1}{2}(\phi-1)\sigma_P^2\right] - \lambda - \frac{\sigma_{A^n}^2}{2}\right), \end{aligned} \tag{IA.41}$$

and thus yield spreads can be defined as

$$y - r_n = \frac{1}{T}\ln(1-(1-R)P_T^{\mathbb{Q}^n}). \tag{IA.42}$$

Constant Debt

By setting $\lambda = 0$ in the Constant Growth of Debt model, I obtain a version with constant debt, in which the cumulative default probability is

$$\begin{aligned} P_T^{\mathbb{Q}^n} =& N\left(\frac{-\ln\left(\frac{dA_t^n}{F_t^n}\right) - a(T-t)}{\sigma_{A^n}\sqrt{(T-t)}}\right) + \exp\left(\frac{-2\ln\left(\frac{dA_t^n}{F_t^n}\right)a}{\sigma_{A^n}^2}\right) \\ & N\left(\frac{-\ln\left(\frac{dA_t^n}{F_t^n}\right) + a(T-t)}{\sigma_{A^n}\sqrt{(T-t)}}\right), \\ a =& \left(r_r + \phi\left[\mu_P + \frac{1}{2}(\phi-1)\sigma_P^2\right] - \frac{\sigma_{A^n}^2}{2}\right), \end{aligned} \tag{IA.43}$$

and the yield spreads

$$y - r_n = \frac{1}{T}\ln\left[1-(1-R)P_T^{\mathbb{Q}^n}\right]. \tag{IA.44}$$

D. Figures

Figure IA.1: **Time Series of Treasury, TIPS and Swap rates**

The top panel shows the time series of 2-year zero coupon treasury yield, break-even, and inflation swaps. The bottom panel represents the difference between the 2-year zero coupon inflation swap rate and the 2-year TIPS implied zero-coupon break-even inflation yield. Yields are expressed as annual percentages, and the difference is in annual basis points.

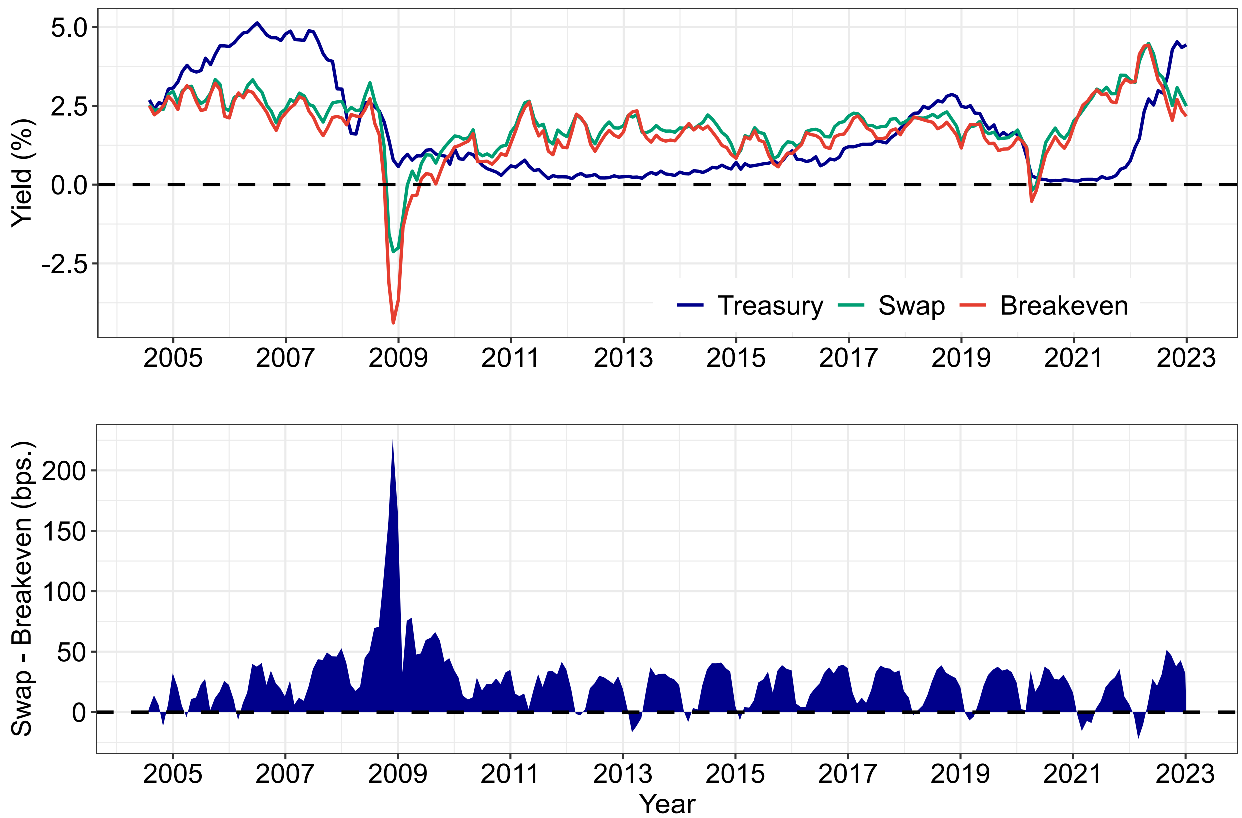
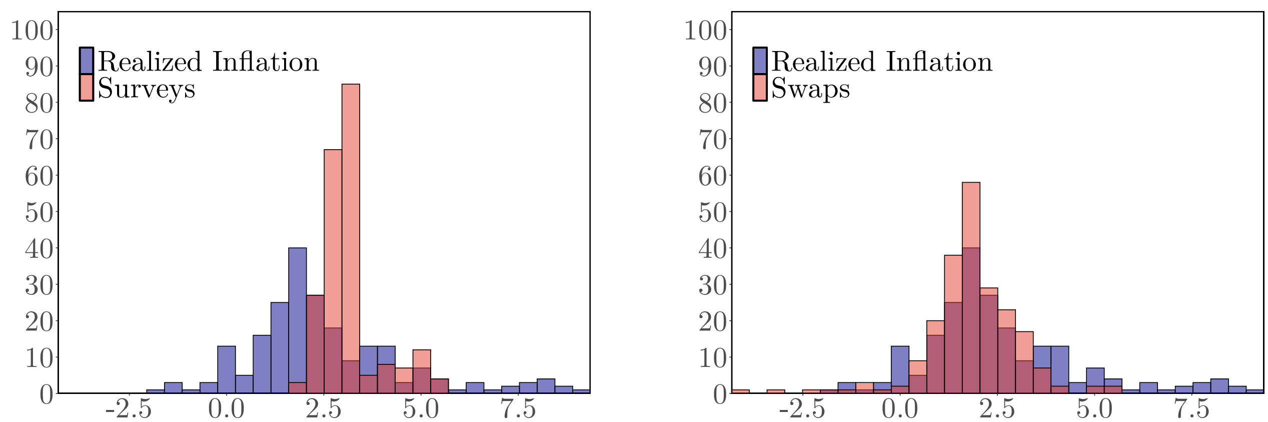


