Corporate Bonds Distress and FOMC Announcement Returns*

Tommaso Baglioni† Ruy M. Ribeiro†

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Abstract

This paper documents that the ex-ante level of the corporate bond market distress is a good predictor for the pre-FOMC announcement return, subsuming the relevant information of equity market uncertainty highlighted by the previous literature. We compute the orthogonal components of distress and uncertainty, and we find that only distress can predict the pre-announcement return, which tends to be positive (negative) when distress is high (low), regardless of the level of uncertainty. These results hold also after 2011, when the average pre-announcement return is flat, but it is possible to predict it using distress.

Keywords: Corporate Bonds Distress; FOMC Announcements; Pre-FOMC Announcement Return; Post-FOMC Announcement Return.

JEL Classification: G12; G14.

* E-mail addresses: baglioni.tommaso@yahoo.com (Baglioni); ruymr@insper.edu.br (Ribeiro).

† Insper, Rua Quatá, 300 – Vila Olímpia, São Paulo – SP, 04546-042, Brazil.

1 Introduction

Corporate bonds make up one of the largest components of the U.S. bond market, which is considered the largest securities market in the world and funds the majority of U.S. corporate debt. Following Bernanke and Gertler (1989), Carlstrom and Fuerst (1997), and Kiyotaki and Moore (1997), a vast literature studies how vulnerabilities in the availability of credit affect the future evolution of the real economy. According to Boyarchenko et al. (2021), primary corporate bond market conditions are an important source of predictive information for output, investment, and employment of both public firms and the whole economy, as future real economic activity tends to deteriorate following periods of impaired corporate bond market functioning. Impaired access to debt markets forces borrowers to reduce their activities, since they are not able to obtain financing, and widespread market access freezes can potentially propagate through the economy and weaken aggregate economic activity. Corporate bond market conditions and equity prices are thus strictly linked, and the aim of this paper is to explore how the ex-ante level of corporate bonds distress relates with the pre- and post-FOMC announcement equity market return.[1]

The main finding of this paper is that the (ex-ante) level of the corporate bond market distress is a good predictor for the pre-announcement return. In contrast with the previous literature, we show that equity market uncertainty is not relevant to predict the pre-announcement return. Previous studies document a large average excess return in U.S. equities before scheduled FOMC announcements (Lucca and Moench, 2015), which is not directly related to the actual monetary policy decision and tends to be particularly pronouced during periods of considerable market uncertainty or risk premium (Martello et al., 2021) and in periods of high investor sentiment and low economic policy uncertainty (Guo et al., 2021). The literature refers to this phenomenon as the "pre-FOMC announcement drift."[2] In contrast, the average

[1] In the remainder of the paper, we refer to "pre-announcement," as the interval that spans from 24 hours and 15 minutes before the announcement to 15 minutes before the announcement, in line with Lucca and Moench (2015). We refer to "post-announcement" as the interval that spans from the minute of the announcement (opening of the minute) until the closing time on FOMC days. When citing a paper, the expressions "pre-announcement return" and "post-announcement return" might refer to a slightly different interval, but the interpretation of the results does not change.

[2] The literature gives numerous explanations for the pre-FOMC announcement drift, spanning from the possibility of information leakage before FOMC announcements (Bernile et al., 2016; Ai and Bansal, 2018; Ying, 2020; Mano, 2021) and informal communication by Fed officials with the media and the financial sector (Cieslak et al., 2019; Cieslak and Schrimpf, 2019; Vissing-Jorgensen, 2019; Cieslak and Vissing-Jorgensen, 2021),

post-announcement return is approximately zero (Lucca and Moench, 2015; Hu et al., 2022), and the post-announcement return-to-variance ratio is much lower than the pre-announcement counterpart, suggesting that different types of risk premia are realized around FOMC announcements (Hu et al., 2022).

Our study contributes to the literature on equity return dynamics around FOMC announcements. The empirical analysis presented here is based on an event study including 120 scheduled FOMC meetings over the period 2005 – 2020. We rely on intraday data on E-Mini S&P 500 futures to compute the pre- and post-announcement market return. As a proxy for corporate bonds distress, we use data on the Corporate Bond Market Distress Index (CMDI) from the Federal Reserve Bank of New York (Boyarchenko et al., 2021). As a proxy for equity market uncertainty, in line with (Martello et al., 2021), we use the VIX Index. We use lagged observations of distress and uncertainty, related to the week before the FOMC meeting, in order to document whether it is possible to predict FOMC announcement returns and if one of the two variables is a better predictor. In fact, Boyarchenko et al. (2021) show that the CMDI predicts future realizations of VIX, even when controlling for contemporaneous realizations of VIX, but not vice versa, suggesting that the CMDI provides relevant and timely information, identifying imminent distress that may not be consistently captured by the VIX.

First, we show that both distress and uncertainty are positively correlated with the pre-announcement return. As only one of the two variables might be relevant to predict the pre-announcement return, we compute the orthogonal components of distress and uncertainty (Distress$^{\perp}$ and Uncertainty$^{\perp}$, respectively), i.e., the component of distress (uncertainty) that is uncorrelated with uncertainty (distress). Exploring the relationship between the orthogonal components and FOMC announcement returns, we find that only Distress$^{\perp}$ can predict the pre-announcement return, whereas none of the variables appear to be related with the post-announcement return.

Second, we explore the magnitude of the two returns conditioned on different levels of Distress$^{\perp}$ and/or Uncertainty$^{\perp}$. We identify a high (low) level as if the orthogonal component on the week before the FOMC meeting is greater (not greater) than its median, where the median is computed using only observations related to the week before each FOMC meeting. While there is no statistical evidence for the post-announcement return, we document that

to differences of opinion (Cocoma, 2018), constrained institutional buying pressure (Kaul and Watanabe, 2015), endogenous information acquisition (Ai et al., 2021), a premium for heightened uncertainty (Hu et al., 2022), and rare disasters (Wachter and Zhu, 2022).

the pre-announcement return tends to be highly positive when Distress$^{\perp}$ is high and negative when Distress$^{\perp}$ is low. For the case of Uncertainty$^{\perp}$, the pre-announcement return tends to be positive (and of similar magnitude) for both the levels of Uncertainty$^{\perp}$. Conditioning on the level of both variables together, we find that the pre-announcement return tends to be positive when Distress$^{\perp}$ is high and negative when Distress$^{\perp}$ is low, regardless of the level of Uncertainty$^{\perp}$ being high or low, thus suggesting that the pre-announcement return is mainly driven by the ex-ante level of Distress$^{\perp}$, and the ex-ante level of Uncertainty$^{\perp}$ plays a minor role. We obtain similar results by conditioning first on the level of one of the two variables, dividing the sample in two subsamples of 60 observations, and then conditioning each subsample on the level of the second variable, creating four subsamples in total.

