Equity Premium Events*

Ben Knox Juan M. Londono

Mehrdad Samadi Annette Vissing-Jorgensen

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Abstract: Using daily S&P 500 options, we develop a methodology for determining which days have elevated option-implied equity premium measures relative to the daily term structure. A variety of prescheduled events exhibit elevated premiums. FOMC, NFP, and CPI have the largest abnormal macro-release premiums, which increase substantially over June 2022-June 2023. However, these release days account for a smaller share of total equity premium compared to estimates using realized returns. We propose an asset pricing framework to explain variation in event premiums which decomposes premiums into components due to news variance and sensitivities of the market and SDF to news released.

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*Knox (ben.knox@frb.gov) is with the Federal Reserve Board, Londono (juan.m.londono@frb.gov) is with the Federal Reserve Board, Samadi (mehrdad.samadi@rutgers.edu) is with Rutgers University and Vissing-Jorgensen (annette.vissing-jorgensen@frb.gov) is with the Federal Reserve Board, NBER, and CEPR. The authors thank Hengjie Ai, Nick Bloom, Adrian Buss, Fousseni Chabi-Yo, Mike Chernov, Steven Davis, Ian Dew-Becker, Elise Gourier, Mohammad Jahan-Parvar, Paymon Khorrami, Eben Lazarus, Johnathan Loudis, Jack McCoy, Alan Moreira, Dmitriy Muravyev, Yoshio Nozawa, Neil Pearson, Seth Pruitt, Matt Ringgenberg, Pavel Savor, David Schreindorfer, Sang Seo, Ivan Shaliastovich, Taisiya Sikorskaya, Xiaoxiao Tang, Michael Weber, Mungo Wilson, Nancy Xu, Emre Yoldas, Terry Zhang, conference and seminar participants at the Adam Smith Workshop, SFS Cavalcade, CDI, European Finance Association, FEBS, Fordham, Gothenburg Asset Pricing and Machine Learning Conference, IRMC, MARC, Melbourne Asset Pricing Meeting, MFA, NBER SI Asset Pricing Meeting, NFA, Rutgers, SAFE Asset Pricing Workshop, U.Chicago BFI Firms' Cost of Capital, Discount Rates, and Investment Conference, UIC Finance Conference, UMass Amherst Finance Conference, UT Dallas Finance Conference, UW Foster Summer Finance Conference, Wake Forest, and WFA. Bill Lang, Ella Moxley, and Will Porcello provided excellent research assistance. The views expressed in this paper are those of the authors and do not represent the views of the Federal Reserve Board, Federal Reserve System or their staff.

A fundamental question in finance is what drives the equity risk premium. Recent work has highlighted the importance of prescheduled economic releases containing information about cash flows and discount rates for which investors may demand risk compensation (Savor and Wilson (2013); Lucca and Moench (2015)). Most existing evidence is based on realized excess returns around these events. However, realized returns are a noisy estimate of expected returns and can contain economically large unexpected returns even averaged over multiple decades of data (Elton (1999); Fama and French (2002)). Therefore, analyses using realized excess returns to measure risk premiums for macro announcements and other infrequently-occurring events are potentially subject to small-sample problems (Cieslak, Morse, and Vissing-Jorgensen (2019); Ernst, Gilbert, and Hrdlicka (2019); Ghaderi and Seo (2024)).

In this paper, we propose a new and complementary approach to studying what types of prescheduled events are associated with a higher equity premium and how these premiums vary over time. Our approach does not require realized returns. It, instead, exploits the rich forward term structure of S&P 500 option prices observed each trading day along with option-implied models of the equity premium to obtain ex ante estimates of the equity premium over daily (or, in some periods, 2-day) forward periods up to one month in the future. End-of-week S&P 500 option expirations became available in 2008 (Andersen, Fusari, and Todorov (2017)), and Cboe added Monday and Wednesday expirations on the S&P 500 in 2016 and Tuesday and Thursday expirations in 2022, resulting in an option expiration at the end of each trading day. We can then estimate ex ante equity premiums separately for each upcoming day (forward period) using adjacent option expirations available on a given trade date. We estimate a panel of forward daily (or 2-day) option-implied measures of equity premiums for trade dates from October 2016 through December 2024 using forward analogs of option-implied measures of the equity premium (Gandhi, Gormsen, and Lazarus (2022); Londono and Samadi (2023)). These option-implied measures are the Martin (2017) SVIX lower bound, the Chabi-Yo and Loudis (2020) Restricted Lower Bound (LBR), and the Tetlock, McCoy, and Shah (2024) Implied Equity Premium (IEP) which provides a point estimate of the equity premium. While these measures differ in their underlying assumptions (e.g., log utility or not) and estimation, our conclusions remain qualitatively similar irrespective of the measure used.

We develop a methodology to determine which days are associated with abnormally high measures of equity premiums relative to nearby dates, referring to such days as “equity premium events”. To identify equity premium events, we calculate residuals from a quantile (median) regression of forward equity premium measures on term (time to expiration), term squared, and an indicator for the first expiration of the calendar week. These regressions are estimated separately for each trade date. The use of quantile regression ensures that events do not affect the estimated term structure for non-event days, enabling an accurate measure of abnormal forward equity premiums on event days. By contrast, traditional yield curve fitting methods (Nelson and Siegel (1987); Svensson (1994)) would try to fit events (outliers) if they are not removed prior to estimation (often in ad-hoc ways, see Fama and Bliss (1987); Gürkaynak, Sack, and Wright (2007); among others).

Our first research question is simple: Are there equity premium events? We decompose the variation of our trade date-forward period panel of options-based equity premium measures to assess the relative role of time-series variation versus variation across forward periods on a given trade date. We find that the former is more important. The time series standard deviation of trade date-level median forward premium is 3.69 basis points (bp) using the IEP. However, there is also significant variation in forward equity premiums within trade date. The average within trade date standard deviation is 1.17 bps, with a significant share of this variation coming from outliers on the equity term structure. This is evidence of economically important variation in measures of equity premiums across forward periods.

We next ask: What happens on days that are equity premium events? We let the data speak regarding which events are associated with significant abnormal premiums. While the literature has examined the drivers of large realized moves in equity markets (Niederhoffer (1971); Cutler, Poterba, and Summers (1988); Kapadia and Zekhnini (2019); Baker, Bloom, Davis, and Sammon (2021); Aleti and Bollerslev (2025); among others), our data-driven analysis provides an ex ante counterpart to these papers. The forward periods identified by our data-driven approach as having the most abnormally high equity premium measures include types of events extensively studied in the literature using realized returns. The 43 most significant events in our sample include 14 Federal Open Market Committee (FOMC) meetings (Savor and Wilson (2013); Lucca and Moench (2015); among others), 10 U.S. consumer price index (CPI) releases, 7 nonfarm payroll (NFP) releases, and the 2016, 2020, and 2024 U.S. presidential elections (Niederhoffer, Gibbs, and Bullock (1970); Li and Born (2006); Kelly, Pástor, and Veronesi (2016); among others). Our approach also identifies other events less explored in the literature, such as the 2018 and 2022 U.S. midterm elections, the 2017 French presidential election and subsequent runoff, the 2021 Georgia congressional runoff, the 2019 Trump-Xi G-20 bilateral meeting, and the August 2024 NVIDIA earnings release. Of the recurring events with significant abnormal pricing, U.S. presidential elections are associated with the largest average abnormal premiums, though elections comprise a small proportion of the total equity premium in our sample, as these events occur much less frequently than days with macroeconomic releases or monetary policy announcements.

Our third research question is whether option-implied equity premiums lead to different conclusions regarding the additional equity premium investors require for FOMC and other macroeconomic announcement days compared to previous estimates based on average realized excess returns (Savor and Wilson (2013); Lucca and Moench (2015); among others). We consider this question both qualitatively and quantitatively. When examining the full cross-section of U.S. economic releases tracked by the Bloomberg Economic Calendar, option-implied equity premium measures indicate that FOMC, NFP, and CPI releases are the most important in our sample based on economic magnitudes of the lower bound measures and the IEP as well as statistical significance. However, option-implied FOMC, NFP, and CPI release premiums estimated for our sample are significantly lower than previous estimates based on realized excess returns. To reconcile this difference in magnitudes, we consider three potential explanations. First, ex post good news could be driving up average excess returns over the samples used in Savor and Wilson (2013) and Lucca and Moench (2015). Second, our sample used to estimate option-implied measures of expected returns may be unrepresentative. Third, the option-implied measures of equity premiums may be inaccurate. We find some support for the first and third explanations. Notably, we hand-collect data for an extended sample of FOMC, NFP, and CPI releases starting in 1928 for NFP, 1936 for FOMC, and 1941 for CPI, long before the start date of the sample periods of previous studies examining realized excess returns. In this extended sample, FOMC meetings are associated with a 12 bps higher average excess return, which is substantially lower than the 22 bps effect in the Savor and Wilson (2013) 1958-2009 sample and the 34 bps effect in the Lucca and Moench (2015) 1994-2011 sample, suggesting that those estimates could be partly driven by unexpectedly good news, rather than purely reflecting ex ante risk compensation. By contrast, the average excess return of NFP releases in the long sample are comparable to that of the original sample of Savor and

Wilson (2013). While we find some evidence that option-implied measures of the equity premium, particularly the lower bound measures, do not vary as much as realized excess returns at daily and weekly forecast horizons, this finding is not enough to fully reconcile the difference in magnitudes between option-implied macro release premiums and our long-sample estimates based on realized excess returns.

The final part of our analysis focuses on the time-series evolution of measures of abnormal equity premiums for macroeconomic releases and monetary policy announcements. We find that abnormal equity premium measures for FOMC and CPI releases became particularly elevated during 2022 and 2023. To understand the drivers of the time-series variation in the abnormal equity premium for a given even type and, in particular, the variation in abnormal CPI premiums in 2022 and 2023, we derive an asset pricing framework that decomposes the equity premium for a given economic release into components due to (i) the variance of the news in the upcoming release, (ii) the beta of the stock market with respect to the news, and (iii) the beta of the stochastic discount factor (SDF) with respect to the news. We find a role for both increased risk with respect to release news and time-varying betas when explaining the elevated CPI release premiums during 2022 and 2023, with CPI release premiums and return sensitivities all peaking around the same time as long-term inflation uncertainty.

Because the measures of forward equity premiums can be obtained in real time using end-of-day option prices, the empirical framework proposed in this paper can be used to estimate option-implied measures of the equity premium for upcoming events on the economic and political calendar. Given the significant variation in forward premiums across release types and through time, our approach can identify which upcoming events equity markets perceive to be important on any given day and provide estimates of how large the premiums for these events are. We provide an example of how to price the upcoming economic calendar. We also use the 2024 presidential election as an example of how to price a given event over time. Forward measures of equity premiums for the upcoming month of daily forward periods are available at www.pricingthecalendar.com.

While our focus is on the equity premium, our work is related to papers examining option prices around specific types of events, including the implied volatility, volatility slope, and variance risk premiums of international presidential elections and political summits (Kelly et al. (2016)), the implied volatility of earnings releases (Patell and Wolfson (1981); Dubinsky, Johannes, Kaeck, and Seeger (2019)), and variance risk premiums of U.S. FOMC and NFP releases (Wright (2020)), among others. We also build upon prior work estimating equity premiums for FOMC meetings by imposing specific forms of investor preferences (Liu, Tang, and Zhou (2022)) and work estimating forward equity premiums for CPI, GDP, FOMC, and NFP releases (Londono and Samadi (2023)).

The novelty of our work relative to this literature is as follows. Using the entire forward term structure of option-implied measures of daily equity premiums up to one month in advance, we develop a methodology for estimating the abnormal equity premium for a given forward period relative to other forward periods observed on the same trade date. Using data for all trading days between October 2016 and December 2024, we determine all events with significantly elevated lower bounds and IEPs using a data-driven approach, also quantifying the importance of equity premium events in our trade date-forward period panel. Furthermore, we provide novel ex ante estimates of macroeconomic release premiums using the full cross-section of U.S. releases tracked in the Bloomberg economic calendar, also examining what share of the total equity premium measures correspond to CPI, FOMC, and NFP releases during our sample (Savor and Wilson (2013); Lucca and Moench (2015)). We also hand-collect novel out-of-sample data for FOMC, NFP, and CPI releases prior to the sample periods of Savor and Wilson (2013) and Lucca and Moench (2015) to construct an extended analysis of realized excess returns. Finally, to better understand the variation in abnormal event premiums across event types and time, we introduce a novel asset pricing framework for decomposing the equity premium for a given event.

There are several advantages to our approach of estimating event equity premiums. First, the approach is fully ex ante and available in real time. Second, the approach easily allows for variation in equity premium estimates across event types, over time for a given event type, or even over time leading up to an individual event of a given type. Finally, the approach is able to identify non-recurring events (e.g., the Georgia runoff) as having elevated premiums.

This paper proceeds as follows: Section I describes the data; Section II discusses option-implied models of the equity premium, describes the forward daily equity premium measures, and explains our methodology to measure abnormal forward daily equity premiums; Section III decomposes the variance of our trade date-forward period panel and presents results for a data-driven analysis that examines which forward periods are associated with significant abnormal measures of forward equity premiums; Section IV extends the analysis to consider realized excess returns and equity premiums on U.S. macroeconomic releases; Section V develops an asset pricing framework for abnormal release premiums; Section VI provides examples of how the empirical framework can be used to price the economic and political calendar; and Section VII concludes.

I. Data

Our sample consists of end of day prices for options on the S&P 500 for trade dates from October 2016 through December 2024. For this time period, we construct non-overlapping forward periods one or two trading days long based on data availability. Cboe added Monday and Wednesday expirations to Friday expirations in October 2016, then added Tuesday and Thursday expirations in May 2022, resulting in option expirations for every trading day. Otherwise known as SPX "Weeklys" (SPXW), these are cash settled European options that settle to the market closing price. These options trade for about one month prior to expiration during our sample period.[1]

Data for option prices, S&P 500 prices, forward prices, and interest rates are obtained from Optionmetrics. We use out of the money options with p.m. settlement. We use option expirations with at least 10 distinct strike prices. We remove options with missing implied volatility, which occurs when the option midquote is below intrinsic value or when the Optionmetrics implied volatility calculation fails to converge. We use option expirations with a minimum moneyness range of 95% to 105% (moneyness is defined as K/P_t, where K is the option's strike price and P_t is the close price of the S&P 500 on trading day t). For each trade date, we use a common moneyness range, which is calculated as the minimum moneyness range across forward periods. We remove option expirations with more than 28 calendar days to expiration. We also remove a small subset of forward periods with negative measures of expected returns. These initial filters result in 29,549 trade date-forward period observations for 1,571 unique forward periods.

Table 1 summarizes the option expiration dates (i.e., the calendar dates on which options expire) by expiration day of the week for every year in our sample which runs from October 2016 to December 2024. Panel A reports the number of unique expiration dates, e, while Panel B reports

[1] SPX Weeklys end of week expirations are not available on the same days as SPX monthly expirations with a.m. settlement (last trade day of the third week of the month) until May 2017. Our results are qualitatively similar when we add SPX Monthly options to the sample for which SPX Weeklys are unavailable. SPX Tuesday and Thursday expirations initially traded for two weeks prior to expiration following their introduction until October 2022.

the number of trade date-expiration date, (t, e), observations. From October 2016 through 2021, nearly all option expiration dates fall on Mondays, Wednesdays, and Fridays. The limited number of Tuesday and Thursday expirations during this period are the result of exchange holidays for which Cboe shifts the option expiration date to an adjacent trading day. From June 2022, there are option expirations on every trading day. Accordingly, the bottom rows of Table 1 show that expirations are approximately equally distributed across Mondays through Fridays from 2023.

[Insert Table 1 here]

Descriptive statistics at the forward period level are reported in Internet Appendix Table A1. These statistics indicate a large number of strikes for each forward period and a large moneyness range and suggest that these options are actively traded.

We also collect all 125 U.S. macroeconomic variables for which releases are tracked in the Bloomberg Economic Calendar. Because a given release may contain information about several macroeconomic variables, we group variables released together, and we examine option-implied measures of equity premiums at the release level. For example, information about the Unemployment Rate is contained in the same release as NFP, so any abnormal equity premium on the release date is the combined compensation for both variables' releases. Our procedure to group 125 macroeconomic variables into 45 releases is detailed in Internet Appendix C.

II. Methodology: Option-Implied Equity Premiums

In this section, we discuss approaches to calculate option-implied equity premiums and forward equity premiums.[2] We furthermore introduce a novel methodology to estimate abnormal forward equity premiums with respect to the daily forward term structure.

II.A. Measures of Option-Implied Equity Premiums

The option-implied measures of the equity premium that we use are grounded in asset pricing theory and can be updated at high frequency since they use S&P 500 option prices rather than infrequently updated accounting or macroeconomic information. These measures empirically reflect risk neutral

[2]For background, Internet Appendix A provides further theoretical detail.

variance, and for some measures, higher order risk neutral moments. Under assumptions about utility and the assets available to the investor, these measures provide bounds or point estimates of the expected excess return on the market. We first state the measures and their underlying assumptions, before turning to how they are estimated from options prices.

II.A.1. Definitions and Theory

The first option-implied measure of the equity premium that we examine is based on the Martin (2017) SVIX. This measure of the equity premium is the risk-neutral variance of the stock market return divided by the gross risk-free rate,

$$E_t^{SVIX}(\tilde{R}_{t:e}) = \frac{1}{R_{f,t:e}} \text{var}_t^* R_{t:e}, \tag{1}$$

where $\tilde{R}_{t:e}$ denotes the excess return on the market from date t to date e, $R_{t:e}$ is the return on the market over the same period and $R_{f,t:e}$ is the gross risk-free rate over the same period.[3] In the case of an unconstrained investor with log utility over terminal wealth who is fully invested in the stock market, the equity premium from date t to date e equals the SVIX measure. More generally, the discounted risk-neutral variance provides a lower bound subject to Martin's negative correlation condition (NCC), $\text{cov}_t(M_{t:e}R_{t:e}, R_{t:e}) \leq 0$, where $M_{t:e}$ is the stochastic discount factor from date t to date e and $R_{t:e}$ is the return on the market portfolio from date t to date e. The NCC economically reflects the idea that market returns tend to be low in states when the marginal utility of consumption is high and vice-versa.[4] Importantly, the following option-implied measures of the equity premium do not require the NCC (or relative-NCC for forward measures) to be valid bounds or point estimates of the equity premium.

The second option-implied measure of the equity premium that we examine is the Chabi-Yo

[3] While we refer to this measure of the equity premium as the SVIX for notational ease, the Martin lower bound is $R_{f,t:e}SVIX^2_{t:e}$ as Martin defines $SVIX^2_{t:e}$ as $\frac{1}{e-t}\text{var}_t^*\left(\frac{R_{t:e}}{R_{f,t:e}}\right)$.

[4] Martin (2017) shows that the NCC holds in leading asset pricing models. Empirically, Chabi-Yo and Loudis (2020) derive and estimate an upper bound on the conditional covariance term above and find that the NCC holds on nearly all days in their sample. Schreindorfer and Sichert (2025) jointly estimate conditional expected returns, conditional risks, and conditional risk prices and find that their estimates of expected excess returns exceed the SVIX on 99% of days in their sample, with the NCC only being violated in periods of extreme volatility. Our main results are qualitatively similar when removing trade dates identified by Schreindorfer and Sichert (2025) as being associated with NCC violations.

and Loudis (2020) Restricted Lower Bound (LBR):

$$E_t^{LBR}(\tilde{R}_{t:e}) = \frac{\frac{E_t^*(\tilde{R}_{t:e}^2)}{R_{f,t:e}} - \frac{E_t^*(\tilde{R}_{t:e}^3)}{R_{f,t:e}^2} + \frac{E_t^*(\tilde{R}_{t:e}^4)}{R_{f,t:e}^3}}{1 - \frac{E_t^*(\tilde{R}_{t:e}^2)}{R_{f,t:e}^2} + \frac{E_t^*(\tilde{R}_{t:e}^3)}{R_{f,t:e}^3}}, \tag{2}$$

where $E_t^*(\tilde{R}_{t:e}^k)$ are risk neutral expected excess market returns raised to the k power. The LBR measure does not assume log utility and is not subject to the NCC, but retains the assumption of a 100% portfolio weight in the stock market. By incorporating additional information from higher-order moments of expected excess returns, the LBR provides a tighter lower bound relative to the SVIX subject to assumptions on the signs of risk neutral moments and the representative investor's tolerance for risk, skewness, and kurtosis.[5] Using the approach of Boudoukh, Richardson, and Smith (1993), Back, Crotty, and Kazempour (2022) generally fail to reject validity for either of the SVIX or LBR lower bounds.

The third option-implied measure of the equity premium that we examine is the Tetlock et al. (2024) implied equity premium (IEP). This measure assumes log utility, but does not restrict the portfolio weight in the stock market to 100%, as the investor is allowed to also invest in derivatives that replicate the market excess return squared, cubed etc. The IEP is a point estimate rather than a lower bound of equity premium and is defined as:

$$E_t^{IEP}(\tilde{R}_{t:e}) = R_{f,t:e}^{-1} \sum_{k=1}^{4} w_{k,t} E_t^*(\tilde{R}_{t:e}^{k+1}), \tag{3}$$

where $E_t^*(\tilde{R}_{t:e}^{k+1})$ is the risk neutral expected excess market return raised to the $k+1$ power and $w_{k,t}$ are growth optimal (GO) portfolio weights on trade date t. These weights are time-varying. The IEP approach thus incorporates additional information from estimates of expected physical market variance (used for variance risk premiums) to estimate GO portfolio weights, thereby enabling approximate recovery with less restrictive assumptions on portfolio weights (Ross (2015); Borovička, Hansen, and Scheinkman (2016)). The SVIX is nested in the IEP framework as the special case when $w_{1,t} = 1$ and $w_{k,t} = 0$ for $k \geq 2$ (then $E_t^{IEP}(\tilde{R}_{t:e}) = E_t^{SVIX}(\tilde{R}_{t:e}) = R_{f,t:e}^{-1} E_t^*(\tilde{R}_{t:e}^2)$).

[5] Our main results are qualitatively similar when estimating the restricted upper bound and unrestricted bounds of Chabi-Yo and Loudis (2020).

