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US EQUITY ANNOUNCEMENT RISK PREMIA

 $p^{\ell}(1-p)^{n-1-\ell}$

Lukas Petrasek Jiri Kukacka

IES Working Paper 38/2024

 $p^{\ell}(1-p)$

 $^{1-1}(1-p)^{r}$

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US Equity Announcement Risk Premia

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Abstract:

We analyze the announcement risk premia on the US market between September 1987 and March 2023 and find that the market index exhibits average excess returns of 8.3 bps for macroeconomic announcement days. This strongly contrasts with 1.4 bps returns for non-announcement days. We further measure the individual stocks' sensitivities to macroeconomic data announcements over various lookback periods and show that stocks in the high-sensitivity portfolios offer investors significantly higher returns than stocks in the low-sensitivity portfolios. The average returns on the difference portfolios amount to 18 bps per month for the 60-month sensitivities. The Fama-MacBeth regression coefficients for the announcement sensitivity are positive and statistically significant across all lookback periods.

JEL: C58, G12, G14 Keywords: Asset pricing, macroeconomic data announcements, risk premia

1. Introduction

Announcements of macroeconomic data provide economic actors with important information about the current state of the economy. These events draw a lot of attention, and the published figures are often covered on the front pages of the media. Economic actors use information about the level of prices, employment situation, or Gross Domestic Product (GDP) in their plans for the future. The announcements that describe the current state of the economy, therefore, also affect expectations about the future. As they help shape the expected outlook of the whole economy, the announcements should not be ignored by any participant in financial markets.

The expected future state of the economy naturally affects perceptions about the future performance of individual companies. Many companies are traded on the equity market, and hence, the announcements of inflation, sales, and other variables also affect equity asset prices. ¹ Investors use macroeconomic news in their market analyses, and the news significantly impacts their trading decisions. Such events pose a risk to investors. The risk stems from the fact that with every announcement, the future prospects of the economy might deteriorate, and equities might consequently lose their value. The specific premia paid for being exposed to such risk has been coined by the term announcement risk premia. Studying these premia is an important empirical task, and the proper understanding of this phenomenon is valuable for financial institutions, central bankers, investors, and generally all parties that engage in financial markets, as it will allow them to manage risks associated with the asset pricing process more meaningfully.²

Savor and Wilson (2013) study excess returns on days when information about inflation, employment, and interest rates are released. They design a theoretical model of pre-scheduled news announcements based on a Lucas tree economy with a single representative investor who has recursive preferences. Investors are compensated for bearing the market risk and the state variable risk - the risk of learning that the economy might be performing worse than expected. The model builds on the idea that on announcement days, investors gain more insight into the state of the economy compared to non-announcement days. One of the characteristics of the model is that assets with high covariance with the state variable are expected to have higher risk premia during announcement days without necessarily increasing the volatility of their returns. They find that in the period between 1958 and 2009, more than 60% of the total cumulative equity risk premia is earned on announcement days which account for only 13% of all trading days. Consistent with their theoretical model, they also document lower-than-average returns on risk-free assets, indicating that investors move capital from more risky to less risky assets on announcement days.

While the reasoning for the existence of announcement risk premia is well understandable, we first challenge the idea that such premia should be carried by only the four above-mentioned

¹For example, a higher-than-expected hike in the interest rate announced by the Federal Open Market Committee (FOMC) signals cuts in spending, increased borrowing costs, or smaller discounted future profits. In general, this news leads to poor stock market performance. Similarly, a better-than-expected GDP growth rate can lead to an increase in stock prices by prompting investors to believe that companies will observe increased revenues and profits due to the expansion of the economy. However, the reaction of the market always depends on the overall condition of the economy. If the FOMC recognizes that the economy is overheating, a higher-than-expected expansion may actually become bad news because it may signal an increased probability of interest rate hikes. For our study, the key takeaway is that regardless of the interpretation of the news as good or bad, the uncertainty in the macroeconomic data releases bears risks for investors holding assets during the announcements.

 $^{^{2}}$ Li et al. (2015) maintain that the literature devoted to market reaction to the news is limited and deserves more attention.

releases. It is clear that those announcements convey very important information about the economy, but that holds as well for reports on other data, e.g., the GDP, retail sales, or consumer attitudes. The initial motivation for our research is to investigate if other macroeconomic news announcements bear similar risks as the announcements used in previous studies. Hence, on top of the set of releases used in Savor and Wilson (2013, 2014), we gather historical announcement dates for 5 additional macroeconomic releases, such as the GDP, international trade, or personal income reports. We find that over the period from September 1987 to March 2023, investors earn a risk premium of 8.33 bps on the Russell 3000 index on 2434 days when data on at least one of the 10 macroeconomic announcements is released. This is 6.91 bps more than the premia earned on the non-announcement days.³

When it comes to analyzing the effects of news on asset prices, we can distinguish between three streams of literature that differ in the nature of the underlying news variable. The first and the most relevant stream of literature focuses directly on the excess returns around economic data announcements. In these studies, all information about the given release is reduced into a dummy variable taking the value of 1 on announcement days and 0 on other days. This dummy variable is then used to study excess returns or volatilities of various financial assets.⁴ Jones et al. (1998) find elevated excess returns of Treasury bonds and their volatilities on selected announcement days. Huberman and Schwert (1985) adopt a similar approach to study the volatility of Israeli-indexed bonds around the time when data on Israeli inflation is released. Another example is the abovementioned Savor and Wilson (2013) who, among else, have studied the announcement risk premia for bonds as well and found out, e.g., that the risk premia increases with the maturity of the US Treasuries, suggesting that longer-term bonds behave similarly to stocks on a daily horizon. Savor and Wilson (2014) analyze the effect of market betas on announcement-day vs non-announcement days, but find no relationship on non-announcement days.