Figure IA.2: **Histogram of Forecasts vs Realized: Surveys and Swaps**

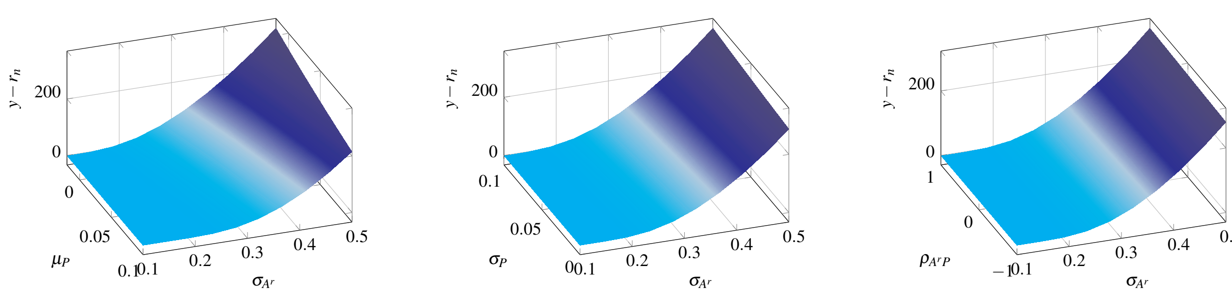
This figure reports the histogram of the forecasts and the 1-year inflation rates. The horizontal axis reflects the forecast or realized inflation in percentage points, while the vertical axis captures the frequency. In blue I report the realizations while in red the expectations. Panel (a) shows the expected price change for one year from Consumer Surveys at the University of Michigan, while Panel (b) the one-year inflation swaps.