II.A.2. Estimation

Following Breeden and Litzenberger (1978) and Carr and Madan (1998), risk neutral moments of the market excess return can be calculated from option prices as

$$\frac{1}{R_{f,t:e}} E_t^*\left[\tilde{R}_{m,t:e}^j\right] = \frac{j(j-1)}{P_t^j}\left[\int_0^{f_{t,e}} (K - f_{t,e})^{j-2} p_{t,e}(K) dK + \int_{f_{t,e}}^{\infty} (K - f_{t,e})^{j-2} c_{t,e}(K) dK\right], \quad (4)$$

where P_t is the price of the S&P 500 index on trade date t, $f_{t,e}$ is the forward price of the S&P 500 on trade date t for expiration date e, and $p_{t,e}(K)$ ($c_{t,e}(K)$) are the midquote prices of out-of-the-money put (call) options with strike price K and expiration date e.

We exploit equation (4) to estimate the relevant risk-neutral moments for each of the three options-based equity premium measures. For example, the Martin SVIX can be computed from option prices as

$$E_t^{SVIX}(\tilde{R}_{t:e}) = \frac{2}{P_t^2}\left[\int_0^{f_{t,e}} p_{t,e}(K)\, dK + \int_{f_{t,e}}^{\infty} c_{t,e}(K)\, dK\right]. \quad (5)$$

To implement the integrals in equation (4), we numerically integrate across option strike prices using the approach of Martin (2017), among others.

For the IEP measure, the growth optional portfolio weights are estimated using regressions of the variance risk premium on higher order risk neutral moments. While the IEP requires additional estimates of expected physical variance, variance risk premiums, and GO portfolio weights relative to the SVIX and LBR lower bounds, the IEP provides a point estimate of the equity premium rather than a lower bound. For comparability with Tetlock et al. (2024)'s estimates of expected returns, we use their estimated GO weights. Due to space constraints, we report certain figures using one measure of the equity premium, though those results are qualitatively similar for the other measures.

II.B. Forward Option-Implied Equity Premiums

We construct a panel of trade date-forward period-level equity premiums using the three distinct option-implied equity premium measures. To construct the panel of forward premiums for each measure, we approximate forward daily equity premiums using adjacent option expiration dates (Londono and Samadi (2023)). Specifically, on a given trade date t, we use the cumulative equity premium to expiration day e_2 and the cumulative equity premium to the shorter-dated adjacent expiration day e_1 to calculate the forward equity premium for forward period $e_1 : e_2$ as

$$F_{t,e_1:e_2} \approx \frac{(1 + E_t(\tilde{R}_{t:e_2}))}{(1 + E_t(\tilde{R}_{t:e_1}))} - 1. \tag{6}$$

We note that our approximations of forward equity premiums can differ from the true expected excess returns for the particular forward periods if returns are correlated across days (specifically, if $\tilde{R}_{t:e_1}$ is correlated with returns on any of the days from e_1 to e_2). This issue does not arise with expected log returns and we document robustness of our conclusions to using log returns in the results below. We use returns, not log returns, for our baseline analysis to link to the prior literature on macro release premiums (e.g., Savor and Wilson (2013); Lucca and Moench (2015)). In terms of assumptions, we note that the forward SVIX provides a lower bound on expected future excess returns under a relative negative correlation condition (rNCC) which is approximately $\text{cov}_t(M_{t:e_2} R_{t:e_2}, R_{t:e_2}) \leq \text{cov}_t(M_{t:e_1} R_{t:e_1}, R_{t:e_1})$. This issue does not arise for the LBR or IEP measures.

Panel A of Table 2 reports summary statistics for the forward equity premium per day for the SVIX, LBR, IEP measures. The average forward equity premium is 1.41 bps per day for the SVIX lower bound measure with a standard deviation of 1.78. Both the mean and standard deviations are higher for the LBR lower bound and IEP measure than for SVIX. The IEP mean and standard deviation are 3.68 and 4.97, respectively. A larger average forward risk premium for the LBR and IEP measures is consistent with the LBR representing a tighter lower bound of the equity premium and the IEP representing a point estimate. Chabi-Yo and Loudis (2020) and Tetlock et al. (2024) find that the difference between their respective measures and the SVIX is time-varying, volatile, and right skewed due to the incorporation of higher-order risk neutral moments and, in the case of IEP, to time-varying growth optimal weights. There is substantial variation in measures of forward expected returns across the trade date-forward period-level observations in our sample, with IEP forward premiums ranging from 0.94 bps for the 5th percentile to 9.35 bps for the 95th percentile. In subsequent tests estimating abnormal equity premium measures for specific events, we adjust for the number of trading days (one or two) per forward period.

[Insert Table 2 here]

II.C. Abnormal Forward Option-Implied Equity Premiums

We next develop a new methodology for computing abnormal forward equity premiums to identify key prescheduled events. Rather than simply using the shortest dated options (which would confound variation from equity premium events with time series variation in equity premia in general), the objective of the methodology is to identify equity premium events from the variation in option-implied equity forward premia across expiration dates on each trade date. We define abnormal forward equity premiums as deviations from a fitted forward term structure. Since outliers in the forward term structure are of particular interest in our setting, we fit the forward term structure using quantile regression (QR) rather than traditional yield-curve fitting methods.

On each trade date t, we observe a term structure of forward equity premiums across a total of E forward periods up to one month in the future, where $F_{t,e_1:e_2}$ denotes the expected (as of date t) excess return per trade day over the forward period going from the end of expiration date e_1 to the end of expiration date e_2 (see equation (6)). From this term-structure of forward expected returns, we estimate a QR on each trade date t:

$$Q_{F_{t,e_1:e_2}|x_{t,e_1:e_2}}(\mathcal{T}) = x_{t,e_1:e_2}\beta_{t,\mathcal{T}}, \tag{7}$$

where $Q_{F_{t,e_1:e_2}|x_{t,e_1:e_2}}(\mathcal{T})$ is the $\mathcal{T}$'th quantile of forward expected returns on date t and $x_{t,e_1:e_2}$ is a vector containing the conditioning variables. The QR slope $\beta_{t,\mathcal{T}}$ is chosen to minimize the quantile weighted absolute value of errors across the E forward periods:

$$\begin{aligned}\hat{\beta}_{t,\mathcal{T}} = \underset{\beta_{t,\mathcal{T}}\in R^k}{\arg\min} \sum_{e_1:e_2=1}^{E} (\mathcal{T}\cdot I_{\left(F_{t,e_1:e_2}>x_{t,e_1:e_2}\beta_t\right)}\left|F_{t,e_1:e_2}-x_{t,e_1:e_2}\beta_{t,\mathcal{T}}\right| \quad + \\ (1-\mathcal{T})\cdot I_{\left(F_{t,e_1:e_2}<x_{t,e_1:e_2}\beta_t\right)}\left|F_{t,e_1:e_2}-x_{t,e_1:e_2}\beta_{t,\mathcal{T}}\right|\ ),\end{aligned} \tag{8}$$

where $I_{(.)}$ denotes the indicator function.

The abnormal forward equity premium ($A_{t,e_1:e_2}$) on trade date t for forward period $e_1 : e_2$ is then defined as the residual from the QR estimation:

$$A_{t,e_1:e_2} = F_{t,e_1:e_2} - \hat{Q}_{F_{t,e_1:e_2}|x_{t,e_1:e_2}}(\mathcal{T}), \tag{9}$$

where $\hat{Q}_{F_{t,e_1:e_2}|x_{t,e_1:e_2}}(\mathcal{T})$ is the predicted quantile value of the forward expected return conditional on $x_{t,e_1:e_2}$.

In our baseline estimation, we implement a QR on each trade date using the median quantile ($\mathcal{T} = 0.5$) and condition on the vector $x_{t,e_1:e_2} = \left(1, I_{e_2=fow}, T_{t,e_2}, T^2_{t,e_2}\right)$, where 1 is a constant, $I_{e_2=fow}$ is an indicator variable equal to one if the forward period $e_1 : e_2$ is the first forward period of the calendar week and equal to zero otherwise, T_{t,e_2} is the time to expiration of the further-dated option expiration (e_2) for forward period $e_1 : e_2$, and T^2_{t,e_2} is the time to expiration squared. The constant parameter absorbs the time variation in the average level of the equity term structure on each day, the time to expiration variable absorbs variation that may come from a slope in the term structure of forward expected returns, and the time to expiration squared variable also absorbs curvature in the term structure. The first expiration of the week indicator variable additionally accounts for any variation in equity premiums due to the fact that the first forward period of the week also spans weekends.

Internet Appendix Table A3 reports the distribution of coefficient estimates for our main specification using the SVIX measure (Panel A) and goodness of fit statistics for alternative QR specifications estimated on each trade date (Panel B). We use the pseudo-R^2 as the goodness of fit measure, which is estimated as 1 minus the ratio between the sum of absolute deviations in the fully parameterized models and the sum of absolute deviations in the null (non-conditional) quantile model. In our baseline specification, the average pseudo-R^2 across all trade dates is 48 percent, indicating that about half of the variation in the term-structure of forward premiums is attributable to the conditioning variables in our approach for the average trade date. The conditioning variables are meant to fit the forward term structure, which varies across substantially trade dates. The forward equity term structure exhibits negative slopes and pronounced curvature during stress periods, consistent with previous findings examining constant-maturity measures of equity premiums (Martin (2017); Chabi-Yo and Loudis (2020); Tetlock et al. (2024)). Accordingly, there is significant variation in the daily level, slope, and curvature coefficient estimates during our sample period, further illustrating the benefits of our approach relative to only using the shortest-dated options when examining prescheduled events.[6]

On some days during the Covid-19 crisis, term and term squared does not provide an accurate fit for very short maturities. Therefore, after estimating raw and abnormal measures of forward equity premiums, for our empirical analysis, we drop observations with less than one week to expiration. This filter results in 23,434 trade date-forward period observations covering 1,551 unique forward periods.[7]

Figure 1 illustrates the data and our approach to measure abnormal forward equity premiums on two example trade dates using the forward SVIX lower bound measure. In all panels, weekend days are excluded when constructing the timeline on the horizontal axis. The first forward period of a week is marked with white circles. The left and right panels in the top row of the figure show the cumulative measure of the equity premium through each expiration date observed on October 19, 2020, and January 18, 2023, respectively. The panels in the middle row show the raw forward equity premium per trade day over each forward period. According to these middle-row panels, the forward SVIX lower bound is approximately 2 bps per trade day on October 19, 2020, (middle-left panel) and approximately 1 bp per trade day on January 18, 2023 (middle-right panel). However, forward measures of equity premiums are significantly larger over certain forward periods (marked with vertical lines); in particular, the forward period spanning the 2020 presidential election in the left panel and the forward periods spanning the FOMC, NFP, and CPI releases in the right panel. The bottom row of Figure 1 reports abnormal measures of the forward equity premium per day over each forward period. Most forward periods have an abnormal SVIX lower bound close to zero, where the abnormal SVIX lower bound for each forward period is measured as the deviation from the fitted forward term structure based on the data in the middle row. The QR methodology identifies forward periods that are outliers, and these outliers reflect "equity premium events" in our empirical setting.

[6]The QR approach is robust when estimated using the median quantile so long as no more than half of the forward periods on a given trade date are abnormally priced. However, one can allow for a greater fraction of forward periods to have abnormal equity risk premiums by estimating the QR at a lower percentile, e.g., with $\mathcal{T} < 0.3$. Our main results are qualitatively similar using this alternative approach.

[7]Dropping the short-dated options also reduces the effects of retail trading. Using the retail trading proxy of Bryzgalova, Pavlova, and Sikorskaya (2023), we find that retail trading is most concentrated in options within 48 hours to expiration (see Internet Appendix Table A2), consistent with the findings of Bryzgalova et al. (2023) and Bogousslavsky and Muravyev (2024). This proxy of retail option trading likely understates the extent of retail trader activity in very-short-dated S&P 500 options.

We use forward measures of premiums per trade day to fit the term structure, thereby accounting for forward periods of unequal length on a given trade day. In particular, during the period from October 2016 to May 2022 where only Monday, Wednesday, and Friday expirations are available, the forward periods ending on Wednesdays and Fridays are two trading days long while those ending on Mondays are one trading day long. In our analysis of events starting in the next section, we re-scale abnormal measures of forward premiums per day by the length of the forward period in order to capture the full abnormal equity premium for any event that takes place during the interval.

[Insert Figure 1 here]

Panel B of Table 2 reports summary statistics for the abnormal equity premiums estimated using the baseline QR specification. As in Panel A of the same table, we report equity premium estimates using the SVIX and LBR lower bounds and the IEP measure of equity premiums. Median abnormal equity premiums are, by design, zero across measures of equity premiums. However, mean abnormal equity premiums are positive, reflecting that some forward periods consistently exhibit positive abnormal pricing across trade dates.

Panel C of Internet Appendix Table A3 presents summary statistics of abnormal equity premiums estimated using alternative QR specifications for the forward SVIX. Irrespective of the specification, median abnormal measures of forward equity premiums are consistently zero, while mean abnormal measures of equity premiums are positive. The standard deviation of abnormal equity premiums falls as we include additional conditioning variables in the QR model.

III. Are There Equity Premium Events? What Are They?

In this section we first decompose the variation of our trade date-forward period panel of options-based equity premium measures to assess whether there is evidence of equity premium events. We then employ a purely data-driven approach to understand what happens on equity premium event days.

III.A. Variance Decomposition

To illustrate the full variation in our trade date-forward period panel, Figure 2 shows all observations of the forward SVIX (Panel A) and forward IEP (Panel B) using blue points, with the corresponding median forward measures for each trade day illustrated by the orange series. There is significant time variation in the level of the daily forward equity term structure, as evidenced by the variation in the daily medians. The daily medians of forward premiums increased considerably during the onset of the Covid-19 pandemic in 2020. There is also significant variation in forward premiums across forward periods within each trade date, as evidenced by the dispersion of the blue points around the daily medians, a graphical indication that equity premium events are present and important.

[Insert Figure 2 here]

Table 3 reports results for a variance decomposition to formally quantify the sources of variation in the trade date-forward period panel. We seek to compare the time series variation in (median) equity premiums across trade dates to the typical amount of cross-sectional variation around the median. We report the standard deviation of the time series of trade date-level median measures of forward premiums over our sample period in column (1) and the time series average of trade date-level standard deviations of measures of forward premiums in column (2). The latter measures the typical amount of dispersion of forward premiums on a given trade day. Time series variation in median forward premiums accounts for the majority of the variation in our panel for all option-implied measures of the equity premium (standard deviation of 1.33, 1.73, and 3.69 bps for the SVIX and LBR lower bounds and the IEP, respectively). However, there is also significant variation within trade date, with the average of daily standard deviations being 0.44, 0.51, and 1.17 bps for the SVIX, LBR, and IEP, respectively (see rows (1),(3), and (5)).

[Insert Table 3 here]

Some of this within-trade date dispersion of forward premiums is due to the slope and curvature of the forward term structure. To fully isolate the role of equity premium events, in rows (2), (4), and (6) of the variance decomposition analysis in Table 3, we also report averages of standard deviations calculated within each trade date to measure dispersion of abnormal forward premiums within trade date. These estimates are 0.28, 0.32, and 0.74 bp for the abnormal equity premium measures using the SVIX and LBR lower bounds and the IEP, respectively. Variation of abnormal forward equity premiums within trade date amounts to about 1/5 of the time series variation in the equity premium level across trade dates documented in rows (1), (3), and (5).

Panel A of Figure 3 shows the full time series of average abnormal forward equity premiums, with values for each forward period in our sample averaged across available trade dates. While most forward periods have near-zero abnormal forward premiums, many equity premium events appear in the data, with the frequency of these events being substantially higher since 2022. We identify several forward periods with negative abnormal measures of premiums in our sample, some of which correspond to forward periods during the onset of the Covid-19 pandemic due to significant noise in the estimated equity term structure, likely associated with liquidity issues (Hu, Pan, and Wang (2013)).

[Insert Figure 3 here]

III.B. Which Forward Periods are Significantly Priced and What Happens on These Dates?

We employ a data-driven approach to identify forward periods with the most significant abnormal equity premiums in our sample.[8] While a large literature has examined the drivers of large realized moves in equity markets ((Niederhoffer (1971); Cutler et al. (1988); Kapadia and Zekhnini (2019); Baker et al. (2021); and Aleti and Bollerslev (2025); among others), we provide an ex ante analog to these papers, identifying forward periods which, as of each trade date, consistently had significant abnormal equity premiums. To do so, we first calculate average abnormal forward equity premiums ($A_{e_1:e_2}$) for each of the 1,551 forward periods in our sample by averaging observations for each forward period across available trade dates. With this time series of 1,551 non-overlapping forward periods, we estimate a series of 1,551 separate regressions with an indicator variable $I_{e_1:e_2}$ that is equal to one for one forward period in a given regression, and equal to zero for all other 1,550

[8]Data-driven approaches have been employed in cross-sectional asset pricing, where researchers look for variables that explain stock returns (Chordia, Goyal, and Saretto (2020)) and in corporate finance, where researchers search for outcome variables that are impacted by a given right-hand side variable (Heath, Ringgenberg, Samadi, and Werner (2023)).

forward periods in the time series of average abnormal equity premiums. Each regression is:

$$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \beta I_{e_1:e_2} + \epsilon_{e_1:e_2}, \tag{10}$$

where $H_{e_1:e_2}$ is the length of the forward period in trade days. Across regressions, we vary the forward period for which the indicator variable is equal to one. Because the regressions are estimated using average abnormal forward equity premiums, this empirical approach identifies forward periods with consistently significantly larger abnormal equity premiums relative to other forward periods.

Results are presented using the SVIX lower bound in Table 4, which also reports corresponding estimates for the LBR lower bounds and IEP premium measures. Statistically significant forward periods are sorted in descending order of economic significance measured by $\hat{\beta}$ in column (5) using the SVIX lower bound. $\hat{\beta}$ represents the difference between the abnormal forward equity premium of a given forward period and other forward periods. For statistically significant forward periods which do not fall on days with CPI, FOMC, and NFP releases, we search the online archives of the Wall Street Journal for prescheduled events. We report coefficient estimates for the LBR lower bound and IEP in columns (8) and (11), respectively. Average raw measures of forward premiums over each forward period for the SVIX and LBR lower bounds and the IEP are reported in columns (7), (10), and (13), respectively.

[Insert Table 4 here]

Forward periods associated with statistically significant abnormal pricing span a wide variety of events, including those extensively studied in the literature, such as FOMC announcements, CPI releases, NFP releases, and US presidential elections. The forward period with the largest regression estimate in magnitude spans the 2020 presidential election, with an SVIX lower bound regression coefficient of 7.99 bps with a corresponding SVIX lower bound of 13.50 bps. The estimated SVIX regression coefficient for the forward period spanning the January 12, 2023, CPI release is proportionally the largest, with an abnormal forward equity premium regression estimate of 4.99 bps and a corresponding SVIX lower bound of 6.61 bps.

Forward periods spanning 10 CPI releases, mostly during the 2022-2023 inflationary period and monetary tightening cycle, are significantly priced in our sample. The CPI release with the largest abnormal and raw risk premium in our sample is the January 12, 2023, release.

7 NFP releases that occur between 2020 and 2023 have significantly higher abnormal equity premiums in our sample. The NFP release in April 2020 had the largest abnormal and raw equity premium (regression estimate of 2.66 bps, SVIX lower bound of 20.15 bps, IEP of 54.24 bps).

14 FOMC meetings are associated with significant abnormal forward premiums, making FOMC meetings the most frequently priced event type in our sample. The March 2023 FOMC meeting exhibits the largest abnormal premium (regression estimate of 3.22 bps, SVIX lower bound of 4.64 bps), while the March 2022 meeting exhibits the largest raw measures (SVIX lower bound of 8.02 bps and IEP premium of 20.45 bps).

Of the recurring events with significant abnormal pricing, presidential elections are associated with the largest average abnormal premiums in our sample, with the estimated premiums being multiple times larger than on other days for the 2016, 2020, and 2024 elections. However, these elections still comprise a small portion of the total equity premium in our sample, as these events occur much less frequently than macroeconomic releases and monetary policy announcements.

Our data-driven approach also detects several less studied events in the literature as having abnormal U.S. equity pricing. These events include U.S. midterm elections (1.34 bps abnormal equity premium regression estimate, 4.52 bps SVIX lower bound, and 12.29 bps IEP premium for the 2018 midterms), the 2021 Georgia Congressional runoff (2.54 bps regression estimate, 6.45 bps SVIX lower bound, and 17.12 bps IEP), the June 2019 Trump-Xi G-20 Bilateral (regression estimate of 1.52 bps, SVIX lower bound of 2.65 bps, and IEP of 7.17 bps), the August 2024 NVIDIA earnings release (0.91 bp regression estimate, 2.21 bps SVIX lower bound, and 5.65 bps IEP), and the 2017 French presidential election first round and subsequent runoff (1.60 bps regression estimate, 2.31 bps SVIX lower bound, and 5.92 bps IEP for the runoff).

Three additional forward periods ending in March and April 2020 during the onset of the Covid-19 pandemic in the U.S. are also associated with statistically significant regression estimates. These dates, however, do not seem to be explained by events that could have been anticipated by markets sufficiently in advance, and are likely due to significant noise in the estimated equity term structure during the onset of Covid-19 discussed in Section II.C.

Results when estimating the regressions using the LBR lower bound and IEP measures are qualitatively similar, with regression coefficients being larger in magnitude.[9]

While market participants and policymakers may not want to miss potentially important events, we also account for multiple testing concerns (Harvey, Liu, and Zhu (2016); Heath et al. (2023)) in light of our data-driven approach, using multiple testing adjusted p-values. We consider the Family-wise Error Rate (FWER), defined as the probability of making one or more false rejections given all tests considered, and the False Discovery Rate (FDR), which measures the expected value of the ratio of false rejections to total rejections across all tests considered. We use the Holm (1979) p-value correction to control the FWER and the Benjamini and Hochberg (1995) p-value correction to control the FDR.[10] Since the number of tests under consideration in our data is large (> 1000), the FWER is relatively conservative, as it controls for the probability of even one false positive. We find that the 18 (23) forward periods with the largest regression estimates in our sample are statistically significant after controlling the FWER (FDR).