Third, we study whether distress and uncertainty are a good predictor for the FOMC announcement returns over two subsample periods: 2005 – 2011 and 2011 – 2020. In the first period, which, according to data availability of the CMDI, is the period that more closely matches the Lucca and Moench (2015) period, we document that the pre-announcement return tends to be particularly pronounced when Distress$^{\perp}$ is high. In contrast, the pre-announcement return is not statistically significant when Distress$^{\perp}$ is low, suggesting that the pre-FOMC announcement drift of Lucca and Moench (2015) is a characteristic of FOMC announcements associated with high Distress$^{\perp}$ only. The level of Uncertainty$^{\perp}$ is not useful to predict the pre-announcement return, which is pronounced in both cases, and is only 4 basis points (bps) higher when Uncertainty$^{\perp}$ is high. In the second period, we document that the average pre-announcement return is flat, in accordance with the previous literature (Boguth et al., 2019; Ben Dor and Rosa, 2019; Kurov et al., 2021), but it tends to be positive (negative) when Distress$^{\perp}$ is high (low), whereas there is no statistical evidence related to Uncertainty$^{\perp}$. Surprisingly, after 2011, the post-announcement return tends to be positive (negative) when Distress$^{\perp}$ is high (low), even though in the latter case it is slightly statistically unsignificant.

Our results are robust to using the distress of investment grade and high yield bonds, instead of the distress of the corporate bond market, as well as to computing the orthogonal components from different specifications, adopting a different definition for the high and low levels of distress and uncertainty, and changing the interval of the pre-announcement return. Our findings are relevant for policymakers, portfolio managers, and investors concerned with the behaviour of the stock market around monetary policy announcements during periods of high and low distress in the corporate bond market. The remainder of the paper proceeds as follows. Section 2 describes the data. The results of the empirical analysis are presented in

Section 3. Section 4 reports the robustness tests, and conclusions are offered in Section 5.

2 Data Description

The time period of the empirical analysis spans from January, 7, 2005 to January, 31, 2020.[3] Over this period, there have been a total of 121 scheduled FOMC meetings (eight regularly scheduled meetings per year).[4]

2.1 Corporate Bond Market Distress

As a proxy for corporate bonds distress, we use data on the Corporate Bond Market Distress Index (CMDI) from the Federal Reserve Bank of New York.[5] A peculiarity of the CMDI is that, instead of focusing only on trading conditions in the secondary market, it reflects also primary market conditions by capturing access to capital markets credit. Therefore, the CMDI offers a full picture of corporate bond markets functioning and does not, for instance, just identify periods of high credit spreads or decreased liquidity in secondary markets. The CMDI is particularly elevated when conditions in both primary and secondary markets are stressed, thus down-weighting periods when only a subset of indicators signals market stress.[6] For the primary market, the CMDI relies on measures of primary market issuance and primary market spread; for the secondary market, it relies on volume, liquidity, duration-matched spreads, default-adjusted spreads, and conditions for non-traded bonds. Boyarchenko et al. (2021) show that the CMDI identifies periods of market dysfunction and predicts future realizations of commonly used measures of credit market conditions, providing thus more timely information

[3] Our analysis starts in accordance with data availability on corporate bond distress and ends on the week of the last scheduled FOMC meeting before the COVID-19 outbreak began to be incorporated into monetary policy decisions.

[4] As on October 29, 2008 the pre-announcement return was 10.29%, and we are dealing with a relatively small sample, we exclude this outlier and we implement the empirical analysis with observations related to 120 scheduled meetings.

[5] For detailed information on the construction of the CMDI, refer to Boyarchenko et al. (2021). Data on the CMDI are available at `https://www.newyorkfed.org/research/policy/cmdi#/interactive`.

[6] Boyarchenko et al. (2021) point out that, according to the literature, access to the corporate bond market is impaired when primary market issuance slows down (Bebchuk and Goldstein, 2011); secondary market prices decrease and liquidity dries up (Dang et al., 2015; Benmelech and Bergman, 2018); and secondary market trading volume may or may not increase (Benmelech and Bergman, 2018).

about access to public corporate debt markets than alternative measures.[7] They also show that impaired corporate bond market functioning, as measured by the CMDI, predicts deteriorations in future real economic activity.

The CMDI is a weekly time series, starting on January, 7, 2005, which includes one observation for every Friday and reflects the corporate bond market distress level of the week. We use the CMDI as a proxy for corporate bond market distress, and we define an FOMC announcement as characterized by a high (low) level of distress if the CMDI on the week before the FOMC meeting is higher (not higher) than the median CMDI of the week prior to each FOMC meeting in our sample.

2.2 Other Variables

We rely on intraday data on E-Mini S&P 500 futures (continuous contract) at one-minute frequency to construct the pre-announcement return and the post-announcement return. These measures of market return are computed using the mid-price (closing) value of E-Mini S&P 500 of a certain minute.[8] We compute the pre-announcement return as the return of the mid-price of E-Mini S&P 500 from 24 hours and 15 minutes before the announcement to 15 minutes before the announcement, in line with Lucca and Moench (2015). The post-announcement return is the return computed from the mid-price opening value of the minute of the announcement until 3:59 p.m. EST.

Table 1 reports the average pre-announcement return and post-announcement return across the 120 FOMC meetings that we include in the empirical analysis. In line with the previous literature, we find statistical evidence that the average pre-announcement return is greater than zero, differently from the average post-announcement return which is positive but not statistically significant.

INSERT TABLE 1

[7] The CMDI forecasts cross-market measures, such as the CDS-bond basis and the ETF-NAV basis, used as proxy for credit market conditions by policy makers and market participants, while the converse is not the case.

[8] Until March 2011, policy statements are released, on average, at about 2:15 p.m. EST; we obtained the exact release time from the Internet Appendix of Lucca and Moench (2015). Since April 2011, policy statements have been released at 2:00 p.m. EST, except for eight meeting when the policy statement was released at 12:30 p.m. EST. Detailed information on FOMC meeting calendars and statements is available at `https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm`.