(a) Surveys (b) Swaps

Figure IA.3: **Heterogeneity - Asset Volatility**

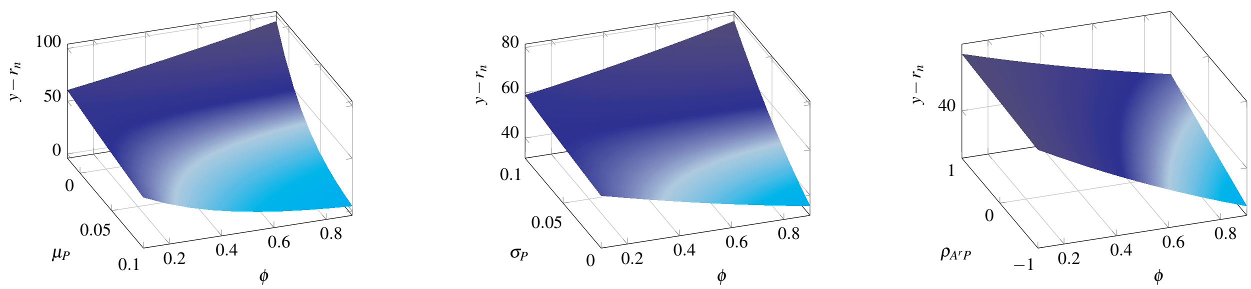
This figure shows the heterogeneity implications of inflation risk. I calibrate the model for each level of real asset volatility from 5 to 40% and for each level of expected inflation rate (μ_P), inflation volatility (σ_P), and the correlation between inflation and assets (ρ_{A^rP}). Expected inflation varies between -2% and 10%, inflation volatility between 0.5% and 10%, and correlation between inflation and real assets between -1 and 1. I fix all parameters according to Table VII.



(a) Expected Inflation (b) Inflation Volatility (c) Correlation

Figure IA.4: **Heterogeneity - Cash-Flow Stickyness**

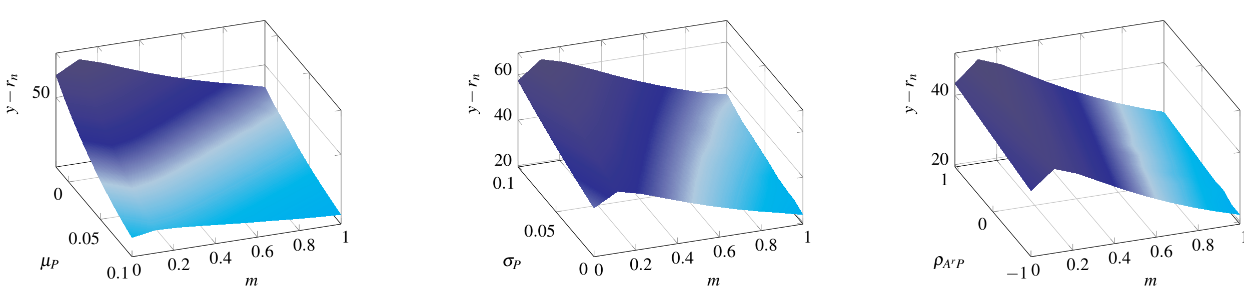
This figure shows the heterogeneity implications of inflation risk. I calibrate the model for each level of cash flow stickyness (ϕ) from 0.1 to 0.9 and for each level of expected inflation rate (μ_P), inflation volatility (σ_P), and the correlation between inflation and assets (ρ_{A^rP}). Expected inflation varies between -2% and 10%, inflation volatility between 0.5% and 10%, and correlation between inflation and real assets between -1 and 1. I fix all parameters according to Table VII.



(a) Expected Inflation (b) Inflation Volatility (c) Correlation

Figure IA.5: **Heterogeneity - Refinancing Intensity**

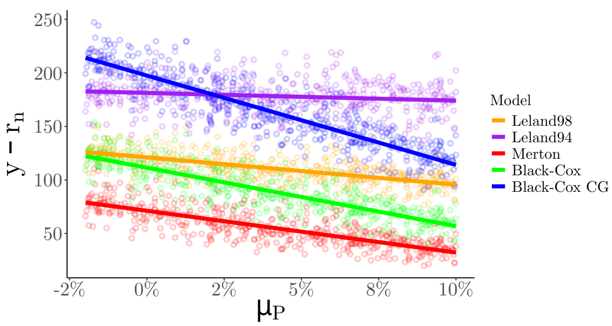
This figure shows the heterogeneity implications of inflation risk. I calibrate the model for each level of cash flow stickyness (ϕ) from 0.1 to 0.9 and for each level of expected inflation rate (μ_P), inflation volatility (σ_P), and the correlation between inflation and assets (ρ_{A^rP}). Expected inflation varies between -2% and 10%, inflation volatility between 0.5% and 10%, and correlation between inflation and real assets between -1 and 1. I fix all parameters according to Table VII.



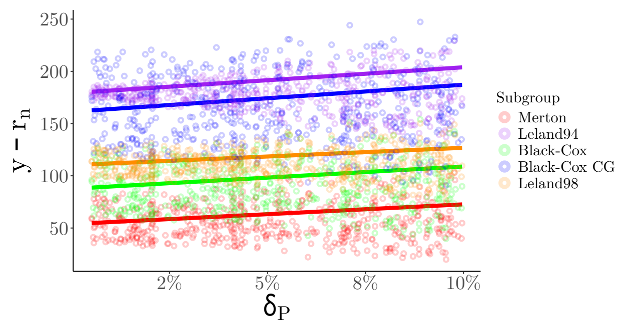
(a) Expected Inflation (b) Inflation Volatility (c) Correlation