Panel B of Figure 3 reports measures of average abnormal forward equity premiums for different event types using the SVIX lower bound. Forward periods spanning CPI (red dots), FOMC (green dots), NFP (yellow dots), and U.S. presidential and midterm elections (purple dots) are marked separately. Not all CPI, FOMC, and NFP are significantly abnormally priced, with substantial variation in the abnormal equity premium for macroeconomic releases across release dates. We examine the full cross-section of macroeconomic releases in Section IV and, in Section V, we introduce a conceptual framework to further explore the variation in abnormal equity premiums across time for a given macroeconomic release type.

IV. Realized Excess Returns and Option-Implied Expected Returns on U.S. Macro Announcement Dates

Considering that realized excess returns are a noisy proxy of expected returns, an important use of option-implied equity premium measures is to assess whether these measures lead to different conclusions regarding the additional equity premium investors require for FOMC and other macroe-

[9]In terms of which dates are significant, results are similar when we construct forward expected log return measures using the Gao and Martin (2021) LVIX lower bound. These results are reported in Internet Appendix Table A5.

[10]Since the indicator variables across regressions are uncorrelated, bootstrap-based methods (e.g. Romano and Wolf (2016)) do not improve power.

conomic announcement days compared to previous estimates based on average excess returns (Savor and Wilson (2013); Lucca and Moench (2015); Ai and Bansal (2018); Hu, Pan, Wang, and Zhu (2022)). There are two questions related to this issue. First, do the same macro announcements appear important for the equity premium? Second, how do the estimated magnitudes of the additional equity premium on macro release days based on option-implied equity premium measures compare to those from realized excess returns?

Regarding the first question, we confirm the choice of Savor and Wilson (2013) to focus on FOMC, NFP, and inflation announcements. As for the second question, while option-implied equity premium measures are elevated on macro announcement days, we document that the magnitude of the extra equity premium on macro release dates is substantially smaller based on options-implied equity premiums than what the literature has found based on realized excess returns. We partly (but not fully) reconcile the differing magnitudes across approaches. We provide evidence (based on a longer sample) that the large average excess returns earned on macro release dates documented in the previous literature likely in part reflect ex post good news. Furthermore, we document that true equity premiums appear to move more than one-for-one with options-implied equity premiums.

IV.A. Which Macro Releases are Important for the Equity Premium?

It is possible that the realized return literature on macro announcements has focused on announcements for which average excess returns happened to be abnormally high due to good stock market news ex post for reasons unrelated to the announcements (Ernst et al. (2019); Ghaderi and Seo (2024)) or due to the announcements, on average, containing good news about the variable announced (Cieslak et al. (2019) regarding FOMC meetings). To further explore this issue, we examine realized excess returns and option-implied measures of equity premiums for the full cross-section of U.S. macroeconomic variables tracked by the Bloomberg Economic Calendar.[11] To do so, we estimate the following regression using the time series of daily excess returns:

$$r_t^{mkt} - r_t^f = \alpha + \Sigma_{m=1}^M \left(\gamma_m I_{m,t}\right) + \delta I_t^{election} + \epsilon_t, \tag{11}$$

[11] Since several variables are released at the same time as part of a given release, we group the 125 U.S. variables tracked in the Bloomberg Economic Calendar into the 45 underlying releases and perform our analysis at the release level. Our grouping methodology is detailed in Internet Appendix C. We use GDP release dates from the Fed's ALFRED database to capture both the advance, second, and third releases.

where $r_t^{mkt} - r_t^f$ is the excess return of the market on date t, $I_{m,t}$ for $m = 1, ..., M$ are separate indicator variables for all 45 macroeconomic releases in our sample, and $I_t^{election}$ is an additional indicator variable for presidential and midterm elections.

Regression estimates for all 45 macroeconomic release indicators are reported in Figure 4. These estimates are based on daily data from October 1996 to December 2024. Releases that are statistically significant at the 10% level or better are labeled by name, while statistically insignificant releases are labeled by number as indexed in Internet Appendix Table A4. Panel A reports the additional excess returns per release, $\widehat{\gamma_m}$, and Panel B reports additional excess returns per year ($\widehat{\gamma_m}$ times the number of releases per year for release m), with releases sorted on the horizontal axis by their Bloomberg relevance rank (1=most relevant).

[Insert Figure 4 here]

A key takeaway from Figure 4 is the difficulty of using realized excess returns to estimate equity premiums. There is a wide dispersion in average excess returns across release types within what is a relatively long sample of 28 years of data. There are several announcements—NFP, FOMC, ISM, Pending Home Sales, and the Chicago Fed National Activity Index—with statistically significant realized excess returns that average over 15 bps per release more than excess returns on non-announcement dates. On first inspection, this may be consistent with a quantitatively large macroeconomic announcement equity premium previously documented in the literature. However, Pending Home Sales and the Chicago Fed National Activity Index are not highly ranked releases based on the Bloomberg relevance score, making it unlikely that these releases would have a substantially larger equity premium than non-announcement dates. Furthermore, there are several announcements with equally large negative average excess return effects, below -15 bps per release. Of these, the effect for Wholesale Inventories and the FHFA House Price Index are estimated to be statistically significant. These findings suggest that the high volatility of realized returns makes it challenging to estimate abnormal equity premiums for macro releases from realized excess returns and that multiple testing may be an issue when estimating equation (11). Consistent with this concern, we find that, with multiple testing adjusted p-values (Holm p-values), none of the announcements in Figure 4 are statistically significant.

The option-implied equity premium measures provide a useful alternative from which to guide researchers and practitioners on the individual releases and release types that are ex ante priced.

Subject to the underlying theoretical assumptions made for these measures, we obtain observable ex ante measures of the equity premium, thus avoiding a need to estimate equity premiums by averaging realized excess returns. Using the option-implied equity premium measures, we estimate a similar regression to that in equation (11), but using the time series of average abnormal equity premiums as the dependent variable instead of realized excess returns:

$$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \Sigma_{m=1}^{M} \left(\gamma_m I_{m,e_1:e_2} \right) + \delta I_{e_1:e_2}^{election} + \epsilon_{e_1:e_2}, \tag{12}$$

where $A_{e_1:e_2}$ is the average abnormal forward equity premium per trade day for either the SVIX lower bound or the IEP measure of expected returns for forward period $e_1 : e_2$, $H_{e_1:e_2}$ is the length of the forward period in trade days (one day or two days), $I_{m,e_1:e_2}$ for $m = 1, ..., M$ correspond, as before, to separate indicator variables for all 45 macroeconomic releases in our sample, and $I_{e_1:e_2}^{election}$ is an additional indicator variable for presidential and midterm elections.

[Insert Figure 5 here]

Figure 5 Panel A reports regression estimates for all 45 macroeconomic release indicators for the regression using abnormal equity premiums based on the SVIX lower bound (left chart) and IEP (right chart).[12] As with Figure 4, statistically significant releases are labeled by name while statistically insignificant releases are labeled by Bloomberg relevance rank.

FOMC, NFP, and CPI releases are highly statistically significant in our sample, indicating that these releases have elevated measures of equity premiums relative to non-announcement dates, with t-statistics of 6.88, 4.50, and 4.02 respectively (see Internet Appendix Table A6). Unlike the realized return analysis, each of these announcements is also still significant using Holm p-values to adjust for multiple hypothesis testing.[13] The evidence from option prices thus suggests that the three releases—FOMC, NFP, and inflation—considered in the seminal realized return study of Savor and Wilson (2013) are the most economically important and statistically robust. In contrast, while ISM, Pending Home Sales and the Chicago Fed National Activity Index appear important for

[12]For reference, tabular results for the SVIX lower bound are also presented in Internet Appendix Table A6 and the corresponding figure for the LBR is reported in Internet Appendix Figure A1.

[13]The fact that FOMC, NFP and CPI release are the important releases, economically and statistically, is robust to using expected log returns, with results for LVIX and LLBR reported in Internet Appendix Figure A1. No other macro releases are economically significant nor statistically robust when adjusting for multiple hypothesis testing.

the equity premium based on realized excess returns in the post-1996 sample, option-implied equity premium measures do not support an interpretation of these releases as equity premium events.

IV.B. How Large is the Equity Premium for Macro Releases Based on Options-Implied Equity Premiums?

Beyond the question of which releases are priced, a comparison between Figure 4 and Figure 5 also sheds light on differences in the quantitative magnitude of the release premiums. For example, while the additional average realized excess returns on FOMC days is estimated to be 25 bps per release from regression (11), the regression coefficient for FOMC days is a much smaller 0.68 bp (1.76 bps) using the forward SVIX lower bound (IEP) measure when estimating regression (12). The large wedge between the abnormal realized excess return and the abnormal ex ante equity premium suggests that the initial finding of Savor and Wilson (2013) that over 50 percent of the equity premium is realized on just FOMC, NFP, and inflation release days and the finding of Lucca and Moench (2015) that 80 percent of the equity premium is realized around FOMC meetings may not fully reflect risk compensation.

To explore quantitative magnitudes further, Table 5 examines what proportion of total forward equity premiums is due to forward periods spanning CPI, FOMC, and NFP releases. We average forward equity premiums across available trade dates separately for each forward period. We then calculate the proportion of the total equity premium in our sample that forward periods spanning CPI, FOMC, and NFP releases account for. We also report the average total forward equity premium per period for each release type and for all three release types pooled together. These results are presented in Panel A for the SVIX lower bound, Panel B for the LBR lower bound, and Panel C for the IEP measure.

[Insert Table 5 here]

For the full sample, the average forward premium is 1.87, 2.22, and 4.90 bps per period for the SVIX lower bound, LBR lower bound, and IEP measure, respectively. Of the three releases, FOMC releases are associated with the largest average forward premium (7.20 bps per forward period, 58 bps per year for the IEP).

For all measures of forward equity premiums, equity premiums for forward periods spanning CPI, FOMC, and NFP releases comprise approximately 22% of the total equity premium across all forward periods in our sample, a proportion that is only modestly larger than the 16% of all forward periods which span these releases. Both the average magnitude of equity premium measures for these releases and the share of total equity premium measures in our sample accounted for by these releases are quantitatively far from previous results using realized returns.[14]

IV.C. Reconciling the Differing Magnitudes Across Approaches

We explore several possible explanations to potentially reconcile the different magnitudes of macro announcement release effects on the equity premium between the realized excess return approach and the option-implied equity premium approach. First, good news ex post could be driving up average excess return effects over the samples used in Savor and Wilson (2013), Lucca and Moench (2015), and subsequent papers. Second, the sample from October 2016 through 2024 for which our option-implied forward estimates of macro release equity premiums are available may be unrepresentative. Third, the three option-implied equity premium measures that we use may be inaccurate in the sense of not moving one-for-one with the true equity premium.

IV.C.1. Nearly a Century of Macro Releases

To test the representativeness of previous samples examining realized excess returns around macroeconomic announcements, we provide novel out-of-sample evidence based on data both prior to and following the sample periods of Savor and Wilson (2013) and Lucca and Moench (2015).[15] For out-of-sample data prior to existing samples, we hand-collect historical data for FOMC meetings and NFP and CPI releases dating as far back as 1928. We obtain FOMC meeting dates since 1936 from the Federal Reserve Board webpage. NFP release dates since 1928 and CPI release dates since 1941 are obtained from historical newspapers via ProQuest as well as from documents from the National Archives. Internet Appendix D describes our data collection methodology in more detail.

[14] Our results are robust to adding neighboring forward periods which precede and follow releases. They are also robust to using expected log returns, see Internet Appendix Table A7.

[15] This analysis is similar in spirit to the approach taken by Linnainmaa and Roberts (2018) in their analysis of the cross-section of equity returns.

Table 6 column (1) summarizes the results from the 1958-2009 sample of Savor and Wilson (2013). They used CPI releases from 1958-1971 and PPI releases from 1971-2009 because PPI was typically released before CPI in a given month between 1971 and 2009. They furthermore used FOMC announcements from 1978-2009. To better understand the role of each of the three release types, we report separate effects rather than pooling the three release types as in Savor and Wilson (2013). Consistent with Savor and Wilson (2013), excess returns on days with FOMC announcements or macroeconomic releases are substantially higher than on other days. FOMC announcements have the highest excess returns with average realized excess returns being 21.66 bps per day larger than on non-announcement days, followed by NFP announcements (7.36 bps larger per day), and CPI/PPI announcements (4.59 bps larger per day, though statistically insignificant).

Column (2) in Table 6 shows that the extra excess return on FOMC announcement days is even larger at 34 bps per day over the shorter sample of Lucca and Moench (2015) from September 1994 through March 2011.

[Insert Table 6 here]

Extended sample results are reported in Table 6 column (3), and results for the pre- and post-Savor and Wilson (2013) samples are decomposed in columns (4) to (6). For the extended FOMC sample in column (3) (using FOMC meetings from 1936-2024), average realized excess returns are 11.84 bps per day larger than on non-announcement dates, with these average returns being 6.85 to 9.55 bps higher per day in the post- and pre-out-of-sample periods, respectively, though statistically insignificant at standard confidence levels. Our post-out-of-sample results for FOMC releases in the first row of column (6) are qualitatively similar to other post-out-of-sample examinations (Cieslak et al. (2019); Kurov, Wolfe, and Gilbert (2021)). These findings suggest that the magnitudes of the FOMC announcement premium estimated in the Savor and Wilson (2013) sample, and, especially, the Lucca and Moench (2015) sample implying excess returns of 34 bp per day, are unrepresentative. As for NFP, the NFP release day excess returns are 7.16 bps per day higher over the period 1928-2024, which is consistent with the effect in the Savor and Wilson (2013) sample period of 7.36 bps per day. Excess returns on NFP days are elevated in both the pre and post out-of-sample periods, with effects of 7.47 bps and 5.16 bps per day, respectively. For inflation days, we do not find evidence of materially higher average excess returns over the full sample period, and these releases were not statistically significant in the Savor and Wilson (2013) sample period.

In summary, the results presented in Table 6 are consistent with a long-sample NFP equity premium magnitude similar to that in Savor and Wilson (2013), while some of the FOMC effect in Savor and Wilson (2013), and, especially, Lucca and Moench (2015), does not extend out of sample and may be due, in part, to unexpected good news. This novel evidence complements that of Cieslak et al. (2019), who provide evidence of falling equity premiums on FOMC announcement dates. Elaborating on that result, Knox and Vissing-Jorgensen (2025) provide evidence of good equity premium news on FOMC announcement days. They show that the post-FOMC declines in equity premiums for longer maturities exceed declines for shorter maturities on FOMC days by 5 to 12 bps. This evidence implies a role for good news ex post on FOMC days rather than lower equity premiums being due only to the run-off in the equity premium for the FOMC day itself (Savor and Wilson (2013); Hu et al. (2022)). Ghaderi and Seo (2024) also provide evidence using Markov chain Monte Carlo estimation suggesting that previous estimates of the macroeconomic release premium may reflect ex post good news for the stock market. That said, the FOMC and NFP effects are 12 bps and 7 bps even in the long sample between 1928 and 2024, still larger than the corresponding effects based on option-implied equity premiums summarized in Table 7, which are all 1.62 bps or smaller, depending on the equity premium measure considered, for the sample between 2016 and 2024. The regressions in Table 7 are similar to those in Figure 5, but without controlling for the 42 other macro releases for expositional purposes. Results are quantitatively similar to those in Figure 5.

[Insert Table 7 here]

IV.C.2. Extended Sample Analysis of Option-Implied Measures

The second possibility we consider to explain the gap between the estimated FOMC and NFP effects on the equity premium from realized excess returns and option-implied equity premium measures is that the 2016-2024 sample may be unrepresentative of the magnitude of equity premiums on announcement days. In particular, it may be the case that the recent period was a time period where option-implied measures of expected returns associated with macroeconomic releases were lower compared to previous time periods. To assess this possibility, we develop tests for options-implied equity premiums that are implementable within the data constraints of an extended sample going back to 2009 for which weekly options are available.

Table 8 reports results for tests where we use Friday S&P 500 Weekly expirations and compute option-implied equity premium measures as of the end of the day before Wednesday FOMC announcements and as of the end of the day before Friday NFP releases, in Panel A and B, respectively. This approach is used throughout the sample 2009-2024. Column (1) reports results for the entire 2009-2024 sample period while columns (2) and (3) report results for the January 2009-September 2016 and October 2016-December 2024 subsamples, respectively. In Panel A, the estimated FOMC equity premiums in the January 2009-September 2016 subsample are statistically indistinguishable from corresponding estimates in our main sample, which suggests that option-implied equity premiums were not larger for FOMC days during pre-2016 sample. Panel B reaches the same conclusion regarding NFP equity premiums.[16]

[Insert Table 8 here]

IV.C.3. Accuracy of Option-Implied Equity Premiums: Predictive Regressions

The last potential explanation for the gap between FOMC and NFP equity premium effects based on realized excess returns and options-based methods we explore is inaccuracy of the latter. After all, option-implied equity premium measures rely on various underlying assumptions and require quality options price data to estimate. In particular, it could be the case that the option-implied equity premiums we use do not vary enough with the true equity premium, and, thus, these measures do not increase enough on macroeconomic release dates.

To explore this possibility, we run regressions of realized excess returns on ex ante option-implied equity premium measures. The regressions take the form

$$\tilde{R}_{t:e} = \alpha + \beta E_t(\tilde{R}_{t:e}) + \epsilon_{t:e}, \tag{13}$$

where $\tilde{R}_{t:e}$ is the realized excess return from date t to date e, and $E_t(\tilde{R}_{t:e})$ is the option-implied equity premium for the same period, as perceived at date t. The coefficient β will capture how much the true equity premium moves with the option-implied measure. We focus on relatively short horizons (1-week and 2-days) compared to the literature which has found evidence of return

[16]We note that the FOMC release premiums in this analysis are substantially larger than corresponding NFP premiums partly because the former use options with three days to expiration while the latter use options with one day to expiration.

predictability using option-implied measures of the equity premium at the 1-month horizon and longer (Martin (2017); Chabi-Yo and Loudis (2020); Back et al. (2022); Tetlock et al. (2024); and Martin (2025)).[17]

The results are reported in Table 9. We report results for various samples based on available options expirations. Tetlock et al. (2024) remove days associated with market stress, where the assumption of costless arbitrage underlying their measure may be violated, and Schreindorfer and Sichert (2025) provide evidence that the Negative Correlation Condition of Martin (2017) is violated during periods of extreme volatility, resulting in the SVIX being too large. Estimation results can also be biased by expectation errors regarding volatility (Lochstoer and Muir (2022)), which may be particularly important when volatility is far from its average. Accordingly, we winsorize the sample's dependent and independent variables at the 5th and 95 percentile to reduce the influence of outliers on parameter estimates.

[Insert Table 9 here]

Panel A of Table 9 documents that the coefficient from predicting realized excess returns with the SVIX lower bound is in the range of 2.16 to 3.82 across table columns, which supports the interpretation that the SVIX lower bound is slack at these horizons (this has also been documented for longer horizons in recent data, see Back et al. (2022) and Martin (2025)). Taking our estimates at face value, Table 9 suggests that we should multiply estimated FOMC effects in Table 7 for SVIX by a factor of 2 to 4. With an average FOMC effect of 0.6 bp per meeting based on the SVIX lower bound, this would still leave an additional estimated equity premium on FOMC days of 2.4 bps or less, substantially below the 12 bps estimate from realized excess returns in the long sample (see Table 6). The conclusion is similar using the estimates based on the tighter LBR lower bound, as presented in Table 9 Panel B.

Table 9 Panel C presents the results with the IEP measure of the equity premium, with estimated coefficients in this case much closer to 1, ranging from 1.21 to 1.51 across columns. These coefficients indicate that the variation in the observed IEP measure may be closer to the variation in the actual equity premium, consistent with this measure being a point estimate rather than a lower bound

[17] These tests relate to the large literature empirically examining the risk-return tradeoff and illustrating that sample size and volatility specifications are particularly important when using realized returns (Ghysels, Santa-Clara, and Valkanov (2005); Lundblad (2007); among others).

(as is the case for the SVIX and LBR) of equity premiums. That said, the coefficients greater than one still suggest we should multiply FOMC effects in Table 7 for IEP by a factor of up to 1.5. This factor, combined with the larger average FOMC effect of 1.6 bps per meeting under the IEP measure in Table 7, implies that the additional equity premium on FOMC days is similar to our estimate with the SVIX and LBR lower bounds and still substantially lower than additional realized excess return estimates in previous studies.

It is possible that the adjustment coefficients estimated in Table 9 vary across time periods (Back et al. (2022)) or on specific days related to macro announcements.[18] Assessing whether this is the case empirically with precision will ultimately require more data.[19]

IV.C.4. Summary of reconciliation results

Our fully ex ante option-implied approach provides robust evidence that FOMC, NFP, and CPI releases are associated with higher equity premiums relative to non-announcement days during our 2016-2024 sample period. The economic magnitudes associated with these releases are, however, significantly smaller based on our ex-ante approach than previous studies using realized returns. For FOMC announcements specifically, the abnormal equity premium for these announcements is about 1 bp using the option-implied approach, much lower than the 34 bps abnormal average excess return effect in the sample of Lucca and Moench (2015). Both approaches appear to have issues. The FOMC effect on the equity premium is much smaller at 12 bps when realized excess returns are used over an extended sample (1928-2024), implying that while FOMC effects documented in the previous literature in part reflect risk compensation, they also likely reflect ex post good news. As for the FOMC effect on the equity premium using the option-implied approach, it increases to about 2 bps when accounting for option-implied equity premiums not moving as much as true equity premiums. For FOMC, as well as for NFP, some discrepancy thus remains across approaches, while CPI effects appear less robust in the realized return approach.

[18] On the latter, Ai and Bansal (2018) theoretically examine the property of Generalized Risk Sensitivity when separately modeling announcement SDFs and corresponding equity premiums.

[19] It is important to note that the elevated FOMC option-implied premiums we document do not simply reflect higher physical risk for these days. Lucca and Moench (2015) show that the high excess returns on FOMC days are earned before the announcement during a period where volatility is abnormally low. Also, using various approaches to measure expected physical variance, including lagged release physical variance, Londono and Samadi (2023) find evidence of FOMC release variance risk premiums.

V. Asset Pricing Framework for Macroeconomic Release Premiums

A strength of the option-implied approach is that one can estimate equity premiums for each individual release date. This allows for the examination of time variation in equity premiums for particular event types in a way that is statistically difficult when estimating equity premiums from realized excess returns. In this section, we propose an asset pricing framework to understand the drivers of abnormal equity premiums on macroeconomic release days. We apply this framework to gain intuition for CPI-release risk premiums and, in particular, for the period of elevated CPI risk premium measures between June 2022 and June 2023. While we do not pursue it here, the asset pricing framework can also be used to understand differences in equity premium effects across types of macro announcement, as opposed to over time for a given announcement type.