As a proxy for equity market uncertainty, we use data, obtained from Bloomberg Terminal, on the VIX Index level of the Friday before the FOMC meeting. We define an FOMC announcement as characterized by a high (low) level of uncertainty if VIX on the Friday before the FOMC meeting is higher (not higher) than the median VIX of the Friday prior to each FOMC meeting in our sample.[9] Figure 1 reports a plot of CMDI and VIX over the period 2005 – 2020. As evident from Figure 1, contemporaneous realizations of distress and uncertainty are highly correlated (correlation of 0.71).

INSERT FIGURE 1

3 Empirical Findings

In this section, we present the results of the empirical analysis. We start by computing the orthogonal components of distress and uncertainty and studying how they relate with the pre- and post-announcement returns. We then explore the magnitude of the two returns conditioned on different levels of distress and uncertainty. Last, we study whether distress and uncertainty are a good predictor for the FOMC announcement returns over two subsample periods.

3.1 The Orthogonal Components of Distress and Uncertainty

As shown in Figure 1, distress and uncertainty are highly correlated over the period 2005 – 2020. Therefore, the behaviour of FOMC announcement returns in periods of high (low) corporate bonds distress should be similar to their behaviour in periods of high (low) market uncertainty, but only one variable might be relevant to predict FOMC announcement returns. To explore the relationship between distress and uncertainty, on the one hand, and FOMC announcement returns, on the other hand, we run the following regressions:

$$FOMC\ Return_t = \alpha + \beta_1 * Distress_{t-1} + \epsilon_t \tag{1}$$

$$FOMC\ Return_t = \alpha + \beta_1 * Uncertainty_{t-1} + \epsilon_t \tag{2}$$

[9] Henceforth, we refer to corporate bond market distress as "distress," and to equity market uncertainty as "uncertainty." We refer to the level of distress and uncertainty of the FOMC meeting as "state of the economy." As the states of the economy are computed using values related to the week prior to the FOMC meeting, those variables represent lagged (ex-ante) observations with respect to FOMC announcement returns. The empirical analysis is implemented using observations related to the week before the FOMC meeting to try to predict the FOMC announcement returns.

$$FOMC\ Return_t = \alpha + \beta_1 * Distress_{t-1} + \beta_2 * Uncertainty_{t-1} + \epsilon_t \quad (3)$$

where we estimate equations (1) to (3) using both the pre- and post-announcement return (*FOMC Return*) as dependent variable, separately. The two returns are described in paragraph 2.2. *Distress* represents the corporate bond market distress level, expressed by the CMDI, and VIX is used as a proxy for *Uncertainty*, as described in paragraph 2.1 and 2.2. The independent variables are lagged observations related to the Friday of the week before (week t–1) the announcement (week t). The equations are estimated using data on our 120 events only. The results are reported in Table 2. As shown in column (1) and (2), both distress and uncertainty are positively related with the pre-announcement return. However, uncertainty is not statistically significant anymore when both of the variables are used as independent variables together (column (3)). Similarly, Boyarchenko et al. (2021) find that the current level of VIX is not statistically significant if controlling for the CMDI, when predicting future VIX realizations. The R^2 of the regression in column (1) and column (3) are similar (0.207 and 0.209, respectively), suggesting that adding VIX as explanatory variable does not increase the remarkable explanatory power of the first regression, which includes only distress as independent variable. None of the two variables is related with the post-announcement return (columns (4) to (6)).

INSERT TABLE 2

To understand whether only one of the two variables is relevant to explain the pre- and/or the post-announcement return, we compute the orthogonal components of distress ($\text{Distress}^{\perp}$) and uncertainty ($\text{Uncertainty}^{\perp}$). More specifically, we compute the component of distress (uncertainty) that is uncorrelated with uncertainty (distress), as the residuals of the following regressions:[10]

$$Distress_t = Uncertainty_t + Uncertainty_t^2 + Uncertainty_t^3 + Distress_t^{\perp} \quad (4)$$

$$Uncertainty_t = Distress_t + Distress_t^2 + Distress_t^3 + Uncertainty_t^{\perp} \quad (5)$$

[10] We choose the functional form that better fits the relationship between distress and uncertainty. As a robustness test, we check whether results are robust to computing the orthogonal components of the two variables from a linear regression and from a quadratic regression.

where *Distress* represents the corporate bond market distress level, expressed by the CMDI, and VIX is used as a proxy for *Uncertainty*, as described in paragraph 2.1 and 2.2. We estimate equations (4) and (5) using weekly data over the period that spans from January, 7, 2005 to January, 31, 2020. The orthogonal components of distress and uncertainty are used in the next paragraphs to study the magnitude of FOMC announcement returns and to understand if one of the two variables is a better predictor.

3.2 Distress$^{\perp}$, Uncertainty$^{\perp}$, and FOMC Announcement Returns

We now study how the orthogonal components of distress and uncertainty are related with FOMC announcement returns. First, to study the relationship with the pre-announcement return, we estimate the following equations:

$$Pre\text{-}Ann.\ Return_t = \alpha + \beta_1 * Distress^{\perp}_{t-1} + \epsilon_t \tag{6}$$

$$Pre\text{-}Ann.\ Return_t = \alpha + \beta_1 * Uncertainty^{\perp}_{t-1} + \epsilon_t \tag{7}$$

$$Pre\text{-}Ann.\ Return_t = \alpha + \beta_1 * Distress^{\perp}_{t-1} + \beta_2 * Uncertainty^{\perp}_{t-1} + \epsilon_t \tag{8}$$

$$Pre\text{-}Ann.\ Return_t = \alpha + \beta_1 * Distress^{\perp}_{t-1} + \beta_2 * Uncertainty_{t-1} + \epsilon_t \tag{9}$$

$$Pre\text{-}Ann.\ Return_t = \alpha + \beta_1 * Distress_{t-1} + \beta_2 * Uncertainty^{\perp}_{t-1} + \epsilon_t \tag{10}$$

where the independent variables (*Distress*, *Uncertainty*, and their orthogonal components) are described paragraph 2.1, 2.2, and 3.1, and are lagged observations related to the Friday of the week before (week t–1) the announcement (week t). The pre-announcement return (*Pre-Ann. Return*) is described in paragraph 2.2. The equations are estimated using data on our 120 events only. The results are reported in Table 3, which shows that only Distress$^{\perp}$ can predict the pre-announcement return. In fact, there is no statistical evidence related to Uncertainty$^{\perp}$ (column (2), (3), and (5)).