Figure IA.6: **Models Simulations**

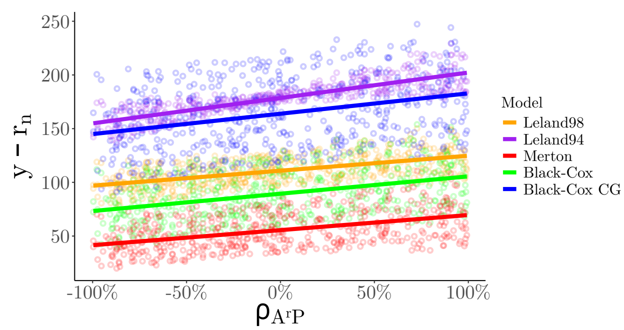
This figure shows the yield spread implications of inflation risk according to the models discussed. I simulate the models 500 times where I fix all parameters except for the expected inflation rate (μ_P), the volatility of inflation (σ_P), and the correlation between inflation and assets (ρ_{A^rP}). I uniformly draw these parameters in reasonable intervals: expected inflation varies between -2% and 10%, inflation volatility between 0.5% and 10%, and correlation between inflation and assets between -1 and 1. I also report regression lines. In Panel (b), the regression line is conditional on the correlation between inflation and real assets being positive. Table IA.6 provides the details about all parameter choices.



(a) Expected Inflation



(b) Inflation Volatility



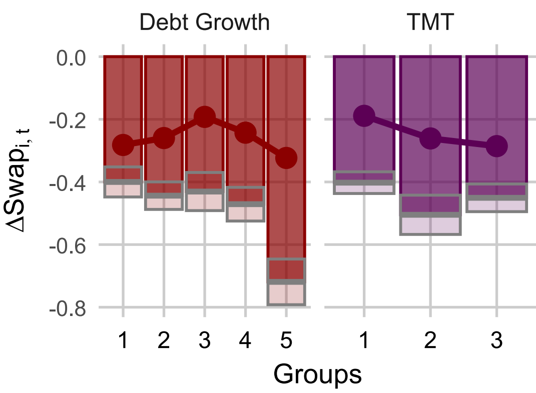
(c) Correlation Inflation Asset

Figure IA.7: **Additional Heterogeneity in Inflation Risk**

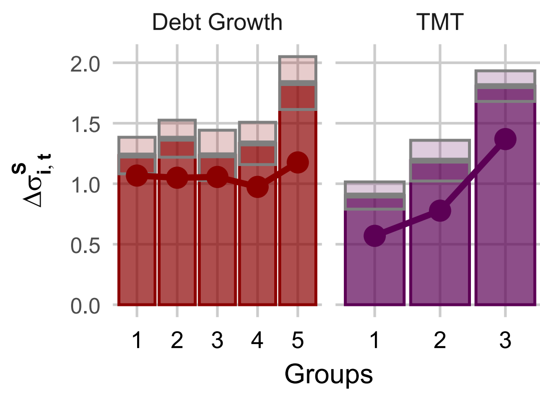
For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \nu_{i,t},$$

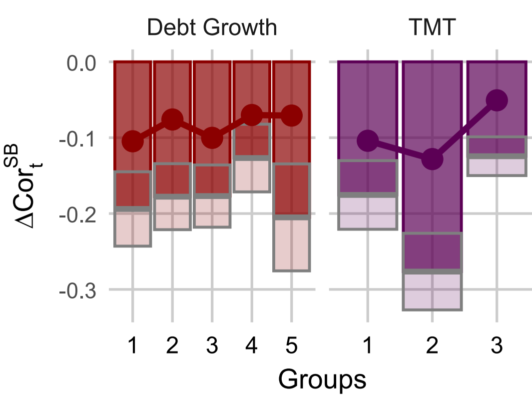
where $\Delta S_{i,t}$ is the vector of structural model variables, and $\Delta I_{i,t}$ refers to the inflation risk proxies. I assign each bond to cohorts based on debt growth and time to maturity (less than five years, five to twelve years, and over twelve years). I plot average coefficients by group with its 5% confidence interval. Panel (a) reports results for expected inflation, Panel (b) for inflation volatility and Panel (c) for the correlation. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.



(a) Expected Inflation



(b) Inflation Volatility



(c) Correlation

E. Tables

Table IA.1: **Determinants of Yield Spread Changes in Collin-Dufresne, Goldstein and Martin (2001)**