V.A. Conceptual Framework

We start from the basic asset-pricing equation with a representative investor, $E_t\left(R_{t+1}\, M_{t+1}\right) = 1$, where R_{t+1} is the realized stock market return on day $t+1$ and M_{t+1} is the stochastic discount factor (SDF). The expected stock market excess return $\mu_t = E_t\left(R_{t+1}\right) - R^F_{t+1}$ can then be expressed as:

$$\mu_t = -R^f_{t+1} Cov_t\left(R_{t+1}\, M_{t+1}\right), \tag{14}$$

where R^f_{t+1} is the (gross) risk-free rate on day $t+1$.

Consider a macroeconomic data release day m where news η_{t+1} is released. The realized excess return on the release day can be expressed as follows:

$$R_{t+1} - R^f_{t+1} = \mu^m_t + \beta^R_t \eta_{t+1} + \epsilon_{t+1}, \tag{15}$$

where μ^m_t is the macroeconomic release day equity premium, β^R_t is the sensitivity of the market return to the news released, and ϵ^R_{t+1} is the residual return; i.e., the portion of the return that is unrelated to the macroeconomic news.

From equations (14) and (15), the equity premium for the macroeconomic data release day m

is:

$$
\begin{aligned}
\mu_t^m &= -R_{t+1}^f Cov_t\left(R_{t+1}, M_{t+1}\right) \\
&= -R_{t+1}^f \beta_t^R Cov_t\left(\eta_{t+1}, M_{t+1}\right) - R_{t+1}^f Cov_t\left(\epsilon_{t+1}, M_{t+1}\right).
\end{aligned}
$$

Assuming the residual return ϵ_{t+1} on a release day has the same covariance with the SDF as returns on surrounding non-release days, i.e., $Cov_t\left(\epsilon_{t+1}^R, M_{t+1}\right) = Cov_t\left(R_{t+1}, M_{t+1}\right)$, and noting that $\mu_t = -R_{t+1}^f Cov_t\left(R_{t+1}, M_{t+1}\right)$, then, the abnormal equity premium on a macroeconomic release day is:

$$
\mu_t^m - \mu_t = -R_{t+1}^F \beta_t^R Cov_t\left(\eta_{t+1}, M_{t+1}\right). \tag{16}
$$

Defining the sensitivity of the SDF to the release news as $\beta_t^M = \frac{Cov_t(\eta_{t+1}, M_{t+1})}{Var_t(\eta_{t+1})}$, we have the following result for abnormal release day risk premiums:

Result 1 (Abnormal release day equity premiums) *Assuming arbitrage-free markets (equation (14)) and a linear sensitivity of returns to announcement news (equation (15)), the abnormal equity premium on a macroeconomic release day m is:*

$$
\mu_t^m - \mu_t = -R_{t+1}^F \beta_t^R \beta_t^M \sigma_t^2(\eta_{t+1}) \approx -\beta_t^R \beta_t^M \sigma_t^2(\eta_{t+1}), \tag{17}
$$

where $R_{t+1}^F \approx 1$ is the gross risk-free rate on day $t+1$, β_t^R is the return sensitivity to the macroeconomic news released, β_t^M is the stochastic discount factor sensitivity to the macroeconomic news released, and $\sigma_t^2(\eta_{t+1})$ is the conditional variance of released news.

Result 1 implies that the drivers of abnormal risk premiums can be grouped into the following two key determining factors:

1. the quantity of news released on the day: $\sigma_t^2(\eta_{t+1})$
2. the sensitivities to news released on the day: $-\beta_t^R \beta_t^M$.

Variation in macroeconomic release equity premiums, whether it is the variation over time for a given macroeconomic release type or variation across different macroeconomic release types within a given period of time, is thus due to variation in the amount of news released (news variance) or in the sensitivity of returns or the SDF to a given unit of released news.

V.B. Application to CPI Releases

We apply our conceptual framework to shed light on the time series variation in the CPI release abnormal equity premium during our main sample period 2016-2024. The top panel of Figure 6 reports the time series of the abnormal equity premiums (based on the SVIX lower bound) for all CPI releases, with the shaded area highlighting the period of elevated measures of CPI release premiums between June 2022 and June 2023. Abnormal CPI release premiums reached a peak of 4.99 bps midway through this period for the January 12, 2023, CPI release.

[Insert Figure 6 here]

To understand this variation in CPI release premiums, we first consider the role of the quantity of CPI news released on CPI days. The estimated time series of $\sigma_t^2(\eta_{t+1})$ is plotted on the left-hand-side of Figure 6 Panel B, where we estimate the conditional variance of CPI release day news using a GARCH(1,5) model on the release surprises.[20] The GARCH model specification is selected using the BIC for the optimal number of lags. Interestingly, the conditional variance of CPI release news peaks at the end of 2021, before the period of elevated abnormal release premiums that begins in summer 2022. The rise in CPI-release news variance in 2021 reflects a period where the largest CPI release surprises occurred. In fact, the two largest CPI release shocks occur at the May 12, 2021, and July 13, 2021, releases, with month-on-month headline CPI being 60 bps and 40 bps above forecaster consensus at these releases, respectively.[21] Given that the elevated CPI risk premiums in the June 2022 to June 2023 period do not line up well with the time-series of CPI-release news variance, there is also a role for elevated $-\beta_t^R \beta_t^M$ during the June 2022 to June 2023 period. To show this, on the right-hand-side of Figure 6 Panel B, we rearrange equation (17) and compute

[20]Release surprises are defined as the difference between the actual data release and the median Bloomberg forecast for CPI. We use month-on-month CPI changes and compute a surprise for both headline and core releases, taking an equal-weighted average of the two.

[21]To get a sense of the timeline of CPI surprises and monetary policy reactions, headline year-on-year CPI in the U.S. first passed 3 percent at the April 2021 CPI release and reached its peak of 8.9 percent at the June 2022 CPI release. The Federal Reserve began its tightening cycle at the March 2022 meeting.

the implied product of betas from the observed abnormal equity premiums and the estimated news variance.

While the SDF M, and thus β_t^M, is not observable, we do observe the stock market responses to CPI release surprises and, therefore, we can compute β_t^R empirically. Specifically, for a given CPI release, we compute the return of near-month E-mini S&P 500 Futures from 8:20 am (10 minutes before the CPI data release) to 8:50 am (20 minutes after the CPI data release) and divide the high frequency data-release return by the release surprise. This method is conceptually close to estimating rolling regressions (without a constant) of returns on surprises to extract conditional betas. However, our approach yields a measure of the sensitivity of the stock market for each individual release, which should map closely to the ex ante risk premium for that specific release day. The cost to this approach is that when the CPI surprise on a particular release day is close to zero, the return sensitivity is not identified. In these cases, where the average of the headline and core CPI surprises is less than 5 bps, we use the lagged return sensitivity as measured at the previous CPI-release date.

The red line in Figure 6 Panel C plots the measured beta of the stock market to CPI news at the release day frequency. In the period of elevated abnormal equity premiums, there were very large stock market responses to CPI release surprises. The largest CPI release beta was observed at the October 13, 2022, CPI release where, following a 20 bps higher CPI print than forecast, the stock market declined 324 bps over the 30 minute window. The measured sensitivity was $\beta_t^R = -16.2$. Figure 6 Panel C also plots the implied β_t^M, which, as one would expect, is negatively correlated with β_t^R.

Our analysis indicates that CPI release abnormal equity premiums reached elevated levels in 2022 and 2023 amid a somewhat elevated variance of news shocks and very high sensitivity of stock returns and the SDF to the releases of inflation news. Panel D of Figure 6 explores one potential driver of this increase in sensitivity, which is an increase in longer-term inflation uncertainty. The Federal Reserve's Survey of Primary Dealers collects survey participants' probability density function for annual average inflation over the next five years and presents the average distribution across participants in the public survey release. From this forecast distribution, we compute the variance of the average forecasts PDF and plot this variance against CPI release-day return sensitivities. As can be seen, announcement equity premiums and return sensitivities peak around the same time as long-term inflation uncertainty, which is consistent with models where the informativeness of a release for the future course of the economy can be a key driver of announcement premiums (Ai and Bansal (2018)). In particular, during a period of elevated inflation uncertainty, CPI releases may allow investors to learn about the persistence of inflation and thus the degree of monetary policy restrictiveness needed to return it to target.

VI. Pricing the Calendar

Since end of day option prices can be obtained in real time, the methodology to estimate abnormal equity premiums developed in this paper can be used to estimate the market pricing of upcoming events on the economic and political calendar. Forward measures of equity premiums for the upcoming month of daily forward periods are available at www.pricingthecalendar.com.

VI.A. Pricing the Economic Calendar

In Table 10, we provide an example of how our empirical framework can be applied to the economic calendar for the upcoming month of forward periods as of August 8, 2025. The table presents forward raw equity premiums and abnormal forward equity premiums using the SVIX lower bound, which only requires end-of-day option prices (as opposed to the IEP). We report select releases that occur during each forward period. Abnormal forward equity premiums falling above the top 80th percentile with respect to a historical distribution starting in August 2022 soon after the introduction of daily option expirations on the S&P 500 are highlighted. Shading goes from yellow (80th percentile) to red (maximum historical value). In this example, the forward period ending on August 12 (CPI), August 22 (Jackson Hole), August 28 (NVIDIA Earnings, among others), and September 5 (NFP) all have elevated abnormal forward premiums of varying magnitudes.

[Insert Table 10 here]

Given the significant variation documented with regard to which releases matter at a given point in time, this empirical framework can help us identify which upcoming events are perceived by markets to be more important on any given day.

VI.B. Pricing an Event Over Time

Since our approach is based on the forward equity term structure, it can also be used to monitor the importance of an upcoming event over time. To illustrate this application, Figure 7 reports the evolution of the abnormal forward equity premium based on the SVIX lower bound for the forward period that covers the day of the 2024 U.S. presidential election. We illustate the evolution over the month preceding the election. Conceptually, variation in abnormal forward equity premiums could reflect both (i) the market's changing perception about the uncertainty of who will win and (ii) changing betas of the market or the SDF with respect to election news. In that context, a decline in this equity premium over the month preceding the election suggests either that there was less perceived remaining uncertainty about the outcome of the election, that the perceived policy differences between the two candidates diminished over time, or that markets became less concerned about the potential implications of a close election outcome. Evidence from prediction markets suggests a key role for the uncertainty of who will win the election. We obtain prediction market implied win probabilities for the republican candidate from UBS. UBS collects prediction market implied probabilities from leading prediction markets and averages implied probabilities across markets. As indicated in the figure, the abnormal forward equity premium for the election declined over the preceding month as market implied probabilities of the republican candidate winning increased from around 50% (maximum uncertainty) to around 65%, suggesting some resolution of uncertainty over time.

[Insert Figure 7 here]

VII. Conclusion

We exploit the fine grid of option expirations on the S&P 500 since 2016 along with option-implied measures of the equity premium to estimate forward equity premiums from October 2016 through December 2024. We develop a new methodology for identifying equity premium events, which we define as days with abnormally high measures of equity premiums relative to surrounding dates. We document four main results.

First, equity premium events are prevalent, with the cross-expiration standard deviation on a given calendar date about 1/5 the size of the time series variation in the median equity premium.

Second, using a data-driven approach, we study what happens on event dates. A wide variety of events are important to equity investors. These events include well-studied macroeconomic releases, including monetary policy announcements, as well as presidential elections and several less studied economic and political events.

Third, among macroeconomic releases, option-implied measures of equity premiums suggest that the most important are FOMC, NFP, and CPI. While these releases have significantly higher option-implied equity premiums relative to the daily equity term structure, equity premiums on these release days account for a smaller fraction of the overall equity premium compared to previous estimates using average realized excess returns to measure equity premiums. We partially reconcile these differing magnitudes by showing that using a longer sample for realized returns from 1928-2024 results in a much smaller FOMC effect of 12 bps than in prior work on shorter samples. Furthermore, option-implied equity premium measures appear to move less than true equity premiums.

Fourth, we develop a simple asset pricing framework and show that event risk premiums are driven by both the quantity of news (news variance) and the sensitivities of the stock market return and the stochastic discount factor to the news. These drivers vary over time, thus rationalizing variation in the equity premium for a given announcement type over time, including the elevated levels of CPI option-implied equity premiums between June 2022 and June 2023.

Importantly, since option-implied forward premiums can be estimated in real time, our approach can be applied to the upcoming economic and political calendar to assess which upcoming events the market perceives to be important at a given point in time. This calendar can be a useful tool for market participants, researchers, and policymakers.

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Figure 1: Option-Implied Equity Premiums on Example Trade Dates

This figure illustrates the data and our methodology on two example trade dates. Panel A reports SVIX lower bound observed on October 19, 2020, and Panel B reports SVIX lower bound observed on January 18, 2023. In all panels, first expiration dates of the week are differentiated from other days as white dots. The top row figures show the cumulative measure of equity risk premium for each option expiration date, the middle row figures show the forward measures of equity risk premium per trade day over each forward period, and the bottom row figures show the abnormal measures of forward equity premium per trade day. The vertical lines highlight the forward periods with elevated abnormal forward premiums. After fitting the daily equity term structure, we re-scale measures of abnormal premiums by the length of the forward period in trade days (bottom left panel, red series). The abnormal forward period observed on October 19, 2020, spans the 2020 presidential election. The three highlighted forward periods observed on January 18, 2023, span the February 1 FOMC announcement, the February 3 nonfarm payrolls release, and the February 14 CPI release.

Panel A: October 19, 2020 **Panel B: January 18, 2023**

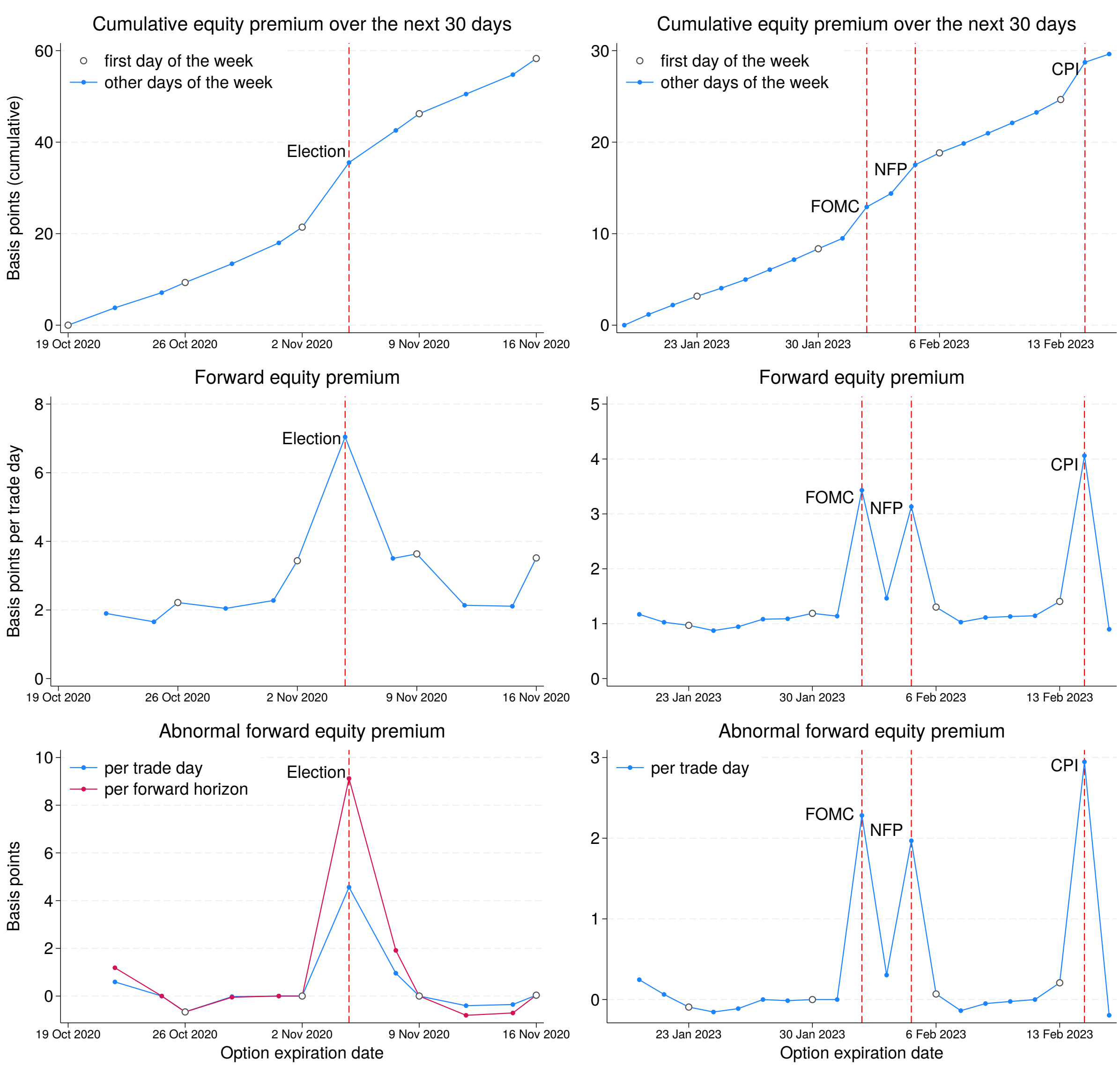


Figure 2: Option-Implied Forward Equity Premiums

This figure shows the full panel data set of forward option-implied measures of the equity premium $F_{t,e_1:e_2}$ for trade date t and the forward period $e_1 : e_2$ using the SVIX lower bound (Panel A) and the IEP equity premium measure (Panel B). Each figure reports the distribution of measures of forward premiums (blue points) and the median forward premiums (orange series) each trade day. Measures are reported in basis points per trade day. For readability of the figure (no censoring is done in any of the analysis), data points in Panel A with a forward equity premium above 15 bps are reported at 15 bps while a similar censoring at 40 bps is used in Panel B (all data points censored pertain to trade dates ranging from February 27, 2020 to April 2, 2020). The sample covers trade dates from October 2016 through December 2024.

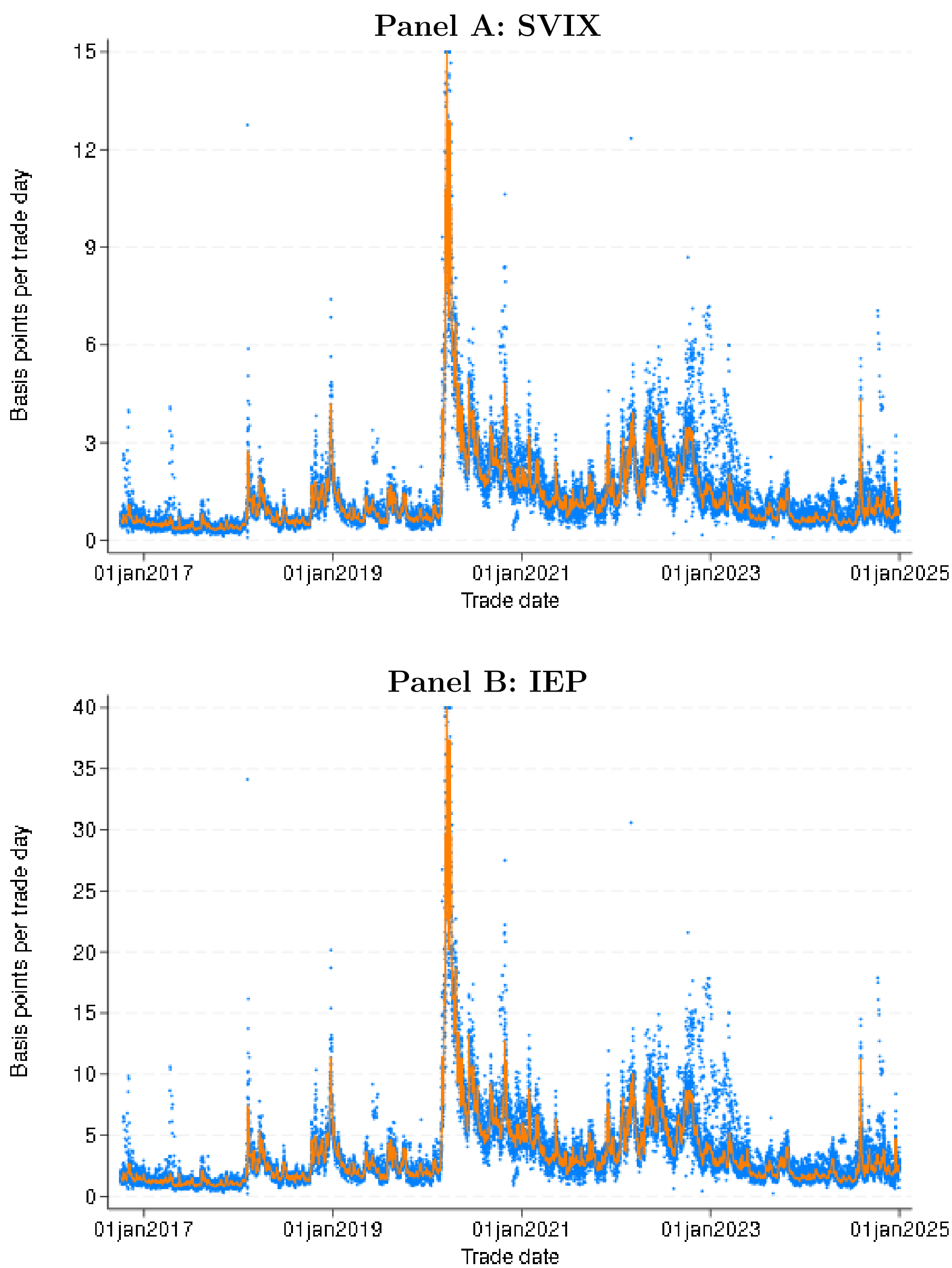
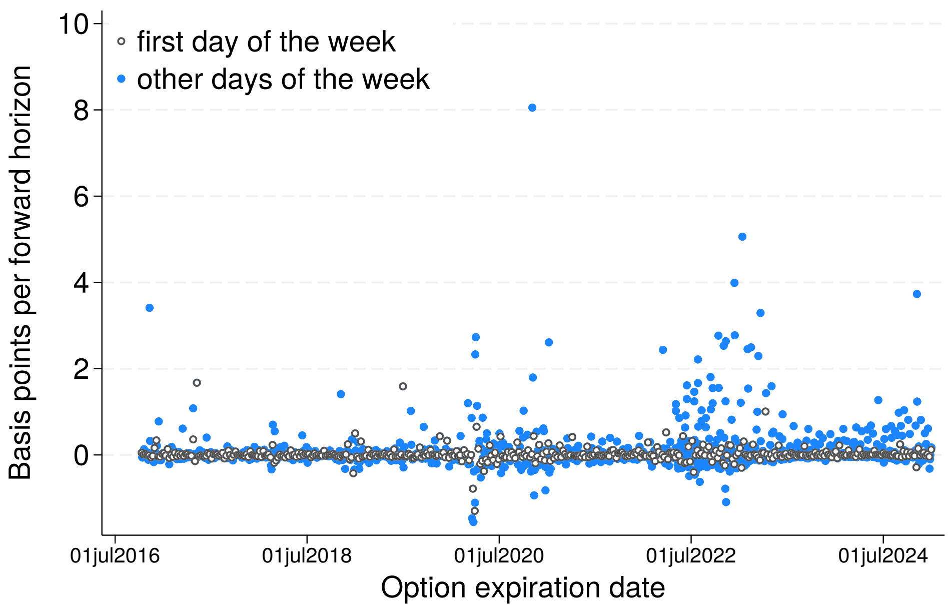


Figure 3: Abnormal Option-Implied Equity Premiums by Forward Period

This figure reports the time series of average SVIX lower bound across trade dates for each forward period in our sample. In Panel A, we separate measures of forward premiums into two sub samples: forward periods which span the first trade day of the week (white dots) and forward periods which do not span the first trade day of the week (blue dots). In Panel B, forward periods spanning CPI releases (red dots), FOMC releases (green dots), NFP releases (yellow dots), and U.S. presidential and midterm elections (purple dots) are marked separately. Measures of forward premiums are reported in basis points per forward period. The sample covers forward periods from October 2016 through December 2024.