INSERT TABLE 3

Second, we study how the orthogonal components of distress and uncertainty are related with the post-announcement return. For this purpose, we estimate equations (6) to (10) using

the post-announcement return (described in paragraph 2.2) as dependent variable, instead of the pre-announcement return. The results are reported in Table 4. As in Table 2, there is no statistical evidence, suggesting that also the orthogonal components of distress and uncertainty are not able to predict the post-announcement return. This result is not surprising, as only a few papers have been able to empirically document significant patterns in the post-announcement return: the main findings are related to the impact of contractionary and expansionary monetary policy shocks in the equity and/or in the Treasury market.[11]

INSERT TABLE 4

3.3 Conditioning Returns on the Level of Distress$^{\perp}$ and Uncertainty$^{\perp}$

In the previous paragraph, we show that only the ex-ante level of Distress$^{\perp}$ predicts the pre-announcement return, as there is no statistical evidence related to the ex-ante level of Uncertainty$^{\perp}$, while none of the two variables appear to be able to predict the post-announcement return. In this paragraph, to check whether we can find further evidence on the importance of Distress$^{\perp}$ to explain the pre-announcement return, we study the magnitude of the two returns conditioned on different combinations of Distress$^{\perp}$ and Uncertainty$^{\perp}$.

3.3.1 Conditional Sorting

In Table 1, we report the unconditional average of the two FOMC announcement returns. We now condition the performance of the two returns on the level of Distress$^{\perp}$ and/or Uncertainty$^{\perp}$. The results are reported in Table 5. In Panel A, the two returns are conditioned on the ex-ante (high or low) level of the two variables, separately. While there is no statistical evidence related to the post-announcement return, we document that the pre-announcement

[11] Rigobon and Sack (2004), Gürkaynak et al. (2005), and Nakamura and Steinsson (2018) show that tightening of monetary policy leads stock prices to fall. Indriawan et al. (2021) find that large post-announcement returns occur mostly following expansionary policy shocks, and Ozdagli and Weber (2016) point to a larger effect of surprise monetary easing on financial markets than of surprise tightening. Bodilsen et al. (2021) document that stock excess returns are positively related to their betas on announcement days with press conferences, and Gu et al. (2018) find that stocks correlated with market uncertainty shocks have higher returns on meetings associated with the Summary of Economic Projections. Kroencke et al. (2021) show that a large part of stock market moves around FOMC meetings is due to shocks linked to changes in investors' attitude towards risk. Baglioni and Ribeiro (2022) document a predictable negative relationship between the pre- and the post-announcement return on FOMC days, while Baglioni et al. (2022) show that there is a liquidity premium in the post-announcement interval.

return tends to be highly positive when Distress$^{\perp}$ is high, and negative when Distress$^{\perp}$ is low. For the case of Uncertainty$^{\perp}$, the pre-announcement return tends to be positive regardless of the level of Uncertainty$^{\perp}$, and it is slightly higher (less than 4 bps) on FOMC announcements characterized by a high level of Uncertainty$^{\perp}$.[12]

INSERT TABLE 5

In Panel B of Table 5, we condition the two returns on the ex-ante level of Distress$^{\perp}$ and Uncertainty$^{\perp}$ together. As expected, for the case in which both Distress$^{\perp}$ and Uncertainty$^{\perp}$ are high, the pre-announcement return is highly positive (more than 80 bps). In contrast, when both Distress$^{\perp}$ and Uncertainty$^{\perp}$ are low, the average the pre-announcement return is negative. Interestingly, the pre-announcement return is positive in announcements characterized by high Distress$^{\perp}$ and low Uncertainty$^{\perp}$ at the same time, while it is negative when Distress$^{\perp}$ is low and Uncertainty$^{\perp}$ is high. Therefore, the pre-announcement return tends to be positive when Distress$^{\perp}$ is high and negative when Distress$^{\perp}$ is low, regardless of the level of Uncertainty$^{\perp}$ being high or low.

The results from Table 5 suggest that the the pre-announcement return is mainly driven by the ex-ante level of Distress$^{\perp}$, whereas the ex-ante level of Uncertainty$^{\perp}$ plays a minor role.

3.3.2 Double Conditional Sorting

As an alternative exercise, we explore the magnitude of FOMC announcement returns when conditioning the two returns in a different manner. First, we divide our sample of 120 observations in two groups of 60 observations each, according to the (high and low) level of Distress$^{\perp}$. Second, we divide each group in two subgroups according to the level of Uncertainty$^{\perp}$, this time considering the median Uncertainty$^{\perp}$ of each group (and not of the 120 observations as before). We thus end up with four groups of 30 observations each. We repeat this procedure conditioning first on the level of Uncertainty$^{\perp}$ and second on the level of Distress$^{\perp}$, creating four more groups of 30 observations each.

The results are reported in Table 6. In Panel A, we report the average returns when conditioning first on the level of Distress$^{\perp}$, and then on the level of Uncertainty$^{\perp}$. We find that the pre-announcement return tends to be positive (negative), on average, when Distress$^{\perp}$

[12] In line with Martello et al. (2021), using the non-orthogonalized level of uncertainty, we find evidence that the pre-announcement return is particularly pronounced in periods of high uncertainty (29.60 bps) rather than in periods of low uncertainty (4.02 bps).

is high (low), regardless of the level of Uncertainty$^{\perp}$ associated with each level of Distress$^{\perp}$. In Panel B, we condition the two returns first on the level of Uncertainty$^{\perp}$, and then on the level of Distress$^{\perp}$. Again, the level of Uncertainty$^{\perp}$ does not help to explain the pre-announcement return, which tends to be positive (negative), on average, when Distress$^{\perp}$ is high (low), even though there is statistical evidence only for the case of high Distress$^{\perp}$.

INSERT TABLE 6

We do not find statistical evidence related to the post-announcement return neither in Panel A nor in Panel B. The results reported in Table 6 provide further evidence on the importance of the ex-ante level of Distress$^{\perp}$ to predict the pre-announcement return.

3.4 Subsample Analysis

In this paragraph, we study the conditional and unconditional magnitude of FOMC announcement returns over two subsamples: 2005 – 2011 and 2011 – 2020.