For each industrial bond i with at least 25 monthly observations of yield spread changes, $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \boldsymbol{\beta}_i^T \boldsymbol{\Delta S}_{i,t} + \varepsilon_{i,t},$$

where $\boldsymbol{\Delta S}_{i,t} := [\Delta Lev_{i,t}, \Delta RF_t, \Delta RF_t^2, \Delta Slope_t, \Delta VIX_t, RM_t, \Delta Jump_t]$ is the vector of the structural model variables defined in Section II, with $\Delta Lev_{i,t}$ as the change in firm leverage, ΔRF_t the change in 10-year Treasury interest rate, ΔRF_t^2 the squared change in the 10-year Treasury interest rate, $\Delta Slope_t$ the change in the slope of the term structure, ΔVIX_t the change in VIX_t index, RM_t the S&P 500 return, and $\Delta Jump_t$ the change in a jump factor based on S&P 500 index options. Panel A reports the average coefficients across bonds, the associated t-statistics, the mean and median adjusted R^2 values, and the numbers of observations and bonds in the sample, respectively. The t-statistics are calculated from the cross-sectional variation over the estimates for each coefficient. That is, each reported coefficient value is divided by the standard deviation of the estimates and scaled by the square root of the number of bonds. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	<15%	15%–25%	25%–35%	35%–45%	45%–55%	>55%	All
Intercept	0.010	0.009	0.018	0.014	0.041	0.065	0.022
	(3.789)	(3.450)	(6.101)	(3.633)	(5.625)	(7.813)	(12.483)
$\Delta Lev_{i,t}$	0.003	0.014	0.016	0.038	0.052	0.115	0.033
	(0.537)	(9.770)	(8.497)	(15.193)	(15.684)	(17.602)	(21.180)
ΔRF_t	-0.299	-0.415	-0.534	-0.751	-0.853	-1.121	-0.594
	(-23.757)	(-35.028)	(-30.715)	(-23.564)	(-14.054)	(-16.774)	(-45.803)
ΔRF_t^2	0.097	0.153	0.068	0.165	0.105	0.195	0.130
	(2.438)	(4.015)	(1.506)	(2.590)	(1.089)	(1.663)	(5.142)
$\Delta Slope_t$	0.279	0.384	0.484	0.676	0.881	0.936	0.538
	(14.054)	(24.669)	(19.193)	(14.217)	(9.862)	(10.186)	(30.044)
ΔVIX_t	0.003	0.005	0.007	0.009	0.009	0.008	0.006
	(1.294)	(6.930)	(5.150)	(5.377)	(2.867)	(2.491)	(8.322)
RM_t	-0.017	-0.020	-0.030	-0.041	-0.062	-0.090	-0.037
	(-10.273)	(-16.341)	(-20.340)	(-19.181)	(-16.284)	(-20.300)	(-38.403)
$\Delta Jump_t$	0.005	0.008	0.011	0.019	0.021	0.031	0.014
	(5.348)	(13.161)	(12.048)	(12.427)	(7.450)	(11.021)	(23.390)
Mean R^2	0.305	0.329	0.349	0.410	0.425	0.393	0.355
Median R^2	0.316	0.350	0.357	0.442	0.457	0.407	0.377
Obs.	81215	124240	97662	57243	32611	56817	449788
Bonds	1261	1900	1288	878	515	984	6826

Table IA.2: **Principal Component Analysis**

For each industrial bond i with at least 25 monthly observations of yield spread changes, $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \boldsymbol{\beta}_i^T \boldsymbol{\Delta S}_{i,t} + \varepsilon_{i,t},$$

where $\boldsymbol{\Delta S}_{i,t} := [\Delta Lev_{i,t},\ \Delta RF_t,\ \Delta RF_t^2,\ \Delta Slope_t,\ \Delta VIX_t,\ RM_t,\ \Delta Jump_t]$ is the vector of the structural model variables defined in Section II, with $\Delta Lev_{i,t}$ as the change in firm leverage, ΔRF_t the change in 10-year Treasury interest rate, ΔRF_t^2 the squared change in the 10-year Treasury interest rate, $\Delta Slope_t$ the change in the slope of the term structure, ΔVIX_t the change in VIX_t index, RM_t the S&P 500 return, and $\Delta Jump_t$ the change in a jump factor based on S&P 500 index options. I then assign each month's residuals to one of 18 bins defined by three maturity groups (less than five years, five to twelve years, and over twelve years) and six leverage groups (less than 15%, 15%–25%, 25%–35%, 35%–45%, 45%–55%, and greater than 55%) and compute an average residual. I extract the principal components of the covariance matrix of these residuals. For each bin, I report the number of bonds, the number of observations, the principal components loadings, and the ratio of variation of the residual to the total variation. I further report the proportions of the variance of the residuals explained by the first and second principal components, PC1 and PC2, respectively, and the total unexplained variance of the regression in percentage points. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.