Panel A: Abnormal SVIX Per Forward Period



Panel B: Abnormal SVIX Per Forward Period, By Release Type

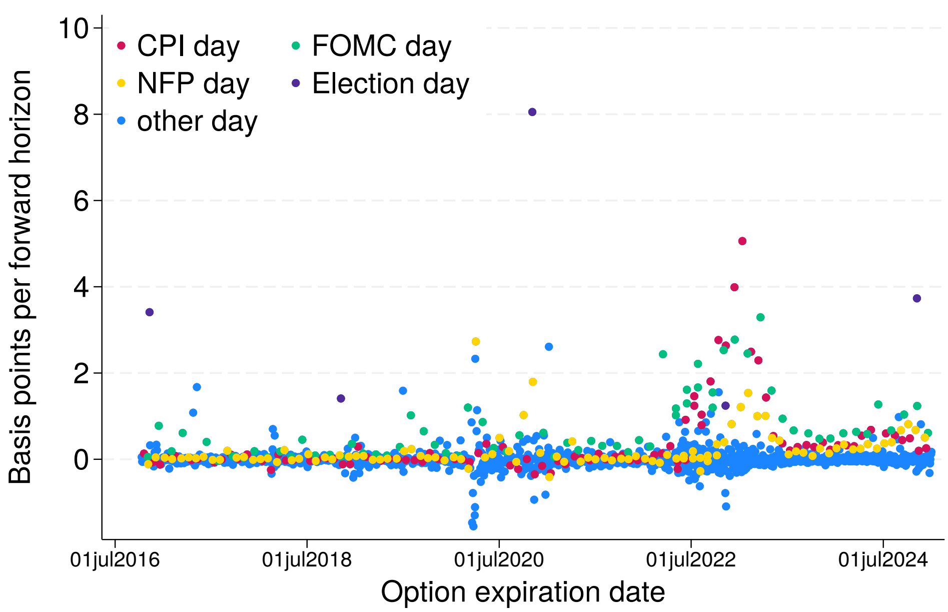


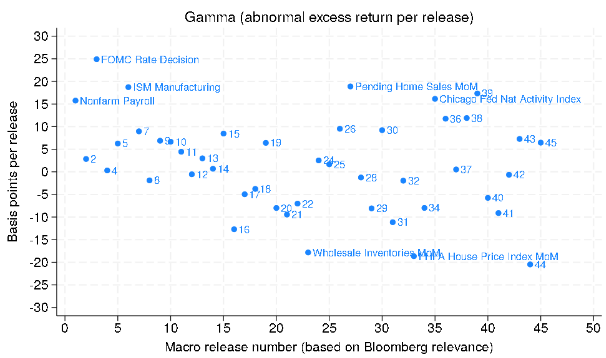
Figure 4: Excess Stock Returns on Macroeconomic Release Dates, October 1996-December 2024

This figure reports results for the following regression of realized excess stock returns on indicator variables for each of the 45 macroeconomic releases and an additional indicator variable for presidential and midterm elections:

$$r_t^{mkt} - r_t^f = \alpha + \Sigma_{m=1}^{M} \left(\gamma_m I_{m,t}\right) + \delta I_t^{election} + \epsilon_t.$$

Daily excess stock returns, $r_t^{stock} - r_t^f$, are S&P 500 returns minus the risk-free rate from Ken French's data library. $I_{m,t} = 1$ if macroeconomic release m occurs on day t and zero otherwise. $I_t^{election} = 1$ on the days following presidential election dates. The regression is estimated on daily data from October 31, 1996, to December 31, 2024. Panel A reports the estimated γ coefficients, with statistically significant releases (at the 10% level) labeled with the release name and statistically insignificant releases labeled with their release number (listed in Internet Appendix Table A4). The estimated values of α and δ are $\widehat{\alpha} = -0.74$ bp (t =-0.27) and $\widehat{\delta} = -2.45$ bp (t =-0.05). Panel B reports the estimated γ coefficient multiplied by the number of releases of release m per year for each macroeconomic release.

Panel A: Additional Excess Return Per Release



Panel B: Additional Excess Return Per Year

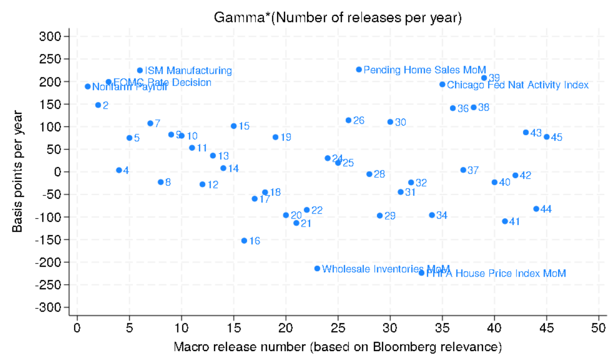


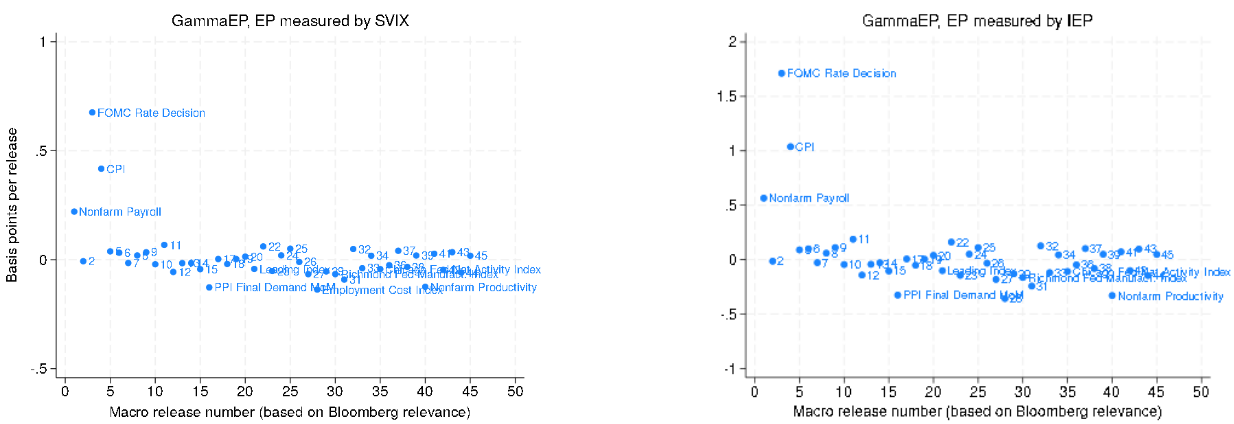
Figure 5: Option-Implied Equity Premiums on Macroeconomic Release Dates

This figure reports results for the following regression of measures of option-implied abnormal equity premiums per forward period on on indicator variables for each of the 45 macroeconomic releases and an additional indicator variable for presidential and midterm elections:

$$A^{EP}_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \Sigma^{M}_{m=1} \left(\gamma_m I_{m,e_1:e_2}\right) + \delta I^{election}_{e_1:e_2} + \epsilon_{e_1:e_2},$$

where $A^{EP}_{e_1:e_2}$ is the average abnormal SVIX lower bound or IEP measure across available trade dates, $I_{m,e_1:e_2} = 1$ if macroeconomic release m occurs over forward period $e_1 : e_2$ and zero otherwise. $I^{election}_{e_1:e_2} = 1$ for forward periods spanning presidential and midterm elections. $H_{e_1:e_2}$ is the length of the forward period in trading days. Panel A reports the estimated γ coefficients (based on separate regressions for the equity premium measured by SVIX lower bound or IEP). Releases for which γ values are statistically significant (at the 10% level) are labeled with the release name and statistically insignificant estimates are instead labeled with their release number (listed in Internet Appendix Table A4). Panel B reports for the estimated γ coefficient multiplied by the number of releases of release type m per year for each macroeconomic release. Tabular results are reported in Internet Appendix Table A6. The sample forward periods run from October 2016 through December 2024.

Panel A: Additional Abnormal Equity Premium Per Release



Panel B: Additional Abnormal Equity Premium Per Year

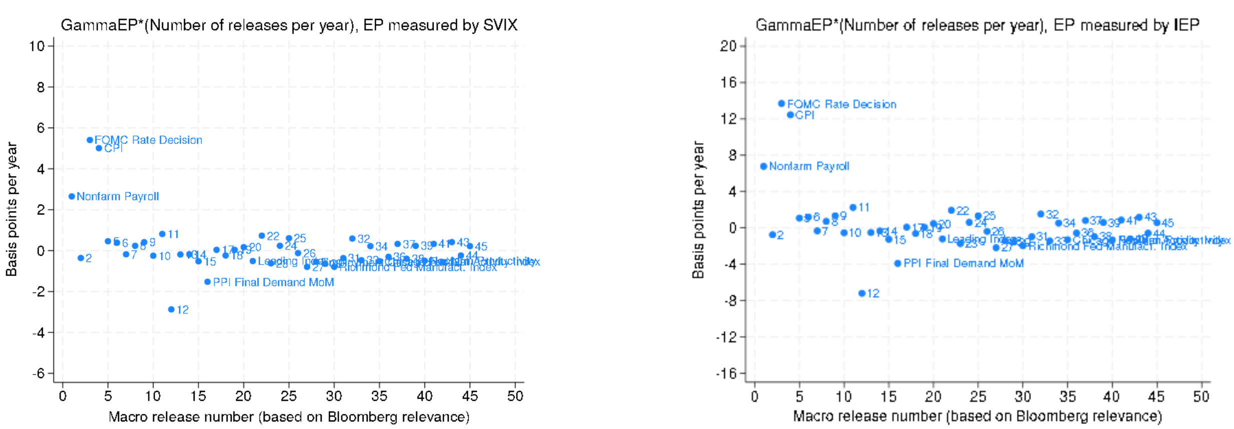
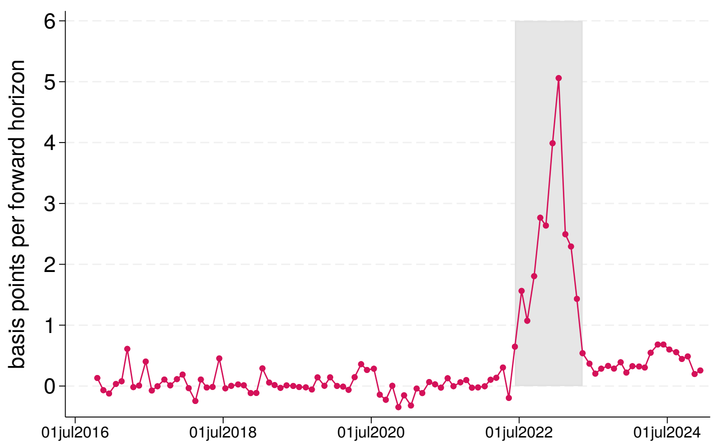


Figure 6: Time variation in the CPI Announcement Equity Premium

This figure explores the time variation in the abnormal equity premiums for CPI announcement release days. Analysis is guided by the asset pricing framework introduced in Section V that shows that abnormal release-day equity premiums are approximately the product of two factors: (1) the quantity of CPI news released on the day, $\sigma_t^2(\eta_{t+1})$, and (2) the sensitivities to CPI news released that day, $-\beta_t^R\beta_t^M$. Panel A plots the time series of the observed abnormal equity premium on CPI release days measured using the SVIX lower bound of option-implied equity premium. Panel B decomposes this abnormal equity premium into the quantity of news (left figure) and the sensitivity to news (right figure). The quantity of news is the conditional variance of CPI releases surprises $\sigma_t^2(\eta_{t+1})$ and is estimated using a GARCH(1,5) model of CPI release surprises. The sensitivity to news is the product of the return beta to the CPI news released β_t^R and the stochastic discount factor beta to the CPI news released β_t^M, and is implied from the measured abnormal equity premium and the estimated quantity of CPI news. Panel C decomposes the total sensitivity to CPI news into the return beta to CPI news and the the SDF beta to CPI news. The return beta is measured from high-frequency stock market responses to CPI surprises. Panel D compares the measured return beta to CPI news with inflation uncertainty, with the latter measured from the average distribution across participants for CPI forecasts in the Federal Reserve's Survey of Primary Dealers.

Panel A: Abnormal SVIX Lower Bound on CPI Release Days



Panel B: Decomposing Abnormal CPI Premiums into Quantity of CPI News and Sensitivities to CPI News

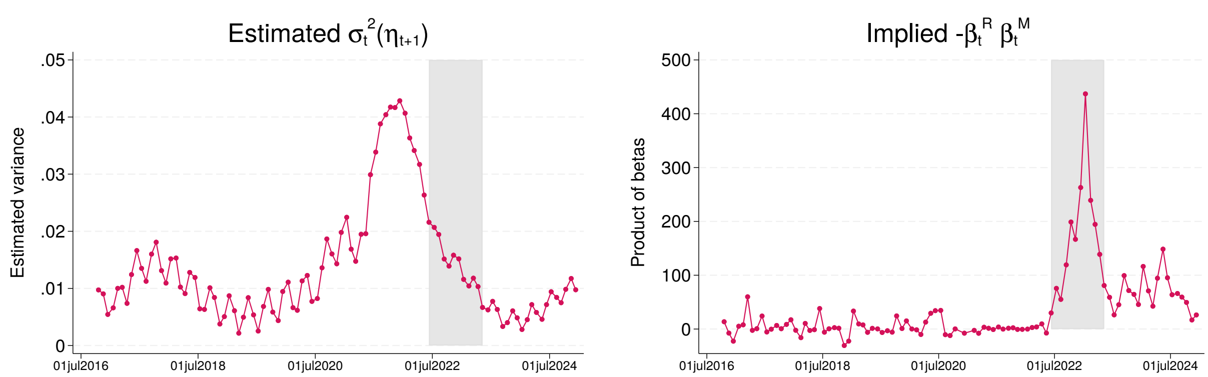
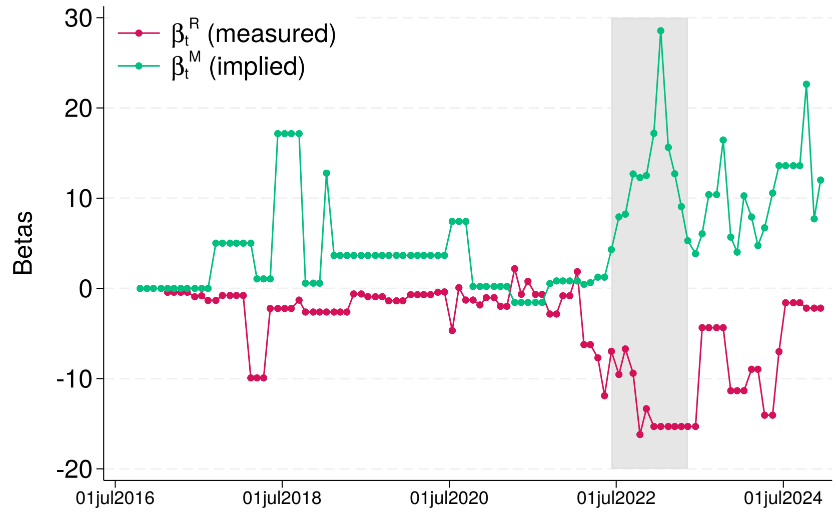


Figure 6 continued on next page...

Panel C: Decomposing the Sensitivity to CPI News



Panel D: CPI News Return Beta and Inflation Uncertainty

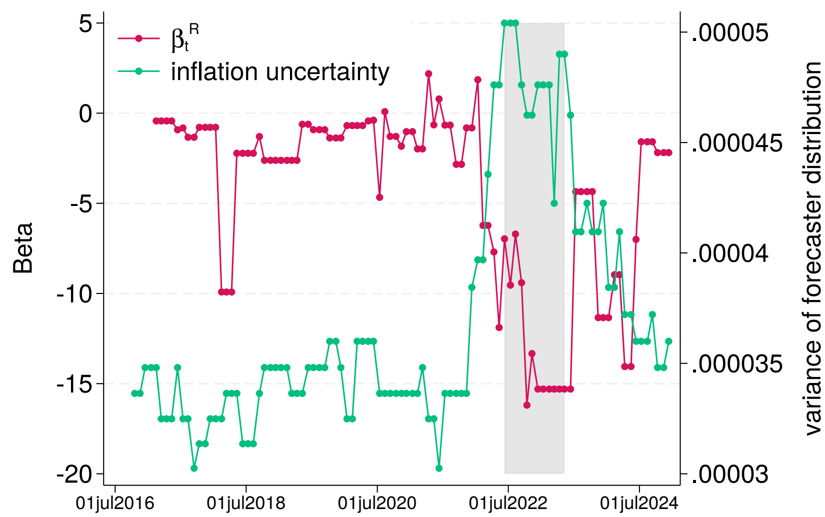


Figure 7: Pricing an Event Over Time

This figure illustrates how option-implied event risk premiums can be tracked over time. The figure reports the abnormal SVIX lower bound estimates for the November 2024 election (red series) and average market implied probabilities of the republican presidential candidate winning (blue series) over the month preceding the election.

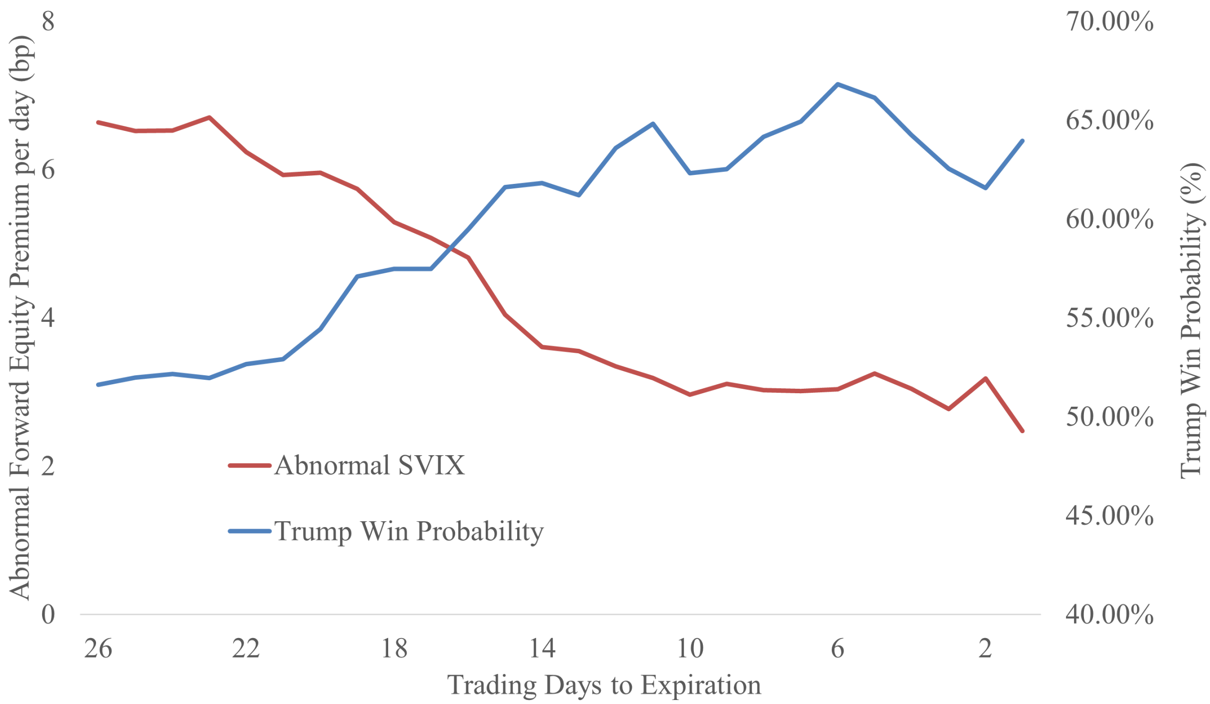


Table 1: Data Availability

This table shows the availability of options data, separated by expiration year and expiration day of the week. Panel A shows the unique option expiration dates, e, and Panel B shows all trade-expiration date observations, (t, e). The sample covers trade dates from October 2016 through December 2024, with some expirations in 2025.