3.4.1 FOMC Announcement Returns Over the Period 2005 – 2011

According to the literature, the pre-FOMC announcement drift (Drift) of Lucca and Moench (2015), a large average excess return in U.S. equities over the 24 hours before scheduled FOMC announcements, is particularly pronounced in the Lucca and Moench sample period (from 1994 to 2011), whereas after 2011 Drift disappears (Kurov and Gu, 2016). Extending the sample to 2017, Boguth et al. (2019) show that Drift is limited to announcements with press conferences. Kurov et al. (2021) extend the sample to 2019 and find that Drift has disappeared in announcements without press conferences and weakened in announcements with press conferences. Ben Dor and Rosa (2019) find no evidence of Drift from 2011 to 2017, and Neuhierl and Weber (2019) find a large and positive Drift for a sample from 1997 to 2002 and from 2007 until 2009, before Drift levels off. Guo et al. (2021) find a significant increase in the stock market over the pre-FOMC announcement window during periods of high investor sentiment and low economic policy uncertainty, while Martello et al. (2021) document that Drift occurs mainly in periods of considerable market uncertainty or risk premium.

We study the magnitude of FOMC announcement returns over the period that spans from January 2005 to March 2011, which, according to data availability of the CMDI, is the period that more closely matches the Lucca and Moench period. Table 7 reports the unconditional average performance of the pre- and of the post-announcement return, as well as the average

performance conditioned on the (ex-ante) level of Distress$^{\perp}$ and Uncertainty$^{\perp}$. We condition only on one state of the economy, as we are dealing with a smaller sample.

INSERT TABLE 7

In accordance with the literature, we document that the unconditional pre-announcement return is high (almost 39 bps) and statistically significant. The pre-announcement return tends to be particularly pronounced (almost 60 bps) when the level of Distress$^{\perp}$ is high. In contrast, the pre-announcement return is not statistically significant when Distress$^{\perp}$ is low, suggesting that Drift is a characteristic of FOMC announcements associated with high Distress$^{\perp}$ only. The level of Uncertainty$^{\perp}$ does not provide any guidance on the direction of the pre-announcement return, which is pronounced regardless of the level and is only 4 bps higher when Uncertainty$^{\perp}$ is high (40.96 versus 36.77 bps).

Regarding the post-announcement return, we find that it is very pronounced (almost 30 bps) when Distress$^{\perp}$ is low, while there is no statistical evidence related to the other states of the economy.

3.4.2 FOMC Announcement Returns Over the Period 2011 – 2020

We now explore FOMC announcement returns restricting the sample to the post-Lucca and Moench period, which spans from April 2011 to January 2020. The results are reported in Table 8. In accordance with the literature (Boguth et al., 2019; Ben Dor and Rosa, 2019; Kurov et al., 2021), we document that the pre-announcement return disappears after 2011, averaging less than 2 bps across 71 FOMC meetings. Similarly, the average post-announcement return is close to zero.

INSERT TABLE 8

Conditioning on the (ex-ante) level of Distress$^{\perp}$, we find that the pre-announcement return is positive (negative) when Distress$^{\perp}$ is high (low), suggesting that the the pre-announcement return only disappears on average after 2011, but it is possible to predict it using Distress$^{\perp}$. In contrast, it is not possible to predict the pre-announcement return using Uncertainty$^{\perp}$ in the post-Lucca and Moench period.

Surprisingly, after 2011, the average post-announcement return is positive (negative) when Distress$^{\perp}$ is high (low), even though in the latter case it is slightly statistically unsignificant. Testing the difference in means (average post-announcement return when Distress$^{\perp}$ is high

minus average post-announcement return when Distress$^{\perp}$ is low), we find statistical evidence for this difference being different than zero (37.09 bps). FOMC meetings characterized by a low level of Uncertainty$^{\perp}$ are, on average, associated with a positive post-announcement return.

4 Robustness Tests

In this section, we test the robustness of our results.[13] First, we account for the distress of investment grade and high yield bonds, instead of the distress of the corporate bond market as a whole. Second, we use the orthogonal components computed from different specifications, instead of the residuals from cubic regressions. Third, we adopt a different definition for the high and low levels of distress and uncertainty. Last, we change the definition of the pre-announcement return.

Accounting for the Distress of Investment Grade and High Yield Bonds. We begin assessing the robustness of our results by implementing the empirical analysis with investment grade (IG) and high yield (HY) bonds distress, instead of the corporate bond market distress, using data from Boyarchenko et al. (2021). In particular, after computing the orthogonal component of both IG and HY bonds distress, we re-compute Table 2 to Table 8 and we get results similar to the ones reported using data on the CMDI. Figure 2 reports a plot of IG and HY corporate bonds distress over the period 2005 – 2020.

INSERT FIGURE 2

Using the Orthogonal Components of Different Specifications. The orthogonal components of distress and uncertainty are computed as the residuals of a cubic regression (equations (4) and (5)). To isolate the component of each variable that is not correlated with the other variable, we used the specification that better fits the relationship between the two variables. In Table 3 to Table 8, we obtain similar results if we use the residuals of a linear or of a quadratic regression, instead of the residuals of a cubic regression. Moreover, results in Table 5 to Table 8 are robust to using the original weekly time series of CMDI and VIX that were used in Table 2.

[13] The results of the robustness tests described in this paragraph are available upon request.

Modifying the Definition of High and Low Levels of Distress and Uncertainty. The results are robust also if, instead of using the median, we identify the high (low) level of distress and uncertainty as higher (lower) than the 66^{th} (33^{rd}) percentile of the distribution.

Changing the Definition of the Pre-Announcement Return. We obtain similar results also if, instead of defining the pre-announcement return as the return spanning from 24 hours and 15 minutes before the announcement to 15 minutes before the announcement, we compute the pre-announcement return from the FOMC day opening time (9:30 a.m. EST) until one minute before the announcement.

5 Conclusions

Our study contributes to the literature on equity return dynamics around FOMC announcements by showing that the (ex-ante) level of corporate bond market distress is a good predictor for the pre-announcement return, in contrast with equity market uncertainty, which was shown to be a good predictor by the previous literature. In fact, the CMDI predicts future realizations of VIX, but not vice versa (Boyarchenko et al., 2021), providing relevant and timely information that may not be captured by the VIX.