Leverage	Maturity	Bonds	Observations	PC1	PC2	Exp
1	1	913	36914	0.094	0.053	0.011
1	2	642	16399	0.097	0.110	0.011
1	3	702	27902	0.068	0.088	0.007
2	1	1331	51716	0.128	0.118	0.019
2	2	1052	25877	0.136	0.140	0.018
2	3	1151	46647	0.093	0.127	0.010
3	1	877	33402	0.182	0.064	0.034
3	2	785	20118	0.156	0.158	0.023
3	3	813	44142	0.128	0.115	0.018
4	1	622	21038	0.264	-0.016	0.068
4	2	597	15212	0.234	0.259	0.053
4	3	539	20993	0.179	0.175	0.035
5	1	403	13519	0.325	-0.577	0.114
5	2	372	9503	0.310	0.155	0.090
5	3	262	9589	0.193	0.083	0.041
6	1	796	25848	0.435	-0.351	0.175
6	2	721	17301	0.402	-0.237	0.152
6	3	398	13668	0.335	0.494	0.121
Proportion of Variance				0.794	0.053	
Unexplained Variance					1.153	

Table IA.3: **Heterogeneity**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model:

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \nu_{i,t},$$

where $\Delta S_{i,t}$ is the vector of structural model variables, and $\Delta I_{i,t}$ refers to the inflation risk proxies. I assign each bond to cohorts based on average leverage ratios (less than 15%, 15%–25%, 25%–35%, 35%–45%, 45%–55%, and greater than 55%) in Panel A, bond ratings (AAA-AA, A, BBB, BB, and B-C) in Panel B, industry cash-flow flexibility in Panel C, firm refinancing intensity in Panel D, average firm's debt to asset growth in Panel E, time to maturity (less than five years, five to twelve years, and over twelve years) in Panel F, to cohorts based on whether the firm has more than 5% of debt outstanding in floating bonds in Panel G. I include average coefficients, t-statistics (calculated from cross-sectional variation), mean and median adjusted R^2 values, and the number of observations and bonds in the sample. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004–2021.

Panel A: Leverage

Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
	-	-	-	0.305	0.316	81215	1261
<15%	-0.212	0.828	-0.078	0.395	0.392	81215	1261
	(-13.900)	(16.912)	(-5.577)				
	-	-	-	0.329	0.350	124240	1900
15%-25%	-0.297	1.124	-0.105	0.424	0.432	124240	1900
	(-24.056)	(25.118)	(-8.174)				
	-	-	-	0.349	0.357	97662	1288
25%-35%	-0.365	1.431	-0.165	0.434	0.448	97662	1288
	(-18.960)	(16.774)	(-7.731)				
	-	-	-	0.410	0.442	57243	878
35%-45%	-0.638	2.039	-0.286	0.499	0.527	57243	878
	(-18.698)	(15.671)	(-9.073)				
	-	-	-	0.425	0.457	32611	515
45%-55%	-0.799	1.680	-0.307	0.498	0.509	32611	515
	(-13.334)	(7.234)	(-6.127)				
	-	-	-	0.393	0.407	56817	984
>55%	-1.150	2.000	-0.300	0.459	0.477	56817	984
	(-17.403)	(11.104)	(-4.803)				

(Continued on the next page)

Panel B: Rating							
Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
	-	-	-	0.277	0.291	35615	546
AAA-AA	-0.050	0.428	-0.073	0.326	0.330	35615	546
	(-4.368)	(10.670)	(-4.335)				
	-	-	-	0.311	0.319	117438	1866
A	-0.183	0.784	-0.117	0.389	0.379	117438	1866
	(-21.475)	(23.019)	(-7.673)				
	-	-	-	0.348	0.376	171463	2847
BBB	-0.458	1.505	-0.107	0.454	0.469	171463	2847
	(-32.759)	(27.788)	(-8.991)				
	-	-	-	0.450	0.479	48983	976
BB	-0.552	1.846	-0.479	0.506	0.532	48983	976
	(-13.855)	(13.120)	(-11.715)				
	-	-	-	0.405	0.427	42649	892
B-C	-1.165	1.561	-0.389	0.445	0.474	42649	892
	(-15.912)	(6.962)	(-4.894)				

Panel C: PPI							
Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
	-	-	-	0.358	0.390	34218	648
Low	-0.405	0.952	-0.099	0.459	0.480	34218	648
	(-12.973)	(5.831)	(-2.359)				
	-	-	-	0.330	0.364	34650	561
2	-0.276	0.921	-0.140	0.418	0.428	34650	561
	(-14.008)	(10.500)	(-4.173)				
	-	-	-	0.308	0.326	35035	490
3	-0.277	0.905	-0.160	0.381	0.402	35035	490
	(-11.117)	(9.797)	(-5.560)				
	-	-	-	0.330	0.344	35051	488
4	-0.317	1.437	-0.116	0.415	0.408	35051	488
	(-9.364)	(13.313)	(-3.883)				
	-	-	-	0.339	0.367	34925	560
High	-0.596	1.573	-0.114	0.429	0.445	34925	560
	(-14.724)	(11.502)	(-2.208)				

(Continued on the next page)