Panel A: Number of Unique Option Expiration Dates, e

	Expiration date day of the week					
	Monday	Tuesday	Wednesday	Thursday	Friday	Total
2016	11	1	13	0	10	35
2017	46	9	52	3	47	157
2018	48	7	51	2	51	159
2019	48	7	51	4	51	161
2020	48	6	52	5	49	160
2021	47	7	52	3	50	159
2022	45	38	52	34	51	220
2023	45	51	52	51	51	250
2024	48	53	50	50	51	252
2025	3	4	3	4	4	18
Total	389	183	428	156	415	1,571

Panel B: Number of Trade Date-Expiration Dates, (t, e)

	Expiration date day of the week					
	Monday	Tuesday	Wednesday	Thursday	Friday	Total
2016	178	19	213	0	168	578
2017	879	169	996	57	895	2,996
2018	921	131	981	39	979	3,051
2019	927	131	985	78	984	3,105
2020	927	114	1,004	97	945	3,087
2021	906	132	1,004	58	964	3,064
2022	867	550	1,003	465	984	3,869
2023	864	979	999	980	980	4,802
2024	920	1,018	962	959	978	4,837
2025	27	29	26	41	37	160
Total	7,416	3,272	8,173	2,774	7,914	29,549

Table 2: The Distribution of Option-Implied Forward Equity Premiums

This table reports the following descriptive statistics of forward option-implied equity premiums: the total number (count), the average (avg), the 5^{th}, 25^{th}, 50^{th}, 75^{th}, and 95^{th} percentiles (p5, p25, p50, p75, p95, respectively), and the standard deviation (sd). Panel A and B present summary statistics of forward and abnormal risk premiums, respectively. Risk premiums using the SVIX and LBR lower bounds, and IEP measures and are reported in basis points per day.

Panel A: Forward Equity Premium Summary Statistics

Equity premium measure	count	avg	p5	p25	p50	p75	p95	sd
		Basis points per trade day						
SVIX	29,549	1.41	0.36	0.61	0.96	1.63	3.60	1.78
LBR	29,549	1.64	0.40	0.70	1.11	1.89	4.26	2.15
IEP	29,549	3.68	0.94	1.58	2.50	4.22	9.35	4.97

Panel B: Abnormal Forward Equity Premium Summary Statistics

Equity premium measure	count	avg	p5	p25	p50	p75	p95	sd
		Basis points per trade day						
SVIX	29,549	0.06	-0.23	-0.03	0.00	0.05	0.52	0.57
LBR	29,549	0.07	-0.28	-0.04	0.00	0.06	0.58	0.63
IEP	29,549	0.16	-0.58	-0.09	0.00	0.13	1.33	1.53
		Basis points per forward period						
SVIX	29,549	0.07	-0.29	-0.04	0.00	0.06	0.60	0.71
LBR	29,549	0.08	-0.35	-0.06	0.00	0.08	0.68	0.77
IEP	29,549	0.18	-0.76	-0.11	0.00	0.16	1.53	1.92

Table 3: Variance Decomposition of Option-Implied Forward Equity Premiums

This table reports results for a decomposition of the variation of the trade date-forward period panel of option-implied measures of equity premiums. We report the time series standard deviation (Std. dev.) of the trade date-level median forward premium, $Median_t$, in the left column and the time series average of trade date-level standard deviations, SD_t, in the right column. Results are reported for raw and abnormal forward premiums using the SVIX and LBR lower bounds and the IEP measures of expected returns. The sample covers trade dates from October 2016 through December 2024.

	Equity premium measure	Median EP (across expirations) by trade date: $Median_t$	Std. dev. of EP (across expirations) by trade date: SD_t
(1)	Raw SVIX	Std. dev.= 1.33	Avg.= 0.44
(2)	Abnormal SVIX		Avg.= 0.28
(3)	Raw LBR	Std. dev.=1.73	Avg.= 0.51
(4)	Abnormal LBR		Avg.= 0.32
(5)	Raw IEP	Std. dev.=3.69	Avg.= 1.17
(6)	Abnormal IEP		Avg.= 0.74

Table 4: Forward Periods with Significant Abnormal Option-Implied Equity Premiums

This table reports all forward periods with significant abnormal option-implied measures of equity premiums. After averaging measures of abnormal premiums across available trade dates for each forward period $e_1 : e_2$, we estimate the following regressions using the time series of average abnormal forward premiums:$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \beta I_{e_1:e_2} + \epsilon_{e_1:e_2}$, where $A_{e_1:e_2}$ is the average abnormal SVIX lower bound (per trade day) for the forward period, $H_{e_1:e_2}$ is the length of the forward period in trade days, and $I_{e_1:e_2}$ is an indicator variable equal to one for one forward period in each regression and zero otherwise. Statistically significant forward periods are sorted in order of economic significance measured by $\hat{\beta}$ in column (5). Column (2) reports the end date of each forward period. Column (3) reports the associated event(s). For forward periods not spanning CPI, FOMC, and NFP releases, we use the online archives of the Wall Street Journal to identify scheduled event(s). Column (4) reports the length of each forward period in trade days. The p-values are reported in column (6). Raw forward premiums for the SVIX lower bound in bp over the forward period are reported in column (7). We additionally report estimates, p-values, and raw forward lower bounds for the LBR lower bound and IEP in columns (8) through (13).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
				SVIX			LBR			IEP		
No.	Forward Period	Event(s)	Period Length	$\beta(bp)$	p-value	Equity Prem. (bp)	$\beta(bp)$	p-value	Equity Prem. (bp)	$\beta(bp)$	p-value	Equity Prem. (bp)
1	2020-11-04	Presidential Election	2	7.99	< 0.001	13.50	9.50	< 0.001	15.94	20.47	< 0.001	34.73
2	2023-01-12	CPI	1	4.99	< 0.001	6.61	5.32	< 0.001	7.09	12.42	< 0.001	16.47
3	2022-12-13	CPI	1	3.92	< 0.001	5.50	4.15	< 0.001	5.93	9.75	< 0.001	13.73
4	2024-11-06	Presidential Election	1	3.66	< 0.001	4.95	3.96	< 0.001	5.62	9.15	< 0.001	12.47
5	2016-11-09	Presidential Election	2	3.34	< 0.001	4.96	3.61	< 0.001	5.39	8.23	< 0.001	12.23
6	2023-03-22	FOMC	1	3.22	< 0.001	4.64	3.46	< 0.001	5.08	8.05	< 0.001	11.65
7	2022-12-14	FOMC	1	2.70	< 0.001	4.27	2.84	< 0.001	4.60	6.72	< 0.001	10.65
8	2022-10-13	CPI	1	2.70	< 0.001	5.61	2.87	< 0.001	6.15	6.67	< 0.001	14.01
9	2020-04-03	NFP	2	2.66	< 0.001	20.15	2.87	< 0.001	26.09	7.21	< 0.001	56.24
10	2022-11-10	CPI	1	2.57	< 0.001	5.86	2.86	< 0.001	6.58	6.38	< 0.001	14.58
11	2021-01-06	Georgia Runoff	2	2.54	< 0.001	6.45	3.14	< 0.001	7.88	6.77	< 0.001	17.12
12	2022-11-02	FOMC	1	2.46	< 0.001	5.71	2.65	< 0.001	6.35	6.09	< 0.001	14.21
13	2023-02-14	CPI	1	2.42	< 0.001	3.53	2.61	< 0.001	3.87	6.05	< 0.001	8.84
14	2023-02-01	FOMC	1	2.38	< 0.001	3.70	2.51	< 0.001	3.95	5.91	< 0.001	9.22
15	2022-03-16	FOMC	2	2.37	< 0.001	8.02	2.80	< 0.001	9.68	5.98	< 0.001	20.45
16	2020-04-01	Covid 19	1	2.26	< 0.001	10.67	3.61	< 0.001	14.54	6.44	< 0.001	29.92
17	2023-03-14	CPI	1	2.22	< 0.001	3.49	2.38	< 0.001	3.82	5.56	< 0.001	8.76
18	2022-07-27	FOMC	2	1.89	< 0.001	5.38	2.01	< 0.001	5.92	4.71	< 0.001	13.45
19	2022-09-13	CPI	1	1.73	< 0.001	4.06	1.85	< 0.001	4.43	4.33	< 0.001	10.20
20	2020-11-06	NFP	2	1.72	< 0.001	7.77	2.16	< 0.001	9.33	4.63	< 0.001	20.38
21	2017-05-08	French Presidential Election Runoff	1	1.60	< 0.001	2.31	1.84	< 0.001	2.66	4.12	< 0.001	5.92
22	2023-05-03	FOMC	1	1.52	< 0.001	2.66	1.64	0.001	2.91	3.81	< 0.001	6.70
23	2019-07-01	Trump-Xi G-20 Bilateral	1	1.52	< 0.001	2.65	1.64	0.001	2.91	4.11	< 0.001	7.17
24	2023-02-03	NFP	1	1.47	< 0.001	2.77	1.53	0.002	2.98	3.65	0.001	6.92
25	2022-06-15	FOMC	2	1.37	0.002	5.08	1.50	0.003	5.68	3.44	0.003	12.73
26	2023-04-12	CPI	1	1.36	0.002	2.86	1.51	0.003	3.27	3.43	0.003	7.21
27	2018-11-07	Midterm Election	2	1.34	0.003	4.52	1.61	0.001	5.36	3.65	0.001	12.29
28	2022-09-21	FOMC	2	1.31	0.003	4.54	1.37	0.007	5.05	3.24	0.004	11.39
29	2022-07-13	CPI	2	1.28	0.004	5.84	1.39	0.006	6.69	3.17	0.005	14.63
30	2024-06-12	CPI, FOMC	1	1.20	0.007	1.82	1.25	0.013	1.99	3.00	0.008	4.59
31	2022-11-09	Midterm Election	1	1.17	0.009	4.55	1.17	0.020	4.99	2.87	0.012	11.27
32	2024-11-07	FOMC	1	1.17	0.009	2.51	1.20	0.018	2.93	2.92	0.010	6.38
33	2023-01-06	NFP	1	1.14	0.011	2.97	1.24	0.014	3.25	2.85	0.012	7.43
34	2020-03-04	Covid 19	2	1.13	0.011	3.59	1.24	0.014	4.09	3.13	0.006	9.99
35	2020-04-08	Covid 19	2	1.07	0.017	19.42	1.39	0.006	25.87	3.51	0.002	54.87
36	2022-05-04	FOMC	2	1.03	0.020	4.00	1.19	0.019	4.74	2.62	0.021	10.20
37	2017-04-24	French Presidential Election First Round	3	1.01	0.024	3.19	1.09	0.031	3.53	2.55	0.025	8.10
38	2024-09-18	FOMC	1	0.97	0.030	2.08	1.18	0.020	2.54	2.46	0.031	5.33
39	2020-10-02	NFP	2	0.95	0.032	5.74	1.17	0.021	6.94	2.46	0.031	14.81
40	2019-07-31	FOMC	2	0.95	0.033	2.26	1.02	0.044	2.49	2.58	0.024	6.15
41	2023-04-10	NFP	1	0.93	0.036	2.80	1.09	0.031	3.29	2.36	0.038	7.08
42	2023-03-10	NFP	1	0.93	0.037	2.23	0.98	0.052	2.44	2.32	0.041	5.60
43	2024-08-29	NVIDIA Earnings	1	0.91	0.042	2.21	1.08	0.033	2.78	2.29	0.045	5.65

Table 5: Option-Implied Macroeconomic Release Equity Premium Statistics

This table reports statistics for option-implied equity premium measures over all forward periods in our sample and for forward periods spanning CPI, FOMC, and NFP releases. Panel A reports results using the SVIX lower bound, Panel B reports results for the LBR lower bound, and Panel C reports results for the IEP. Row (1) of each panel reports the number of forward periods in our sample, row (2) reports the average forward premium per forward period in the full sample in bp, row (3) reports the yearly average of forward premiums per annum in the full sample in percent, row (4) reports the number of forward periods spanning CPI, FOMC, and NFP releases, row (5) reports the average forward premium per period for each release type in bp, row (6) reports the average release forward premium per annum (avg. forward premium per release forward period times number of releases per year) in percent. We also report the share of total measures of equity premiums accounted for by CPI, FOMC, and NFP releases in our sample, as well as the share of total forward periods spanning these releases. The sample consists of forward periods from October 2016 through December 2024.

Panel A: SVIX

(1) No. fwd. periods		1,551		
(2) Avg. EP (bp per period)		1.87		
(3) Avg EP p.a. (percent)		3.36%		
	CPI	FOMC	NFP	All
(4) No. release fwd. periods	97	66	98	253
(5) Avg. release EP (bp per period)	2.51	2.75	2.37	2.51
(6) Avg. release EP p.a. (percent)	0.30%	0.22%	0.28%	
(4)/(1)	6.25%	4.26%	6.32%	16.31%
%Total EP	8.42%	6.28%	8.01%	21.93%

Panel B: LBR

(1) No. fwd. periods		1,551		
(2) Avg. EP (bp per period)		2.22		
(3) Avg EP p.a. (percent)		3.98%		
	CPI	FOMC	NFP	All
(4) No. release fwd. periods	97	66	98	253
(5) Avg. release EP (bp per period)	2.98	3.20	2.81	2.96
(6) Avg. release EP p.a. (percent)	0.36%	0.26%	0.34%	
(4)/(1)	6.25%	4.26%	6.32%	16.31%
%Total EP	8.40%	6.14%	8.01%	21.78%

Panel C: IEP

(1) No. fwd. periods		1551		
(2) Avg. EP (bp per period)		4.90		
(3) Avg EP p.a. (percent)		8.80%		
	CPI	FOMC	NFP	All
(4) No. release fwd. periods	97	66	98	253
(5) Avg. release EP (bp per period)	6.60	7.20	6.25	6.59
(6) Avg. release EP p.a. (percent)	0.79%	0.58%	0.75%	
(4)/(1)	6.25%	4.26%	6.32%	16.31%
%Total EP	8.42%	6.25%	8.05%	21.93%

Table 6: Realized Excess Returns on Macroeconomic Release Dates

The table reports results for the following regression of realized daily excess stock returns on indicator variables for three types of macroeconomic releases:

$$r_t^{stock} - r_t^f = \alpha + \Sigma_{m=1}^{M}\left(\beta_m I_{m,t}\right) + \epsilon_t,$$

where daily excess stock returns, $r_t^{stock} - r_t^f$, are S&P 500 returns minus the risk-free rate from Ken French's data library. $I_{m,t} = 1$ if macroeconomic release m occurs on day t and zero otherwise. Over the long sample 1928-2024, there are 826 FOMC meetings, 1,129 nonfarm payroll announcements, and 999 CPI/PPI announcements (using the earlier of CPI and PPI in each month). The dependent variable is measured in basis points. In column (1), FOMC data start in 1978 and PPI data start in 1971. In columns (3) and (4), FOMC data start in 1936, CPI data start in 1941, PPI data start in 1971. t-statistics are in parentheses and are based on standard errors robust to heteroskedasticity.

	(1) Savor-Wilson (SW) 1958-2009	(2) Lucca-Moench 1994m9-2011m3	(3) Long sample 1928-2024	(4) Pre-SW(1) 1928-1957	(5) Pre-SW(2) 1958-1977	(6) Post-SW 2010-2024
$I_{FOMC,t}$	21.66***	34.34***	11.84***	9.55	7.06	6.85
	(3.62)	(3.12)	(2.98)	(0.84)	(1.61)	(0.66)
$I_{NFP,t}$	7.36*		7.16**	7.47		5.16
	(1.85)		(2.09)	(0.98)		(0.60)
$I_{\text{CPI/PPI},t}$	4.59		0.93	0.325		-10.36
	(1.16)		(0.26)	(0.03)		(-1.21)
Constant	1.30	1.68	2.27***	2.68*	1.28	5.33***
	(1.46)	(0.86)	(3.00)	(1.65)	(1.21)	(2.75)
Observations	13,092	4,176	24,367	7,501	5,016	3,774
R^2	0.001	0.002	0.001	0.000	0.001	0.001

Table 7: Option-Implied Equity Premiums on Macroeconomic Release Dates, October 2016-December 2024

This table reports results of the following regression of abnormal option-implied measures of the equity premium per forward period on indicator variables for each of three types of macroeconomic releases and an additional indicator variable for presidential and midterm elections:

$$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \Sigma_{m=1}^{M} \left(\gamma_m I_{m,e_1:e_2}\right) + \delta I_{e_1:e_2}^{election} + \epsilon_{e_1:e_2},$$

where $A_{e_1:e_2}$ is the average across available trade dates of the trade date-forward period level abnormal measures of equity premiums per trade day, $A_{t,e_1:e_2}$, $I_{m,e_1:e_2} = 1$ if macroeconomic release m occurs over forward period $e_1 : e_2$ and zero otherwise. $I_{e_1:e_2}^{election} = 1$ for forward periods spanning presidential and midterm elections. $H_{e_1:e_2}$ is the length of the forward period in trading days (1 or 2). t-statistics are in parentheses and are based on standard errors robust to heteroskedasticity. Reports are reported for the SVIX lower bound in column (1), LBR lower bound in column (2), and the IEP in column (3). The sample consists of forward periods from October 2016 through December 2024.

	Dependent variable (in basis points):		
	$A_{e_1:e_2}^{SVIX} \times H_{e_1:e_2}$ (1)	$A_{e_1:e_2}^{LBR} \times H_{e_1:e_2}$ (2)	$A_{e_1:e_2}^{IEP} \times H_{e_1:e_2}$ (3)
$I_{FOMC,e_1:e_2}$	0.64***	0.69***	1.62***
	(7.01)	(6.96)	(7.12)
$I_{NFP,e_1:e_2}$	0.21***	0.24***	0.54***
	(4.90)	(4.96)	(4.84)
$I_{CPI,e_1:e_2}$	0.33***	0.36***	0.82***
	(3.69)	(3.74)	(3.69)
$I_{e_1:e_2}^{election}$	3.41***	3.91***	8.70***
	(3.67)	(3.50)	(3.67)
Constant	0.00	0.00	0.01
	(0.28)	(0.29)	(0.28)
Observations	1,551	1,551	1,551
R^2	0.32	0.29	0.31

Table 8: Extended Sample Analysis of Option-Implied Macroeconomic Release Premiums

This table reports option-implied macroeconomic release equity premium statistics for an extended sample period. Option-implied equity premiums are measured on the eve of Wednesday FOMC meetings (Panel A) and on the eve of Friday NFP releases (Panel B) from 2009 using S&P 500 Weekly Friday expirations where sufficient data is available. Results are reported separately for FOMC releases from January 2009 through December 2024 in column (1), January 2009 through September 2016 in column (2) and for our sample period of October 2016 through December 2024 in column (3), with the difference between subsamples means and the associated p-values in columns (4) and (5) respectively. Results are reported for the SVIX and LBR lower bounds and IEP measure of the equity premium.

Panel A: FOMC

	(1)	(2)	(3)	(4)	(5)
Measure	Sample Period				
	2009-2024	2009-2016	2016-2024	Difference	p-value
#Releases	97	38	59		
SVIX (bp)	4.32	4.43	4.25	-0.18	0.811
LBR (bp)	4.57	4.65	4.51	-0.14	0.855
IEP (bp)	10.50	10.01	10.82	0.81	0.663

Panel B: NFP

	(1)	(2)	(3)	(4)	(5)
Measure	Sample Period				
	2009-2024	2009-2016	2016-2024	Difference	p-value
#Releases	176	82	94		
SVIX (bp)	1.62	1.73	1.53	-0.20	0.395
LBR (bp)	1.75	1.84	1.67	-0.17	0.471
IEP (bp)	3.90	3.84	3.95	0.11	0.853

Table 9: Relationship Between Realized Excess Returns and Option-Implied Expected Excess Returns

This table reports results for the following regressions: $\tilde{R}_{t:e} = \alpha + \beta E_t(\tilde{R}_{t:e}) + \epsilon_{t:e}$, where $\tilde{R}_{t:e}$ is the realized excess return from date t to date e, and $E_t(\tilde{R}_{t:e})$ is the option-implied equity premium for the same period, as perceived at date t. Panels A, B, and C report results for the SVIX lower bound, LBR lower bound, and IEP measures, respectively. The regressions use constant maturity realized and expected excess returns of one month (columns 1, 2, and 4), one week (columns 3 and 5) and two days (column 6) using linear interpolation across expirations within each trade date. The sample for column 1 is 1996-2024, the sample for columns 2-3 is 2009-2024 (since the introduction of weekly expirations), and the sample for columns 4-6 is 2016-2024. We use all trade dates within each sample period. Independent and dependent variables are winzorized at the 5th and 95th percentiles prior to each estimation. Newey West standard errors with lag length set to the horizon to adjust for overlapping observations are reported in parentheses.

Panel A: SVIX

	1996-2024	2009-2024		2016-2024		
	1-month (1)	1-month (2)	1-week (3)	1-month (4)	1-week (5)	2-day (6)
Option-implied equity premium	2.16**	3.05***	3.23***	3.78**	3.82**	3.54*
	(0.89)	(1.16)	(1.22)	(1.51)	(1.81)	(1.97)
Constant	-0.01	0.18	0.05	0.05	0.04	0.03
	(0.28)	(0.35)	(0.08)	(0.44)	(0.10)	(0.04)
R^2	0.012	0.030	0.009	0.035	0.010	0.004
Observations	7,169	4,042	4,043	2,090	2,091	2,091

Panel B: LBR

	1996-2024	2009-2024		2016-2024		
	1-month (1)	1-month (2)	1-week (3)	1-month (4)	1-week (5)	2-day (6)
Option-implied equity premium	2.01***	2.51***	2.93***	3.27***	3.62**	3.41*
	(0.77)	(0.97)	(1.13)	(1.22)	(1.67)	(1.87)
Constant	-0.04	0.22	0.05	0.04	0.03	0.02
	(0.28)	(0.34)	(0.08)	(0.43)	(0.10)	(0.04)
R^2	0.014	0.029	0.009	0.038	0.011	0.004
Observations	7,169	4,042	4,043	2,090	2,091	2,091

Panel C: IEP

	1997-2024	2009-2024		2016-2024		
	1-month (1)	1-month (2)	1-week (3)	1-month (4)	1-week (5)	2-day (6)
Option-implied equity premium	1.39***	1.21***	1.33***	1.48**	1.51**	1.41*
	(0.43)	(0.46)	(0.50)	(0.57)	(0.70)	(0.77)
Constant	-0.24	0.21	0.05	0.03	0.02	0.03
	(0.29)	(0.34)	(0.08)	(0.44)	(0.10)	(0.04)
R^2	0.022	0.030	0.009	0.037	0.010	0.004
Observations	6,940	4,042	4,043	2,090	2,091	2,091

Table 10: Pricing the Economic Calendar

This table illustrates an example of how the methodology to estimate forward measures of option-implied equity premium events (Londono and Samadi (2023)) and abnormal option-implied premiums developed in this paper can be used to estimate pricing for the upcoming economic calendar. Forward premiums are estimated using option prices on August 8, 2025, for forward periods for the following four weeks. Raw and abnormal forward premiums using the SVIX lower bound are reported. Release days with abnormal premiums falling in above the 80th percentiles of the historical distribution from August 2022 are highlighted, with shading going from yellow (80th percentile) to red (maximum historical value). Premiums are reported in basis points per trade day. Forward measures of equity premiums for the upcoming month of daily forward periods are updated daily at www.pricingthecalendar.com.