We compute the orthogonal components of distress and uncertainty and we use them to predict FOMC announcement returns. Over the period 2005 – 2020, only Distress$^{\perp}$ can predict the pre-announcement return, whereas none of the variables appear to be related with the post-announcement return. Exploring the magnitude of the two returns conditioned on the level of Distress$^{\perp}$ and Uncertainty$^{\perp}$, we find that the pre-announcement return tends to be positive (negative) when Distress$^{\perp}$ is high (low), regardless of the level of Uncertainty$^{\perp}$, suggesting that the pre-announcement return is mainly driven by the ex-ante level of Distress$^{\perp}$, whereas the ex-ante level of Uncertainty$^{\perp}$ plays a minor role. In a subsample analysis, we document that, in the Lucca and Moench period, Drift is a characteristic of FOMC announcements associated with high Distress$^{\perp}$. In the post-Lucca and Moench period, even though the average pre-announcement return is flat, it is possible to predict it using Distress$^{\perp}$, and the post-announcement return tends to be positive (negative) when Distress$^{\perp}$ is high (low), but in the latter case it is slightly statistically unsignificant.

The results of this paper are of interest and importance to policymakers, investors, and portfolio managers, as this paper improves the understanding of financial markets functioning

during periods of high and low distress in the corporate bond market. Future research could extend this study to the Treasury and options markets.

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6 Tables

Table 1: FOMC Announcement Average Returns.

	Events	Return
Pre-Announcement Return	120	16.81**
Post-Announcement Return	120	5.07

Note: This table reports the magnitude of the pre- and post-announcement return, over the period 2005 – 2020. A detailed description on how we compute the two returns is reported in paragraph 2.2. Events indicates the number of FOMC meetings included. Return represents the average E-Mini S&P 500 return across FOMC meetings, expressed in basis points. Statistical significance of Return at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 2: FOMC Announcement Returns Versus Distress and Uncertainty.

	Dependent variable:					
	Pre-Ann. Return			Post-Ann. Return		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.005***	-0.006***	-0.005***	-0.001	-0.004	-0.004
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
$\text{Distress}_{Previous\ Week}$	0.024***		0.021***	0.006		-0.006
	(0.007)		(0.008)	(0.008)		(0.012)
$\text{Uncertainty}_{Previous\ Week}$		0.0004***	0.0001		0.0002	0.0003
		(0.0001)	(0.0002)		(0.0002)	(0.0003)
Observations	120	120	120	120	120	120
R^2	0.207	0.139	0.209	0.010	0.037	0.042

Note: This table illustrates the relationship between distress, uncertainty, and FOMC announcement returns. *Pre-Ann.Return* and *Post-Ann.Return* indicate the pre- and post-announcement return, respectively, and are described in paragraph 2.2. *Distress* represents the corporate bond market distress level, expressed by the CMDI, and VIX is used as a proxy for *Uncertainty*, as described in paragraph 2.1 and 2.2. The independent variables are lagged observations related to the Friday of the week before (week t–1) the announcement (week t). The equations are estimated using data related to our 120 events only over the period 2005 – 2020. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 3: Pre-Announcement Return Versus Distress$^{\perp}$ and Uncertainty$^{\perp}$.

	Dependent variable:				
	Pre-Ann. Return				
	(1)	(2)	(3)	(4)	(5)
Constant	0.002**	0.002**	0.002**	-0.005**	-0.005**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
$\text{Distress}^{\perp}_{Previous\ Week}$	0.024***		0.026**	0.021***	
	(0.008)		(0.011)	(0.008)	
$\text{Uncertainty}^{\perp}_{Previous\ Week}$		-0.0003	0.0001		-0.0002
		(0.0002)	(0.0003)		0.0002
$\text{Distress}_{Previous\ Week}$					0.023***
					(0.007)
$\text{Uncertainty}_{Previous\ Week}$				0.0004***	
				(0.0001)	
Observations	120	120	120	120	120
R^2	0.092	0.018	0.094	0.207	0.219

Note: This table illustrates the relationship between the pre-announcement return and the orthogonal components of distress and uncertainty. Columns (1) to (5) report estimates of equations (6) to (10), respectively. *Distress* represents the corporate bond market distress level, expressed by the CMDI, and VIX is used as a proxy for *Uncertainty*, as described in paragraph 2.1 and 2.2, while their orthogonal components ($Distress^{\perp}$ and $Uncertainty^{\perp}$) are described in paragraph 3.1. The independent variables are lagged observations related to the Friday of the week before (week t–1) the announcement (week t). The pre-announcement return (*Pre-Ann. Return*) is described in paragraph 2.2. The equations are estimated using data related to our 120 events only over the period 2005 – 2020. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 4: Post-Announcement Return Versus Distress$^{\perp}$ and Uncertainty$^{\perp}$.

	Dependent variable:				
	Post-Ann. Return				
	(1)	(2)	(3)	(4)	(5)
Constant	0.001	0.0005	0.0005	-0.004	-0.001
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
$\text{Distress}^{\perp}_{Previous\ Week}$	-0.003		-0.007	-0.006	
	(0.012)		(0.011)	(0.012)	
$\text{Uncertainty}^{\perp}_{Previous\ Week}$		-0.0001	-0.0002		-0.0001
		(0.0004)	(0.0004)		0.0004
$\text{Distress}_{Previous\ Week}$					0.006
					(0.008)
$\text{Uncertainty}_{Previous\ Week}$				0.0003	
				(0.0002)	
Observations	120	120	120	120	120
R^2	0.001	0.001	0.005	0.041	0.011

Note: This table illustrates the relationship between the post-announcement return and the orthogonal components of distress and uncertainty. Columns (1) to (5) report estimates of equations (6) to (10), respectively, using the post-announcement return as dependent variable. *Distress* represents the corporate bond market distress level, expressed by the CMDI, and VIX is used as a proxy for *Uncertainty*, as described in paragraph 2.1 and 2.2, while their orthogonal components ($Distress^{\perp}$ and $Uncertainty^{\perp}$) are described in paragraph 3.1. The independent variables are lagged observations related to the Friday of the week before (week t–1) the announcement (week t). The post-announcement return (*Post-Ann. Return*) is described in paragraph 2.2. The equations are estimated using data related to our 120 events only over the period 2005 – 2020. Robust standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 5: FOMC Returns Conditioned on Distress$^{\perp}$ and Uncertainty$^{\perp}$.