Panel D: Refinancing Intensity							
Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
	-	-	-	0.402	0.430	88982	1477
Low	-0.768	2.108	-0.275	0.479	0.514	88982	1477
	(-19.150)	(16.626)	(-8.221)				
	-	-	-	0.389	0.404	89020	1246
2	-0.457	1.400	-0.191	0.471	0.479	89020	1246
	(-16.417)	(13.874)	(-6.993)				
	-	-	-	0.362	0.387	89068	1278
3	-0.385	1.390	-0.170	0.454	0.470	89068	1278
	(-16.280)	(18.181)	(-8.807)				
	-	-	-	0.319	0.332	89069	1285
4	-0.357	0.880	-0.170	0.405	0.410	89069	1285
	(-15.138)	(12.726)	(-6.497)				
	-	-	-	0.306	0.324	88872	1476
High	-0.480	1.199	-0.104	0.396	0.394	88872	1476
	(-18.096)	(15.530)	(-3.921)				

Panel E: Debt Growth							
Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
	-	-	-	0.363	0.400	90066	1610
Low	-0.400	1.233	-0.194	0.444	0.461	90066	1610
	(-16.349)	(16.004)	(-7.756)				
	-	-	-	0.349	0.361	89908	1195
2	-0.444	1.372	-0.178	0.438	0.459	89908	1195
	(-19.804)	(17.584)	(-8.008)				
	-	-	-	0.347	0.370	89919	1171
3	-0.431	1.235	-0.177	0.434	0.456	89919	1171
	(-13.871)	(11.679)	(-8.456)				
	-	-	-	0.351	0.378	89946	1296
4	-0.471	1.333	-0.127	0.443	0.454	89946	1296
	(-17.173)	(14.943)	(-5.571)				
	-	-	-	0.362	0.381	89949	1554
High	-0.719	1.832	-0.205	0.443	0.456	89949	1554
	(-19.320)	(16.436)	(-5.699)				

(Continued on the next page)

Panel F: Time To Maturity							
Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
<5	-	-	-	0.280	0.280	165679	3698
	-0.402	0.902	-0.175	0.369	0.342	165679	3698
	(-22.751)	(15.710)	(-7.598)				
5-12	-	-	-	0.389	0.418	75570	2251
	-0.505	1.191	-0.276	0.443	0.455	75570	2251
	(-15.787)	(13.873)	(-10.731)				
>12	-	-	-	0.414	0.425	121874	1603
	-0.451	1.807	-0.124	0.471	0.481	121874	1603
	(-20.001)	(27.990)	(-9.562)				

Panel G: Floating Bonds							
Group	$\Delta E[\mu^S]_{i,t}$	$\Delta\sigma^S_{i,t}$	ΔCor^{SB}_t	Mean R^2	Median R^2	Obs.	Bonds
Float	-	-	-	0.324	0.324	26518	598
	-0.222	1.059	-0.115	0.383	0.376	26518	598
	(-6.483)	(7.817)	(-3.335)				
Fixed	-	-	-	0.356	0.379	406076	6337
	-0.495	1.408	-0.181	0.438	0.456	406076	6337
	(-34.962)	(31.883)	(-14.171)				

Table IA.4: **Inflation Risk and Yield Spread Changes: All Bonds**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \Gamma_i^T \Delta C_{i,t} + \nu_{i,t},$$

where $\Delta S_{i,t}$ represents structural model variables, $\Delta I_{i,t}$ denotes inflation risk proxies, and $\Delta C_{i,t}$ refers to control proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024). Panel A presents average coefficients, t-statistics, mean and median adjusted R^2 values, and sample sizes. Panel B details a principal component analysis on the residuals, reporting the variance explained by the first two principal components and total unexplained variance. Panel C includes R^2 values, F-statistics, and p-values from a Wald-test of the time-series regression of PC1 on inflation risk proxies. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004-2021.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Individual Bond Regressions								
$\Delta E[\mu^S]_{i,t}$		-0.443			-0.417	-0.287	-0.286	-0.248
		(-48.653)			(-48.750)	(-30.504)	(-29.603)	(-24.511)
$\Delta \sigma^S_{i,t}$			1.385		1.244	0.734	0.732	0.382
			(47.771)		(44.431)	(22.944)	(22.704)	(11.276)
ΔCor^{SB}_t				-0.130	-0.079	-0.133	-0.116	-0.104
				(-12.160)	(-8.280)	(-10.839)	(-8.838)	(-7.230)
Mean R^2	0.344	0.374	0.405	0.343	0.428	0.492	0.502	0.515
Median R^2	0.362	0.393	0.411	0.361	0.437	0.519	0.534	0.551
Obs.	911609	911609	911609	911609	911609	911609	911609	911609
Bonds	14338	14338	14338	14338	14338	14338	14338	14338
Panel B: Principal Component Analysis								
FVE		0.141	0.202	0.036	0.338	0.224	0.234	0.222
PC1	0.766	0.739	0.730	0.777	0.714	0.705	0.697	0.668
PC2	0.131	0.138	0.135	0.117	0.134	0.121	0.126	0.141
UV	0.608	0.523	0.485	0.587	0.403	0.214	0.196	0.158
Panel C: Time-Series Regression of PC1 on Inflation Risk Proxies								
Adj. R^2		0.079	0.134	0.002	0.156	0.058	0.055	0.024
R^2		0.083	0.138	0.007	0.168	0.072	0.069	0.038
F-stat		18.680	33.009	1.354	13.725	5.280	5.021	2.704
p-value		0.000	0.000	0.246	0.000	0.002	0.002	0.047
Obs.		208	208	208	208	208	208	208