S&P 500 Forward Premia: Aug 08, 2025

DATE	EVENT(S)	SVIX (BP)	ABN. SVIX (BP)
Aug 11, 2025		0.56	0.00
Aug 12, 2025	Consumer Price Index	0.87	0.44
Aug 13, 2025		0.47	0.00
Aug 14, 2025	Producer Price Index	0.52	0.01
Aug 15, 2025	Michigan Consumer Sentiment Index, Retail Sales	0.63	0.09
Aug 18, 2025		0.72	−0.01
Aug 19, 2025		0.61	0.00
Aug 20, 2025	FOMC Minutes	0.67	0.03
Aug 21, 2025		0.67	0.00
Aug 22, 2025	Jackson Hole Symposium	1.05	0.34
Aug 25, 2025	S&P Global Manufacturing PMI, S&P Global Services PMI	0.92	0.04
Aug 26, 2025		0.75	−0.01
Aug 27, 2025		0.75	−0.04
Aug 28, 2025	Gross Domestic Product, NVIDIA Earnings, Personal Consumption Expenditures	1.38	0.56
Aug 29, 2025		0.84	0.00
Sep 2, 2025	ISM Manufacturing PMI	1.14	0.12
Sep 3, 2025	ADP Employment Change	0.79	−0.10
Sep 4, 2025		0.91	0.00
Sep 5, 2025	Average Hourly Earnings, Nonfarm Payrolls	1.33	0.40

Internet Appendix to "Equity Premium Events"

This Appendix provides additional description and empirical evidence to supplement the analyses provided in the main text. The content of this appendix is the following:

1. Section A details the theory and assumptions underlying the measures of option-implied equity premiums.
2. Section B provides further descriptive information on the data and methodology.
3. Section C details our approach to group 125 macroeconomic variables tracked in the Bloomberg Economic Calendar into 45 releases.
4. Section D reports the data collection and validation process for the near century of macroeconomic releases.
5. Section E provides additional empirical results and robustness.

A. Theoretical Foundations of the Equity Premium Measures

In this section we provide a brief overview of the theoretical foundations underlying the option-implied measures of the equity premium.

I.A. The Martin (2017) Lower Bound, SVIX

The price at t of claim to cash flow X_e at time e is:

$$\text{Price}_t = E_t\left(M_{t:e}X_e\right) = \frac{1}{R_{f,t:e}}E_t^*\left(X_e\right),$$

where the risk-neutral expectation can be expressed as $E_t^*(X_e) = E_t\left(\frac{M_{t:e}}{E_t(M_{t:e})}X_e\right) = R_{f,t:e}E_t\left(M_{t:e}X_e\right)$.

It follows that the risk-neutral variance of the market return is:

$$\begin{aligned}\text{Var}_t^* R_{t:e} &= E_t^*\left(R_{t,e}^2\right) - \left(E_t^* R_{t,e}\right)^2 \\ &= R_{f,t:e}E_t\left(M_{t:e}R_{t:e}^2\right) - R_{f,t:e}^2,\end{aligned}$$

and, thus, we can express the equity risk premium as:

$$\begin{aligned}E_t R_{t:e} - R_{f,t:e} &= \left[E_t\left(M_{t:e}R_{t:e}^2\right) - R_{f,t:e}\right] - \left[E_t\left(M_{t:e}R_{t:e}^2\right) - E_t R_{t:e}\right] \\ &= \frac{1}{R_{f,t:e}}\text{var}_t^* R_{t:e} - cov_t\left(M_{t:e}R_{t:e}, R_{t:e}\right).\end{aligned}$$

Under the negative correlation condition (NCC), $cov_t\left(M_{t:e}R_{t:e}, R_{t:e}\right) \leq 0$, then

$$E_t R_{t:e} - R_{f,t:e} \geq \frac{1}{R_{f,t:e}}\text{Var}_t^* R_{t:e}.$$

Martin (2017) shows that this condition holds across a broad range of leading asset pricing models. For sufficient volatility in $M_{t:e}$, the NCC amounts to requiring that the stochastic discount factor and the return on the market is negatively correlated.

Martin (2017) further shows that the lower bound holds with equality for an investor that is 100% invested in the market with log utility since, in this case, $M_{t:e} = u'(R_{t:e}) = 1/R_{t:e}$ and thus $cov_t\left(M_{t:e}R_{t:e}, R_{t:e}\right) = 0$.

I.B. The Tetlock et al. (2024) Point Estimate, IEP

Consider a log utility agent invested in the risk-free asset, the market, and market derivatives (i.e., derviatives that pay the excess return on the market, the excess return on the market squared, the excess return on the market cubed, etc.). In this case, the agent's stochastic discount factor is:

$$M_{t:e} = \left(R_{GO,t:e}\right)^{-1} = \left(R_{f,t:e} + \sum_{k=1}^{\infty} w_{k,t}\left[\left(R_{t:e} - R_{f,t:e}\right)^k - c_{t,k}\right]\right)^{-1},$$

where $R_{GO,t:e}$ is the return on growth-optimal portfolio and $c_{t,k} = E_t^*\left((R_{t:e} - R_{f,t:e})^k\right)$ ensures derivatives are zero cost upfront.

In this case, an expression for the equity premium can derived as follows:

$$\begin{aligned} E_t R_{t:e} - R_{f,t:e} &= E_t\left[\tfrac{M_{t:e}}{E_t(M_{t:e})}\tfrac{E_t(M_{t:e})}{M_{t:e}}\left(R_{t:e} - R_{f,t:e}\right)\right] \\ &= E_t^*\left[\tfrac{E_t(M_{t:e})}{M_{t:e}}\left(R_{t:e} - R_{f,t:e}\right)\right] \\ &= \tfrac{1}{R_{f,t:e}}\sum_{k=1}^{\infty} w_{k,t} E_t^*\left[(R_{t:e} - R_{f,t:e})^{k+1}\right], \end{aligned}$$

where the last equality holds since $E_t^*\left(R_{t:e} - R_{f,t:e}\right) = 0$.

This differs from the Martin (2017) lower bound, since now $w_{1,t} \neq 1$, $w_{2,t} \neq 0$, $w_{3,t} \neq 0$. Tetlock et al. (2024) show that the growth-optimal portfolio weights can be estimated based on regressions of the variance risk premium on higher order moments.

I.C. The Chabi-Yo and Loudis (2020) Restricted Lower Bound, LBR

As with the Tetlock et al. (2024) measure, this measure uses the following expression of the equity premium:

$$\begin{aligned} E_t R_{t:e} - R_{f,t:e} &= E_t\left[\tfrac{M_{t:e}}{E_t(M_{t:e})}\tfrac{E_t(M_{t:e})}{M_{t:e}}\left(R_{t:e} - R_{f,t:e}\right)\right] \\ &= E_t^*\left[\tfrac{E_t(M_{t:e})}{M_{t:e}}\left(R_{t:e} - R_{f,t:e}\right)\right]. \end{aligned}$$

Now, consider a representative agent who invests 100% in the market and maximizes utility at date e, which means that (up to a constant) $M_{t:e} = u'\big(R_{t,e}\big)$ and thus:

$$\frac{E_t(M_{t:e})}{M_{t:e}} = \frac{E_t\big(u'(R_{t:e})\big)}{u'(R_{t:e})}.$$

Reorganizing this expression, we get

$$\frac{1}{E_t\big(u'(R_{t:e})\big)} = E_t^*\left(\frac{1}{u'\left[R_{t:e}\right]}\right),$$

and, therefore,

$$\frac{E_t(M_{t:e})}{M_{t:e}} = \frac{E_t\big(u'(R_{t:e})\big)}{u'(R_{t:e})} = \frac{\frac{1}{u'(R_{t:e})}}{\frac{1}{E_t\left(u'(R_{t:e})\right)}} = \frac{\frac{u'[R_{f,t:e}]}{u'[R_{t:e}]}}{E_t^*\left(\frac{u'[R_{f,t:e}]}{u'[R_{t:e}]}\right)}.$$

Using a Taylor-series expansion of the ratio $u'(R_{f,t:e})/u'(R_{t:e})$ around $R_{t:e} = R_{f,t:e}$ implies

$$\frac{E_t(M_{t:e})}{M_{t:e}} \approx \frac{1 + \sum_{k=1}^{\infty} \theta_k \, (R_{t:e} - R_{f,t:e})^k}{1 + \sum_{k=1}^{\infty} \theta_k \, E_t^* \left[(R_{t:e} - R_{f,t:e})^k\right]}.$$

Substituting back into the expression of the equity premium yields

$$E_t R_{t:e} - R_{f,t:e} = \frac{\sum_{k=1}^{\infty} \theta_k \, E_t^* \left[(R_{t:e} - R_{f,t:e})^{\,k+1}\right]}{1 + \sum_{k=1}^{\infty} \theta_k \, E_t^* \left[(R_{t:e} - R_{f,t:e})^k\right]},$$

where the first three preference-moment coefficients are

$$\theta_1 = \frac{1/\mathcal{T}}{R_{f,t:e}}, \quad \theta_2 = \frac{(1-\rho)/\mathcal{T}^2}{R_{f,t:e}^2}, \quad \theta_3 = \frac{(1-2\rho+\kappa)/\mathcal{T}^3}{R_{f,t:e}^3},$$

and $\mathcal{T}$ is risk tolerance, ρ measures prudence, and κ captures temperance.

If:

1. Risk-neutral moments of market excess returns are ≤ 0 for k odd
2. Preferences parameters are such that $\theta_k \leq 0$ for k even and $\theta_k \geq 0$ for k odd (so investors require compensation for taking the risk from each moment)
3. $\theta_1 \geq \frac{1}{R_{f,t:e}}$, $\theta_2 \leq \frac{-1}{\left(R_{f,t:e}\right)^2}$, and $\theta_3 \geq \frac{1}{\left(R_{f,t:e}\right)^3}$,

then one gets a lower bound if ignoring risk-neutral moments past the 4th moment and assuming $\theta_1 = \frac{1}{R_{f,t:e}}$, $\theta_2 = \frac{-1}{\left(R_{f,t:e}\right)^2}$, and $\theta_3 = \frac{1}{\left(R_{f,t:e}\right)^3}$. The lower bound is:

$$E_t R_{t:e} - R_{f,t:e} \geq \frac{\Sigma_{k=1}^{3} \theta_k E_t^* \left((R_{t:e} - R_{f,t:e})^{k+1} \right)}{1 + \Sigma_{k=2}^{3} \theta_k E_t^* \left((R_{t:e} - R_{f,t:e})^{k} \right)}.$$

This result generalizes the Martin (2017) lower bound by allowing higher order terms up to the fourth moment.

B. Further Information on Data and Methodology

This section provides further information on the data and methodology used in the paper. Table A1 reports expiration-level descriptive statistics for the daily option expirations in our sample, Table A2 reports retail trading activity statistics for our sample, and Table A3 reports the estimation fit of various QR specifications and statistics for coefficient estimates in our baseline specification.

Table A1:
Daily Option Expiration Descriptive Statistics

This table provides descriptive statistics for trade date-expiration level daily options data aggregated to the expiration level. For each variable, we report the mean, standard deviation, and select percentiles of expiration-level statistics. #Strikes is the daily average number of unique strike prices for a given expiration. Min. Moneyness is the daily average minimum moneyness (K/P_t) across available strike prices for a given expiration. Max. Moneyness is the daily average maximum moneyness across available strike prices for a given expiration. Min. Call Delta is the daily average of minimum call option delta across available strike prices for a given expiration. Max. Put Delta is the daily average maximum put option delta across available strike prices for a given expiration. Spread is the daily average of the within trade date median of percentage bid-ask spread for at-the-money ($0.4 \leq \Delta \leq 0.6$) options for a given expiration. Volume is the sum of trading volume across all contracts and trade dates for a given expiration. Open Interest is the daily average total open interest across all contracts for a given expiration. The sample covers trade dates from October 2016 through December 2024, with some expirations extending into 2025 (see Table 1).

	Statistic							
	Count	Mean	P5	P25	P50	P75	P95	SD
#Strikes	1,571	200	114	152	181	226	372	73
Min. Moneyness	1,571	0.35	0.13	0.25	0.28	0.46	0.62	0.17
Max. Moneyness	1,571	1.30	1.13	1.20	1.29	1.37	1.52	0.14
Min. Call Delta	1,571	0.0014	0.0003	0.0005	0.0008	0.0012	0.0044	0.0030
Max. Put Delta	1,571	-0.0006	-0.0023	-0.0005	-0.0002	-0.0001	-0.0001	0.0013
Spread	1,571	1.6%	0.8%	1.0%	1.2%	2.1%	3.6%	0.9%
Volume	1,571	722,637	255,779	407,993	567,700	944,313	1,612,200	452,528
Open Interest	1,571	145,068	26,375	45,233	63,511	210,548	471,214	169,572

Table A2:
Retail Trading Activity

This table reports average daily shares of retail volume (in contracts) using the proxy of Bryzgalova et al. (2023). Trade date-expiration level daily retail volume shares are grouped by year of the trade date, trading days to expiration, and expirations following CPI, FOMC, NFP releases or other expirations. This analysis uses option trade data obtained from Cboe. Trades with a price of quantity less than or equal to zero are removed. Trades with prices below the prevailing best bid minus the bid-ask spread or above the best ask plus the bid-ask spread are removed. Trades with a prevailing bid-ask spread that is less than or equal to zero are removed. Cancelled trades are removed. Results are presented for trade dates from 2021 through 2024. The retail trading proxy detects negligible retail activity prior to 2021.

2021				
Days to Expiration	Other	CPI	FOMC	NFP
0	0.96%	0.68%	0.32%	0.76%
1	0.97%	0.64%	2.13%	1.35%
2	0.51%	0.00%	0.49%	0.45%
3	0.38%	0.16%	0.49%	0.34%
4	0.22%	0.00%	0.21%	0.26%
5	0.13%	0.04%	0.13%	0.08%
6	0.16%	0.11%	0.33%	0.25%
7	0.26%	0.12%	0.11%	0.22%
8	0.21%	0.19%	0.10%	0.12%
9	0.19%	0.45%	0.06%	0.07%
10	0.13%	0.23%	0.17%	0.12%

2022				
Days to Expiration	Other	CPI	FOMC	NFP
0	3.50%	3.04%	1.83%	3.31%
1	2.37%	2.91%	2.68%	3.48%
2	1.39%	1.28%	0.98%	1.68%
3	1.05%	0.75%	0.89%	1.89%
4	0.82%	1.45%	0.00%	0.79%
5	0.63%	0.11%	0.25%	0.47%
6	0.72%	0.78%	0.82%	0.35%
7	0.78%	0.43%	0.39%	0.72%
8	0.63%	0.90%	1.20%	0.81%
9	0.80%	0.53%	0.82%	0.45%
10	0.72%	0.00%	0.00%	0.36%

2023				
Days to Expiration	Other	CPI	FOMC	NFP
0	3.82%	4.11%	2.81%	3.03%
1	1.97%	1.84%	2.55%	0.95%
2	1.21%	0.87%	0.91%	1.14%
3	1.06%	0.73%	0.60%	1.08%
4	0.73%	0.00%	0.31%	0.64%
5	0.59%	1.05%	0.33%	0.62%
6	0.72%	0.34%	0.49%	1.00%
7	0.72%	0.36%	0.25%	0.83%
8	0.59%	0.41%	0.29%	0.74%
9	0.58%	0.17%	1.50%	0.88%
10	0.61%	0.31%	0.84%	0.67%

2024				
Days to Expiration	Other	CPI	FOMC	NFP
0	3.16%	3.54%	4.78%	3.83%
1	2.37%	1.27%	3.49%	1.75%
2	1.36%	0.73%	1.07%	1.26%
3	1.21%	1.12%	0.68%	0.90%
4	0.89%	0.52%	0.80%	0.84%
5	0.66%	1.17%	0.72%	0.00%
6	0.78%	0.74%	0.70%	0.94%
7	0.77%	0.58%	1.09%	0.86%
8	0.77%	0.48%	0.71%	1.17%
9	0.76%	0.12%	0.00%	0.48%
10	0.62%	0.24%	0.31%	0.61%

Table A3: QR Coefficient Estimates and Model Fit, SVIX measure

On each trade date t, we fit the term structure of forward risk premium using a quantile regression model:

$$Q_{F_{t,e_1:e_2}|x_{t,e_1:e_2}}(\mathcal{T}) = x_{t,e_1:e_2}\beta_{t,\mathcal{T}},$$

where $Q_{F_{t,e_1:e_2}|x_{t,e_1:e_2}}(\mathcal{T})$ is the $\mathcal{T}$'th quantile of forward equity premiums observed on trade date t and $x_{t,e_1:e_2}$ is a vector containing the conditioning variables. Panel A reports summary statistics of the estimated coefficients across trade dates in our baseline estimation. Panel B reports model fits for various quantile regression specifications. The goodness of fit measure, the pseudo$-R^2$, is estimated as 1 minus the ratio between the sum of absolute deviations in the parameterized model and the sum of absolute deviations in the null (non-conditional) quantile model. The specifications show the incremental improvement in model fit when additionally conditioning on the first forward period expiration of the week ($I_{e_2=fow}$), time to expiration (T_{t,e_2}), and time to expiration squared (T^2_{t,e_2}), respectively. Panel C reports summary statistics of measures of abnormal risk premiums under the different quantile regressions (QR) specifications. Each panel is based on estimations using the SVIX lower bound measure of the equity premium.

Panel A: Coefficient Estimate Statistics, Baseline Specification

	count	mean	p5	p25	p50	p75	p95	sd
Constant	2,072	1.36	0.18	0.35	0.66	1.36	4.05	3.20
First of Week	2,072	0.30	0.02	0.09	0.16	0.37	0.92	0.53
Slope	2,072	-0.02	-0.22	-0.01	0.02	0.05	0.14	0.36
Curvature	2,072	0.00	-0.01	-0.00	-0.00	0.00	0.01	0.01

Panel B: Goodness of Fit Statistics Across Model Specifications

	count	mean	p5	p25	p50	p75	p95	sd
$Q_{F_{t,e_1:e_2}\|1}$	2,072	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00
$Q_{F_{t,e_1:e_2}\|1,I_{e_2=fow}}$	2,072	0.13	0.00	0.03	0.09	0.20	0.43	0.14
$Q_{F_{t,e_1:e_2}\|1,I_{e_2=fow},T_{e_2}}$	2,072	0.37	0.05	0.19	0.36	0.53	0.72	0.21
$Q_{F_{t,e_1:e_2}\|1,I_{e_2=fow},T_{t,e_2},T^2_{t,e_2}}$	2,072	0.48	0.13	0.30	0.48	0.65	0.80	0.22

Panel C: Abnormal Equity Premium Across Model Specifications

	count	mean	p5	p25	p50	p75	p95	sd
$Q_{F_{t,e_1:e_2}\|1}$	29,549	0.08	-0.63	-0.15	-0.00	0.14	0.88	1.30
$Q_{F_{t,e_1:e_2}\|1,I_{e_2=fow}}$	29,549	0.09	-0.55	-0.12	-0.00	0.13	0.78	1.28
$Q_{F_{t,e_1:e_2}\|1,I_{e_2=fow},T_{t,e_2}}$	29,549	0.08	-0.35	-0.06	-0.00	0.08	0.65	0.93
$Q_{F_{t,e_1:e_2}\|1,I_{e_2=fow},T_{t,e_2},T^2_{t,e_2}}$	29,549	0.07	-0.29	-0.05	-0.00	0.06	0.60	0.71

C. Procedure to Group Macroeconomic Variables into 45 Releases

Our procedure for grouping the 125 macroeconomic variables tracked in the Bloomberg Economic Calendar into 45 releases is as follows:

1. For each variable, determine the first announcement date available, T_i^{min}.
2. Sort the variables based on Bloomberg's relevance score, from most to least relevant.
3. Define a set of 125 daily dummy variables $D_{i,t}$, with $i = 1, \ldots, 125$, and $D_{i,t} = 1$ if date t is an announcement date for variable i.
4. For each variable, regress $D_{i,t}$ on $D_{1,t}, \ldots, D_{i-1,t}$ using daily data from T_i^{min} and later.
   - If an $R^2 = 1$ emerges, determine (by looking at the underlying releases) whether the variable i is from the same release as one of the more relevant variables 1 to $i-1$. This is the case for 64 variables. We then use only one combined release dummy and label it based on the most relevant variable included in the release measured by the Bloomberg relevance variable.
   - For nine variables, R^2 values close to 1 in cases where the less relevant variable is in fact from the same release as a more relevant variable, but one of the two variables involved has one or a few errors in the release date. In each case, we use only one combined release dummy, labeling releases based on the most relevant variable according to the Bloomberg relevance variable.
   - For four variables, we get R^2 values above 0.80 despite the variables not being a part of a release of a more relevant variable. This occurs when two variables tend to be released on the same dates, but as part of different economic releases. We drop these variables to avoid multi-collinearity issues. We also drop one quarterly variable which is always released on the same day as another monthly variable. Finally, we drop the Challenger Job Cuts release because, in some years, it is always released the Thursday before the nonfarm payroll release which makes it indistinguishable from that release in the period where we use Mon/Wed/Fri options to estimate equity premiums.
   - One variable has data only from 2023, and we drop it.

Based on this method, we group variables into 45 (=125-64-9-6-1) macroeconomic releases. The groupings of macroeconomic variables are reported in Internet Appendix Table A4.

Table A4: Grouping of Macroeconomic Variables Into 45 Releases

This table lists the grouping of the 125 macroeconomic variables tracked in the Bloomberg Economic Calendar into 45 releases. Variables are grouped using the approach detailed in Internet Appendix C.