Panel A – Returns Conditioned on One State of the Economy

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
High Distress$^{\perp}$	60	49.39***	8.72
High Uncertainty$^{\perp}$	60	18.70*	0.18
Low Bond Distress$^{\perp}$	60	-15.77**	1.41
Low Uncertainty$^{\perp}$	60	14.92*	9.95

Panel B – Returns Conditioned on Both States of the Economy

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
High Distress$^{\perp}$ and High Uncertainty$^{\perp}$	23	81.75***	2.99
High Distress$^{\perp}$ and Low Uncertainty$^{\perp}$	37	29.28**	12.28
Low Distress$^{\perp}$ and High Uncertainty$^{\perp}$	37	-20.49**	-1.57
Low Distress$^{\perp}$ and Low Uncertainty$^{\perp}$	23	-8.18*	6.21

Note: This table reports the performance of FOMC announcement returns conditioned on the level of $Distress^{\perp}$ and/or $Uncertainty^{\perp}$ over the period 2005 – 2020. In Panel A, we report the performance conditioned on the level of one variable only, while in Panel B returns are conditioned on the level of both variables. $Distress^{\perp}$ and $Uncertainty^{\perp}$ are described in paragraph 3.1. The pre-announcement return (*Pre-Ann. Return*) and the post-announcement return (*Post-Ann. Return*) are described in paragraph 2.2, and represents the average E-Mini S&P 500 return across FOMC meetings, expressed in basis points. Events indicates the number of FOMC meetings included. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 6: Double Conditional Sorting for Distress$^{\perp}$ and Uncertainty$^{\perp}$.

Panel A – Conditioning First on Distress$^{\perp}$ and Second on Uncertainty$^{\perp}$

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
High Distress$^{\perp}$ and High Uncertainty$^{\perp}$	30	76.72***	16.86
High Distress$^{\perp}$ and Low Uncertainty$^{\perp}$	30	22.16***	0.57
Low Distress$^{\perp}$ and High Uncertainty$^{\perp}$	30	-20.91*	-5.43
Low Distress$^{\perp}$ and Low Uncertainty$^{\perp}$	30	-10.63**	8.26

Panel B – Conditioning First on Uncertainty$^{\perp}$ and Second on Distress$^{\perp}$

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
High Uncertainty$^{\perp}$ and High Distress$^{\perp}$	30	44.81**	-1.01
High Uncertainty$^{\perp}$ and Low Distress$^{\perp}$	30	-7.41	1.37
Low Uncertainty$^{\perp}$ and High Distress$^{\perp}$	30	32.43**	12.78
Low Uncertainty$^{\perp}$ and Low Distress$^{\perp}$	30	-2.59	7.12

Note: This table reports the conditional performance of FOMC announcement returns over the period 2005 – 2020. In Panel A, we first divide the sample of 120 observations in two groups of 60 observations each, according to the (high and low) level of Distress$^{\perp}$. Then, we divide each group in two subgroups according to the level of Uncertainty$^{\perp}$, considering the median Uncertainty$^{\perp}$ of each group (and not of the 120 observations). We thus end up with four groups of 30 observations, and we test the performance of FOMC announcement returns in each group. In Panel B, we repeat the procedure from Panel A, conditioning first on the level of Uncertainty$^{\perp}$ and second on the level of Distress$^{\perp}$, creating four more groups of 30 observations each. $Distress^{\perp}$ and $Uncertainty^{\perp}$ are described in paragraph 3.1. The pre-announcement return (*Pre-Ann. Return*) and the post-announcement return (*Post-Ann. Return*) are described in paragraph 2.2, and represents the average E-Mini S&P 500 return across FOMC meetings, expressed in basis points. Events indicates the number of FOMC meetings included. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 7: FOMC Announcement Returns Conditioned on Distress$^{\perp}$ and Uncertainty$^{\perp}$ Over the Period 2005 – 2011.

Panel A – Unconditional Returns

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
–	49	38.82***	11.71

Panel B – Conditional Returns

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
High Distress$^{\perp}$	24	59.76**	-6.88
High Uncertainty$^{\perp}$	24	40.96*	20.43
Low Distress$^{\perp}$	25	18.73	29.55*
Low Uncertainty$^{\perp}$	25	36.77**	3.33

Note: This table reports the performance of FOMC announcement returns over the period that spans from January 2005 to March 2011. In Panel A, we report the unconditional performance of the two returns, while in Panel B returns are conditioned on the level of $Distress^{\perp}$ or $Uncertainty^{\perp}$. $Distress^{\perp}$ and $Uncertainty^{\perp}$ are described in paragraph 3.1. The pre-announcement return (*Pre-Ann. Return*) and the post-announcement return (*Post-Ann. Return*) are described in paragraph 2.2, and represents the average E-Mini S&P 500 return across FOMC meetings, expressed in basis points. Events indicates the number of FOMC meetings included. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Table 8: FOMC Announcement Returns Conditioned on Distress$^{\perp}$ and Uncertainty$^{\perp}$ Over the Period 2011 – 2020.