Table IA.5: **Inflation Risk and Yield Spread Changes: End of Month Only**

For each industrial bond i with at least 25 monthly observations of yield spread changes $\Delta YS_{i,t}$, I estimate the model

$$\Delta YS_{i,t} = \alpha_i + \beta_i^T \Delta S_{i,t} + \theta_i^T \Delta I_{i,t} + \Gamma_i^T \Delta C_{i,t} + \nu_{i,t},$$

where $\Delta S_{i,t}$ represents structural model variables, $\Delta I_{i,t}$ denotes inflation risk proxies, and $\Delta C_{i,t}$ refers to control proxies from Friewald and Nagler (2019), He, Khorrami and Song (2022) and Eisfeldt, Herskovic and Liu (2024). Panel A presents average coefficients, t-statistics, mean and median adjusted R^2 values, and sample sizes. Panel B details a principal component analysis on the residuals, reporting the variance explained by the first two principal components and total unexplained variance. Panel C includes R^2 values, F-statistics, and p-values from a Wald-test of the time-series regression of PC1 on inflation risk proxies. The sample is based on U.S. corporate bond transaction data from TRACE for the period 2004-2021.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Individual Bond Regressions								
$\Delta E[\mu^S]_{i,t}$		-0.504			-0.453	-0.289	-0.295	-0.220
		(-30.850)			(-29.749)	(-18.160)	(-18.345)	(-11.959)
$\Delta\sigma^S_{i,t}$			1.697		1.488	0.895	0.877	0.342
			(33.228)		(30.089)	(16.422)	(15.659)	(5.344)
ΔCor^{SB}_t				-0.212	-0.141	-0.127	-0.098	-0.120
				(-15.047)	(-9.481)	(-7.746)	(-5.617)	(-6.417)
CDGM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FN	No	No	No	No	No	Yes	Yes	Yes
HKS	No	No	No	No	No	No	Yes	Yes
EHL	No	No	No	No	No	No	No	Yes
Mean R^2	0.394	0.423	0.459	0.392	0.481	0.541	0.551	0.565
Median R^2	0.423	0.454	0.484	0.420	0.503	0.580	0.594	0.612
Obs.	236694	236694	236694	236694	236694	236694	236694	236694
Bonds	4356	4356	4356	4356	4356	4356	4356	4356
Panel B: Principal Component Analysis								
FVE		0.146	0.203	0.036	0.346	0.250	0.253	0.241
PC1	0.715	0.662	0.654	0.716	0.612	0.562	0.536	0.506
PC2	0.068	0.074	0.086	0.067	0.097	0.107	0.107	0.112
UV	1.081	0.922	0.861	1.042	0.707	0.393	0.346	0.295
Panel C: Time-Series Regression of PC1 on Inflation Risk Proxies								
Adj. R^2					0.179	0.063	0.058	0.028
R^2		0.091	0.154	0.010	0.191	0.077	0.072	0.042
F-stat		20.695	37.633	2.033	16.007	5.650	5.263	2.985
p-value		0.000	0.000	0.155	0.000	0.001	0.002	0.032
Obs.		208	208	208	208	208	208	208

Table IA.6: **Additional Model Parameters**

This table lists the parameters that I use to examine how yield spreads relate to inflation risk in Figure IA.6. I fix all parameters except for expected inflation (μ_p), inflation volatility (σ_P) and the correlation between inflation and asset growth ($\rho_{A^r,P}$). I uniformly draw these parameters in reasonable intervals.

Name	Symbol	Value
Initial Price Level	P_0	1
Initial Asset Value	A_0	100
Leverage	$\frac{100K}{K+A_0}$	30
Strike Price	K	42.86
Time to Maturity	T	8
Stickiness Parameter	ϕ	0.40
Refinancing Intensity	m	0.125
Firm-Specific Volatility	σ_{A_r}	0.30
Real Risk-Free Rate	r_r	0.04
Tax Rate	τ_{tax}	0.35
Recovery Rate	R	0.50
Default Fraction of Debt	d	1
Debt Growth	λ	0.043
Expected Inflation	μ_P	$\mathscr{U}[-0.02, 0.10]$
Correlation Inflation Asset Growth	$\rho_{A^r P}$	$\mathscr{U}[-1, 1]$
Inflation Volatility	σ_P	$\mathscr{U}[0.005, 0.1]$