Release No.	Macro variable
1	Nonfarm Payroll
1	Unemployment Rate
1	Change in Manufact. Payrolls
1	Average Hourly Earnings MoM
1	Average Hourly Earnings YoY
1	Change in Private Payrolls
1	Average Weekly Hours All Employees
1	Underemployment Rate
1	Labor Force Participation Rate
1	Two-Month Payroll Net Revision
2	Initial Jobless Claims
2	Continuing Claims
3	FOMC Rate Decision (Upper Bound)
3	FOMC Rate Decision (Lower Bound)
3	Interest on Reserve Balances Rate
4	CPI MoM
4	CPI YoY
4	CPI Ex Food and Energy MoM
4	CPI Ex Food and Energy YoY
4	CPI Core Index SA
4	CPI Index NSA
4	Real Avg Weekly Earnings YoY
4	Real Avg Hourly Earning YoY
5	GDP Annualized QoQ
5	GDP Price Index
5	Personal Consumption
5	Core PCE Price Index QoQ
6	ISM Manufacturing
6	ISM Prices Paid
6	ISM New Orders
6	ISM Employment
7	U. of Mich. Sentiment
7	U. of Mich. 1 Yr Inflation
7	U. of Mich. 5-10 Yr Inflation
7	U. of Mich. Expectations
7	U. of Mich. Current Conditions

Release No.	Macro variable
8	Retail Sales Advance MoM
8	Retail Sales Ex Auto MoM
8	Retail Sales Ex Auto and Gas
8	Business Inventories
8	Retail Sales Control Group
9	Conf. Board Consumer Confidence
9	Conf. Board Expectations
9	Conf. Board Present Situation
10	Durable Goods Orders
10	Factory Orders
10	Durables Ex Transportation
10	Cap Goods Orders Nondef Ex Air
10	Cap Goods Ship Nondef Ex Air
10	Factory Orders Ex Trans
11	ADP Employment Change
12	MBA Mortgage Applications
13	New Home Sales
13	New Home Sales MoM
14	Housing Starts
14	Building Permits
14	Housing Starts MoM
14	Building Permits MoM
15	Industrial Production MoM
15	Capacity Utilization
15	Manufacturing (SIC) Production
16	PPI Final Demand MoM
16	PPI Final Demand YoY
16	PPI Ex Food and Energy MoM
16	PPI Ex Food and Energy YoY
16	PPI Ex Food, Energy, Trade MoM
16	PPI Ex Food, Energy, Trade YoY
17	Existing Home Sales
17	Existing Home Sales MoM
18	Personal Income
18	Personal Spending
18	PCE Core Deflator MoM
18	PCE Core Deflator YoY
18	PCE Deflator YoY
18	Real Personal Spending
18	PCE Deflator MoM
19	Trade Balance
20	Empire Manufacturing
21	Leading Index
22	MNI Chicago PMI
23	Wholesale Inventories MoM
23	Wholesale Trade Sales MoM

Release No.	Macro variable
24	ISM Services Index
24	ISM Services Prices Paid
24	ISM Services New Orders
24	ISM Services Employment
25	Philadelphia Fed Business Outlook
26	Import Price Index MoM
26	Import Price Index YoY
26	Export Price Index MoM
26	Export Price Index YoY
26	Import Price Index ex Petroleum MoM
27	Pending Home Sales MoM
27	Pending Home Sales NSA YoY
28	Employment Cost Index
29	Monthly Budget Statement
30	Richmond Fed Manufact. Index
31	Current Account Balance
32	Net Long-term TIC Flows
32	Total Net TIC Flows
33	FHFA House Price Index MoM
34	Dallas Fed Manf. Activity
35	Chicago Fed Nat Activity Index
36	NFIB Small Business Optimism
37	FOMC Meeting Minutes
38	JOLTS Job Openings
39	NAHB Housing Market Index
40	Nonfarm Productivity
40	Unit Labor Costs
41	Wards Total Vehicle Sales
42	Consumer Credit
43	Kansas City Fed Manf. Activity
44	Household Change in Net Worth
45	Advance Goods Trade Balance
45	Retail Inventories MoM

D. Data Collection for a Century of Macroeconomic Releases

To provide more context for the difference in magnitudes between our option-implied estimates of the macroeconomic release premium and those of previous studies using realized excess returns, we hand-collect historical data for FOMC meetings, NFP releases, and CPI releases dating as far back as 1928. These data allow us to provide novel extended sample estimates of equity premiums for these event types using average excess returns.

FOMC meetings from 1936: We hand-collect data on FOMC meetings dating back to 1936 from the Federal Reserve Board's webpage. To restrict attention to scheduled meetings, we remove conference calls. This results in 826 FOMC meetings over an 89-year period from 1936 to 2024, with the number of meetings per year ranging from 3 to 19. We date the FOMC as the second meeting day for 2-day meetings. Prior to 1994, no announcement was made following an FOMC meeting and the public instead learned of any policy change from the open market operation on the following day. We follow Kuttner (2001) and Savor and Wilson (2013) and assume that the FOMC "announcement" in those years was one day after the meeting.[22] We examined newspaper archives using Proquest to assess whether investors were aware of the dates of FOMC meetings in the early decades of the sample, finding many references to upcoming FOMC meetings. For example, a January 22, 1937, Wall Street Journal article covers an upcoming FOMC meeting, reporting "Open Market Group to Meet January 26".

Nonfarm payroll announcements from 1928: For NFP announcements from May 1955, we use the Federal Reserve's ALFRED database. Prior to this, we hand-collect announcements dating back to 1928 using Proquest newspaper archives. NFP announcements were widely covered by the press as we find articles in the New York Times, Wall Street Journal, and other leading publications for most announcements, which occur monthly over the full 1928-2024 sample.[23] Overall, we obtain dates for 1,129 NFP announcements. As anecdotal evidence that NFP has been an important economic indicator for decades, we note that the first Federal Reserve Greenbook from June 1964 prominently lists NFP among the indicators monitored.[24]

CPI announcements from 1941: For CPI announcements from March 1949, we use the Federal Reserve's ALFRED database. CPI release dates back to 1941 are then obtained from historical newspapers via ProQuest as well as from documents from the National Archives. We accessed hard copies of the CPI releases during a site visit to the National Archives. The hard copies were available from November 1944 and provided proof of concept that the

[22]Lucca and Moench (2015) also study an extended sample (back to 1960) relative to their main sample (back to 1994). However, compared to our analysis they used the day of, rather than the day after, the FOMC, as their focus was a potential pre-FOMC drift.

[23]Data are sparser from 1943-1951 where we are able to date between 6 and 11 announcements per year.

[24]See https://www.federalreserve.gov/monetarypolicy/files/FOMC19640617greenbook19640610.pdf.

Proquest new articles search worked as intended, as the verification exercise produced the same CPI release dates. We then extended the data as far back as possible with Proquest searches until the period before which inflation announcements (at that time called the "Cost of Living Index") were weekly.

E. Additional Empirical Results

This section provides additional results that supplement the main analysis and also show robustness. Table A5 reports forward periods with significant abnormal option-implied equity premiums for log measures of the equity premium. Table A6 reports multivariate results examining option-implied measures of expected returns in the cross-section of macroeconomic releases. Figure A1 reports multivariate results examining option-implied measures of expected log returns in the cross-section of macroeconomic releases. Table A7 reports option-implied macroeconomic release equity premium statistics using alternative measures of the equity premium.

Table A5: Forward Periods with Significant Abnormal Option-Implied Equity Premium Measures, Log Measures of Equity Premium

This table reports all forward periods with significant abnormal option-implied measures of equity premiums, instead using log measures of the equity premium. After averaging abnormal premiums across available trade dates for each forward period $e_1 : e_2$, we estimate the following regression using the time series of average abnormal forward premiums:

$$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \beta I_{e_1:e_2} + \epsilon_{e_1:e_2},$$

where $A_{e_1:e_2}$ is the average abnormal LVIX forward lower bound (per trade day) for forward period $e_1 : e_2$, $H_{e_1:e_2}$ is the length of the forward period in trade days, and $I_{e_1:e_2}$ is an indicator variable equal to one for all observations pertaining to one forward period in each regression and zero otherwise. Statistically significant forward periods are sorted in order of economic significance measured by $\hat{\beta}$ in column (5). Column (2) reports the end date of each forward period. Column (3) reports the associated event(s). For forward periods not spanning CPI, FOMC, and NFP releases, we use the online archives of the Wall Street Journal to identify scheduled event(s). Column (4) reports the length of each forward period in trade days. The p-values are reported in column (6). Raw forward premiums for the LVIX lower bound in basis points over the forward period are reported in column (7). We additionally report estimates, p-values, and raw forward lower bounds for the LLBR in columns (8) through (10).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				LVIX			LLBR		
No.	Forward Period	Event(s)	Period Length	$\beta(bp)$	p-value	Equity Prem. (bp)	$\beta(bp)$	p-value	Equity Prem. (bp)
1	2020-11-04	Presidential Election	2	4.24	< 0.001	7.13	4.78	< 0.001	8.22
2	2023-01-12	CPI	1	2.54	< 0.001	3.37	2.70	< 0.001	3.60
3	2022-12-13	CPI	1	1.99	< 0.001	2.81	2.10	< 0.001	3.02
4	2024-11-06	Presidential Election	1	1.88	< 0.001	2.57	2.01	< 0.001	2.89
5	2016-11-09	Presidential Election	2	1.71	< 0.001	2.54	1.92	< 0.001	2.88
6	2023-03-22	FOMC	1	1.64	< 0.001	2.38	1.79	< 0.001	2.64
7	2020-04-03	NFP	2	1.53	< 0.001	10.96	1.33	< 0.001	13.71
8	2020-04-01	Covid-19	1	1.42	< 0.001	5.92	1.88	< 0.001	7.70
9	2022-10-13	CPI	1	1.37	< 0.001	2.88	1.43	< 0.001	3.15
10	2022-12-14	FOMC	1	1.37	< 0.001	2.18	1.46	< 0.001	2.37
11	2021-01-06	Georgia Runoff	2	1.36	< 0.001	3.44	1.68	< 0.001	4.18
12	2022-11-10	CPI	1	1.33	< 0.001	3.03	1.43	< 0.001	3.30
13	2022-11-02	FOMC	1	1.25	< 0.001	2.94	1.35	< 0.001	3.21
14	2022-03-16	FOMC	2	1.24	< 0.001	4.26	1.48	< 0.001	5.21
15	2023-02-14	CPI	1	1.24	< 0.001	1.81	1.34	< 0.001	2.01
16	2023-02-01	FOMC	1	1.21	< 0.001	1.88	1.26	< 0.001	2.01
17	2023-03-14	CPI	1	1.13	< 0.001	1.79	1.24	< 0.001	1.99
18	2022-07-27	FOMC	2	0.96	< 0.001	2.77	1.03	< 0.001	3.07
19	2020-11-06	NFP	2	0.93	< 0.001	4.12	1.27	< 0.001	5.15
20	2022-09-13	CPI	1	0.88	< 0.001	2.09	0.95	< 0.001	2.32
21	2017-05-08	French Presidential Election Runoff	1	0.84	< 0.001	1.21	1.00	< 0.001	1.45
22	2023-05-03	FOMC	1	0.78	< 0.001	1.37	0.85	0.001	1.52
23	2019-07-01	Trump-Xi G-20 Bilateral	1	0.78	< 0.001	1.36	0.85	0.001	1.53
24	2020-04-08	Covid-19	2	0.76	0.001	10.67	0.56	0.033	13.66
25	2023-02-03	NFP	1	0.74	0.001	1.41	0.78	0.003	1.53
26	2018-11-07	Midterm Election	2	0.71	0.002	2.38	0.86	< 0.001	2.90
27	2022-06-15	FOMC	2	0.70	0.002	2.63	0.79	0.002	2.98
28	2023-04-12	CPI	1	0.70	0.003	1.49	0.79	0.002	1.71
29	2022-09-21	FOMC	2	0.66	0.004	2.34	0.69	0.008	2.63
30	2022-07-13	CPI	2	0.65	0.005	3.04	0.71	0.007	3.45
31	2024-06-12	CPI, FOMC	1	0.60	0.009	0.93	0.65	0.012	1.04
32	2024-11-07	FOMC	1	0.60	0.010	1.32	0.63	0.016	1.55
33	2022-11-09	Midterm Election	1	0.59	0.011	2.33	0.57	0.029	2.49
34	2020-03-04	Covid-19	2	0.59	0.012	1.87	0.65	0.012	2.20
35	2023-01-06	NFP	1	0.58	0.012	1.52	0.65	0.013	1.67
36	2022-05-04	FOMC	2	0.54	0.020	2.11	0.63	0.015	2.55
37	2017-04-24	French Presidential Election First Round	3	0.52	0.026	1.65	0.58	0.026	1.88
38	2024-09-18	FOMC	1	0.51	0.028	1.11	0.62	0.018	1.36
39	2020-10-02	NFP	2	0.50	0.030	3.05	0.59	0.023	3.64
40	2023-04-10	NFP	1	0.48	0.037	1.47	0.57	0.030	1.72
41	2019-07-31	FOMC	2	0.48	0.037	1.16	0.54	0.038	1.33
42	2024-08-29	NVIDIA Earnings	1	0.48	0.039	1.19	0.55	0.033	1.46
43	2020-03-18	Covid-19	2	0.47	0.043	4.58	0.72	0.006	5.81
44	2023-03-10	NFP	1	0.47	0.043	1.14	0.51	0.049	1.28

Table A6: Option-Implied Equity Premiums on Macroeconomic Release Dates, Oct 2016-Dec 2024

This table reports results of the following regression of abnormal option-implied measures of the equity premium per forward period on indicator variables for each of the 45 macroeconomic releases and an additional indicator variable for presidential and midterm elections.

$$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \Sigma_{m=1}^{M} \left(\gamma_m I_{m,e_1:e_2} \right) + \delta I_{e_1:e_2}^{election} + \epsilon_{e_1:e_2},$$

where $A_{e_1:e_2}$ is the average across available trade dates of the trade date-forward period level SVIX lower bound, $I_{m,e_1:e_2} = 1$ if macroeconomic release m occurs over forward period $e_1 : e_2$ and equals zero otherwise. $I_{e_1:e_2}^{election} = 1$ for forward periods spanning presidential and midterm elections. $H_{e_1:e_2}$ is the length of the forward period in trading days. Releases for which γ values are statistically significant and positive are labeled with the release name and statistically insignificant estimates are instead labeled with their release number (listed in Internet Appendix Table A4). Robust standard errors are used. The sample consists of forward periods from October 2016 through December 2024.

Regressor	Coefficient	t-stat	Regressor	Coefficient	t-stat
$I_{1,e}$ (NFP)	0.22	4.50***	$I_{26,e}$	-0.01	-0.22
$I_{2,e}$	-0.01	-0.19	$I_{27,e}$	-0.07	-1.62
$I_{3,e}$ (FOMC)	0.68	6.88***	$I_{28,e}$	-0.14	-1.74*
$I_{4,e}$ (CPI)	0.42	4.02***	$I_{29,e}$	-0.05	-0.76
$I_{5,e}$	0.04	1.06	$I_{30,e}$	-0.07	-1.93*
$I_{6,e}$	0.03	0.40	$I_{31,e}$	-0.09	-1.42
$I_{7,e}$	-0.02	-0.47	$I_{32,e}$	0.05	1.61
$I_{8,e}$	0.02	0.49	$I_{33,e}$	-0.04	-0.58
$I_{9,e}$	0.03	0.36	$I_{34,e}$	0.02	0.78
$I_{10,e}$	-0.02	-0.54	$I_{35,e}$	-0.04	-2.11**
$I_{11,e}$	0.07	1.01	$I_{36,e}$	-0.03	-0.37
$I_{12,e}$	-0.06	-1.54	$I_{37,e}$	0.04	0.98
$I_{13,e}$	-0.02	-0.64	$I_{38,e}$	-0.03	-0.67
$I_{14,e}$	-0.02	-0.52	$I_{39,e}$	0.02	0.57
$I_{15,e}$	-0.04	-1.08	$I_{40,e}$	-0.12	-2.61***
$I_{16,e}$	-0.13	-2.83***	$I_{41,e}$	0.03	0.28
$I_{17,e}$	0.00	0.09	$I_{42,e}$	-0.05	-1.12
$I_{18,e}$	-0.02	-0.44	$I_{43,e}$	0.03	0.83
$I_{19,e}$	0.00	0.05	$I_{44,e}$	-0.06	-1.50
$I_{20,e}$	0.01	0.57	$I_{45,e}$	0.02	0.59
$I_{21,e}$	-0.04	-1.86*	$I_{e}^{election}$	3.43	3.74***
$I_{22,e}$	0.06	0.86	Constant	0.03	1.94**
$I_{23,e}$	-0.05	-1.24	N	1,551	
$I_{24,e}$	0.02	0.40	R^2	0.35	
$I_{25,e}$	0.05	1.39			

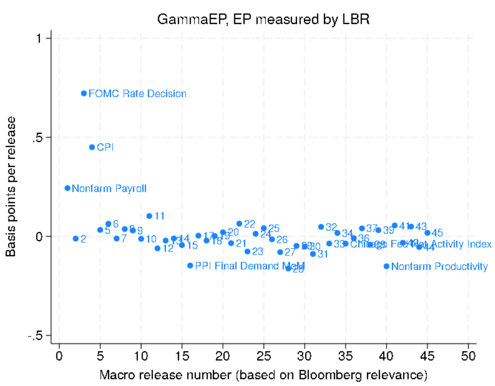
Figure A1: Option-Implied Equity Premiums on Macroeconomic Release Dates, Alternative Measures of Equity Premium

This figure reports results for the following regression of alternative measures of option-implied abnormal equity premiums per forward period on indicator variables for each of the 45 macroeconomic releases and an additional indicator variable for presidential elections:

$$A_{e_1:e_2} \times H_{e_1:e_2} = \alpha + \Sigma_{m=1}^{M} \left(\gamma_m I_{m,e_1:e_2}\right) + \delta I_{e_1:e_2}^{election} + \epsilon_{e_1:e_2},$$

where $A_{e_1:e_2}$ is the average abnormal LVIX lower bound, LBR lower bound, or the LLBR lower bound across available trade dates, $I_{m,e_1:e_2} = 1$ if macroeconomic release m occurs over forward period $e_1 : e_2$ and zero otherwise. $I_{e_1:e_2}^{election} = 1$ for forward periods spanning presidential and midterm elections. $H_{e_1:e_2}$ is the length of the forward period in trading days. Panel A reports the estimated γ coefficients (based on separate regressions for the equity premium measured by LVIX lower bound, LBR lower bound, or LLBR lower bound). Releases for which γ values are statistically significant (at the 10% level) are labeled with the release name and statistically insignificant estimates are instead labeled with their release number (listed in Internet Appendix Table A4). The sample consists of forward periods from October 2016 through December 2024

Panel A: Alternative expected return measure



Panel B: Alternative expected *log* return measures

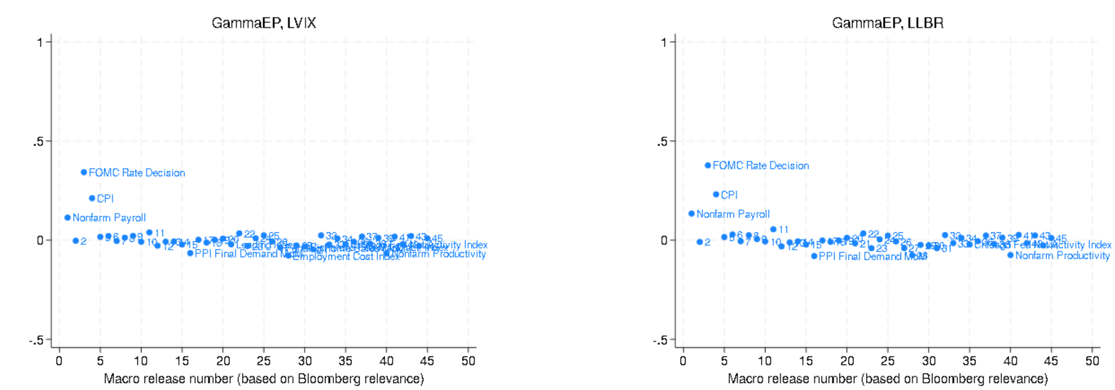


Table A7: Option-Implied Macroeconomic Release Equity Premium Statistics, Log Measures of Equity Premium

This table reports statistics for option-implied equity premium measures over all forward periods in our sample and for forward periods spanning CPI, FOMC, and NFP releases, instead using log measures of the equity premium. Panel A reports results using the LVIX lower bound and Panel B reports results for the LLBR lower bound. Row (1) of each panel reports the number of forward periods in our sample, row (2) reports the average premium per forward period in the full sample in bp, row (3) reports the yearly average of forward premium per annum in the full sample in percent, row (4) reports the number of forward periods spanning CPI, FOMC, and NFP releases, row (5) reports average forward premiums per period for each release type in bp, row (6) reports the average release forward premium per annum (avg. forward premium per release forward period times number of releases per year) in percent. We also report the share of total forward premium accounted for by CPI, FOMC, and NFP releases in our sample, as well as the share of total forward periods spanning these releases. The sample consists of forward periods from October 2016 through December 2024.

Panel A: LVIX				
(1) No. fwd. periods	1551			
(2) Avg. EP (bp per period)	0.99			
(3) Avg EP p.a. (percent)	1.77%			
	CPI	FOMC	NFP	All
(4) No. release fwd. periods	97	66	98	253
(5) Avg. release EP (bp per period)	1.33	1.44	1.25	1.32
(6) Avg. release EP p.a. (percent)	0.16%	0.12%	0.15%	
(4)/(1)	6.25%	4.26%	6.32%	16.31%
%Total EP	8.41%	6.23%	8.01%	21.88%
Panel B: LLBR				
(1) No. fwd. periods	1551			
(2) Avg. EP (bp per period)	1.18			
(3) Avg EP p.a. (percent)	2.12%			
	CPI	FOMC	NFP	All
(4) No. release fwd. periods	97	66	98	253
(5) Avg. release EP (bp per period)	1.59	1.71	1.51	1.58
(6) Avg. release EP p.a. (percent)	0.19%	0.14%	0.18%	
(4)/(1)	6.25%	4.26%	6.32%	16.31%
%Total EP	8.40%	6.13%	8.05%	21.80%