Panel A – Unconditional Returns

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
–	71	1.62	0.48

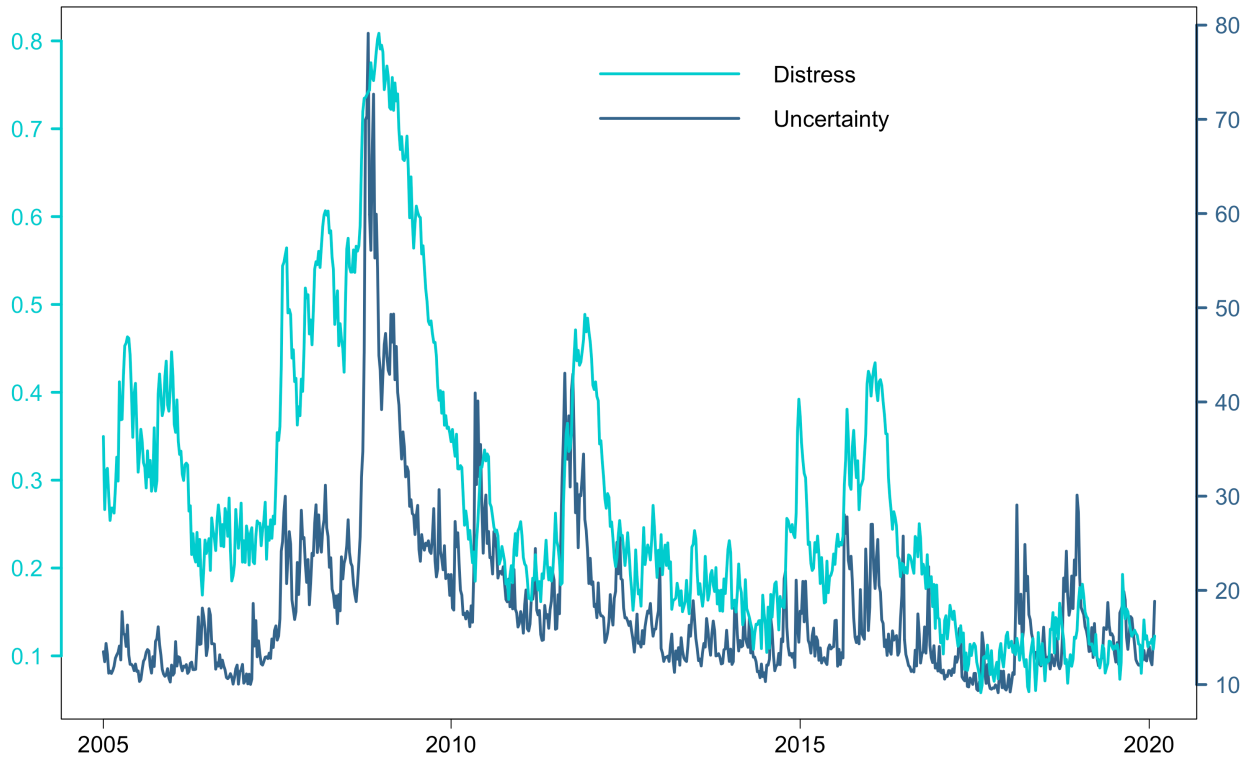
Panel B – Conditional Returns

State of the Economy	Events	Pre-Ann. Return	Post-Ann. Return
High Distress$^{\perp}$	35	14.01*	19.28*
High Uncertainty$^{\perp}$	35	6.35	-14.03
Low Distress$^{\perp}$	36	-10.43*	-17.80
Low Uncertainty$^{\perp}$	36	-2.99	14.59**

Note: This table reports the performance of FOMC announcement returns over the period that spans from April 2011 to January 2020. In Panel A, we report the unconditional performance of the two returns, while in Panel B returns are conditioned on the level of $Distress^{\perp}$ or $Uncertainty^{\perp}$. $Distress^{\perp}$ and $Uncertainty^{\perp}$ are described in paragraph 3.1. The pre-announcement return (*Pre-Ann. Return*) and the post-announcement return (*Post-Ann. Return*) are described in paragraph 2.2, and represents the average E-Mini S&P 500 return across FOMC meetings, expressed in basis points. Events indicates the number of FOMC meetings included. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

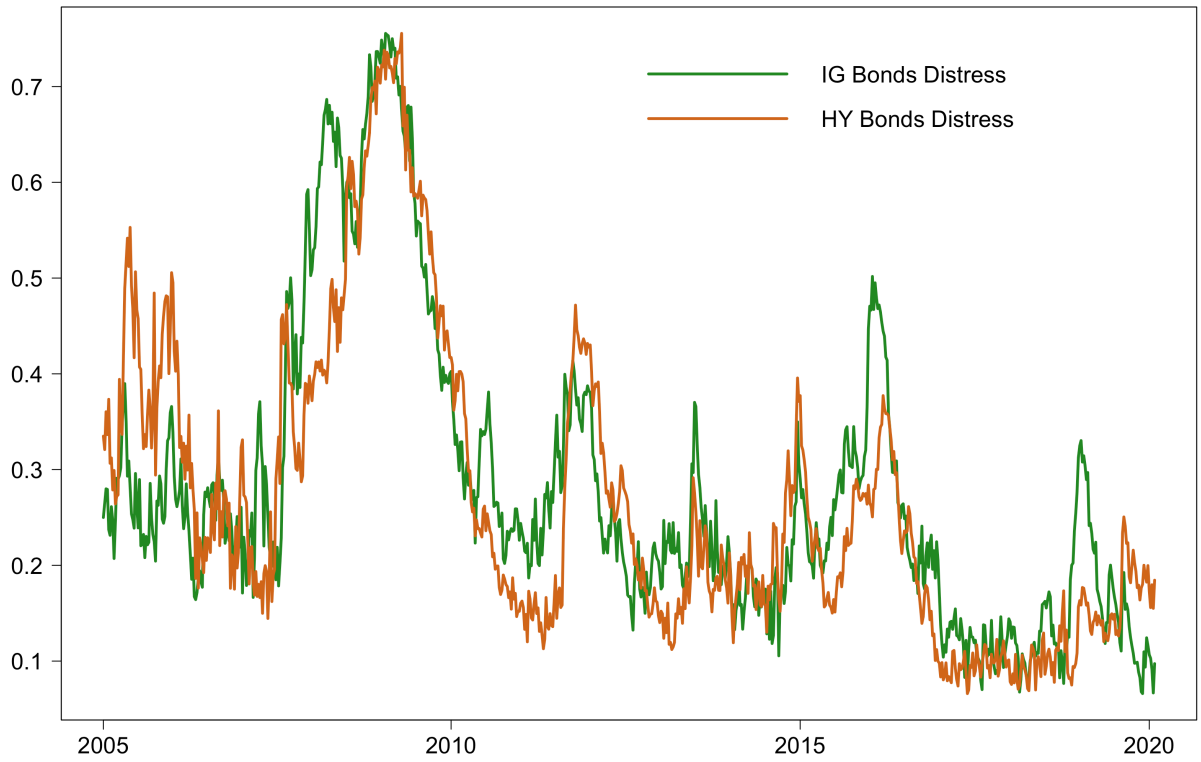
7 Figures

Figure 1: Distress and Uncertainty Over the Period 2005 – 2020.



Note: This figure reports a plot of the level of distress and uncertainty over the period 01/2005 – 01/2020, using weekly data. Distress represents the corporate bond market distress level, expressed by the CMDI, and VIX is used as a proxy for uncertainty, as described in paragraph 2.1 and 2.2.

Figure 2: Investment Grade and High Yield Bonds Distress Over the Period 2005 – 2020.



Note: This figure reports a plot of the level of investment grade (IG) and high yield (HY) corporate bonds distress over the period 01/2005 – 01/2020, using weekly data.