The second important strand of literature examines the effects of surprise components of regular releases of new information, often concerning macroeconomic data. The surprise components are obtainable as the differences between the real observed value of a given variable and its market expectation, usually proxied by a median of expectations from a group of analysts. Among the most influential works in this strand are Balduzzi et al. (2001) or Gürkaynak et al. (2005).

The last stream focuses on analyzing the market sentiment in general, mostly by extracting valuable information from news articles, headlines, central bank minutes, or statements on social media, classifying the information, and investigating its influence on financial markets. Applications of this approach can be found, e.g., in Schumaker et al. (2012) or Allen et al. (2019).

However, to our best knowledge, there is currently no study exploring the announcement risk premia in the fashion standard for asset pricing - utilizing portfolio sorts, testing for positive announcement risk alphas, or performing Fama-MacBeth regression procedures. Our research uses these techniques, aiming at filling this blind spot in the literature.

We measure the sensitivities of individual stocks to macroeconomic data announcements by regressing their returns on the announcement day dummy variable. Our main empirical finding is

³Using only the original four releases, the difference between announcement and non-announcement day returns is 6.86 bps, but the number of announcement days drops to 1117. This leads to a remarkable observation that while the Consumer Price Index (CPI), Producer Price Index (PPI), employment situation, and FOMC interest rate announcements together coincide with approximately 30% of the cumulative risk premia earned on Russell 3000 between 1987 and 2023, the ratio surges to 69% when all 10 releases in our sample are considered.

⁴In Section 3, we study announcement risk premia in the same manner.

that 1-month ahead returns on portfolios sorted based on the stock-level announcement sensitivities reveal a strong positive relationship between announcement sensitivities and returns for various lookback periods taken into consideration when measuring said sensitivities. In other words, stocks that are more sensitive to macroeconomic data announcements earn consistently higher equalweighted excess returns than stocks that are less sensitive. The market-neutral difference portfolios exhibit up to 18 bps of monthly returns with positive and statistically significant alphas after controlling for the five factors of Fama and French (2015). The highest returns are observed for sensitivities constructed using the 60-month lookback period, suggesting that it is best to measure the sensitivities over longer time frames to capture the announcement risk in the cross-section of asset returns. The results are supported by positive and statistically significant slope coefficients from the Fama-MacBeth regressions of announcement sensitivities on excess stock returns.

The paper is structured as follows. First, Section 2 contains a description of our dataset and an overview of the methodology used. Further, Section 3 contains the preliminary empirical results of our analysis. The main results are shown in Section 4, exploring the effects of sensitivities to macroeconomic announcements in the cross-section of stock returns. Finally, Section 5 concludes.

2. Data & Methodology

This section begins with a description of our data. The integration of two types of specific datasets is necessary for the announcement risk premia analysis. First, data on stock prices serve as the underlying source for both the dependent variables and for the construction of announcement sensitivities. Excess returns are computed utilizing the risk-free rates obtained from Kenneth R. French - Data Library (2023). Second, we collect historical announcement dates of macroeconomic data releases from the St. Louis Fed's Archival Federal Reserve Economic Data (2023) and Federal Reserve Archival System for Economic Research (2023) databases.

In the last part of this section, we explain how we measure the sensitivities of stocks to pre-scheduled macroeconomic data announcements, provide key statistics of the sensitivities, and explore the correlations between the individual sensitivity measures.

2.1. Excess returns

The data on all asset prices used to compute returns are collected from Refinitiv (2023). For the preliminary analysis, investigating the impacts of announcement days on the US market as a whole, we compute daily returns on the Russell 3000 index. The index is market capitalizationweighted and tracks the performance of the 3000 largest stocks in the US.⁵ The date range spans from September 1987 until March 2023 and contains 8961 trading days. Excess returns are computed by subtracting the risk-free rates downloaded from Kenneth R. French - Data Library (2023) from all asset returns.

In order to compute the sensitivities of publicly traded US stocks on the announcement days, we fetch daily close prices of 4071 individual stocks available in the Refinitiv (2023) database over the period spanning from November 1999 to March 2023, covering more than 23 years of market data. While the dataset spans a smaller period compared to other asset pricing studies, it still encompasses multiple economic cycles, including the dot-com bubble, the 2008 global financial

 $^{{}^{5}}$ The Russell 3000 index covers about 98% of the US equity market and, therefore, better represents the market as a whole compared to the S&P 500 index, which covers only about 80% of the total market capitalization.

crisis, the economic expansion following the Great Recession, the COVID-19 pandemic, and the subsequent recovery period. The close prices are used to compute excess returns in the same fashion as in the case of the Russell 3000 index.

2.2. Release dates

The St. Louis Fed's Archival Federal Reserve Economic Data (ALFRED) database offers historical release dates for macroeconomic data announcements. We download release dates for 9 releases that are most relevant to the whole US economy and are available for a significant part of our sample. Our selection of macroeconomic releases takes into consideration the combination of the releases' presence in the previous literature studying macroeconomic announcements, their relevance scores in publicly available economic calendars (specifically, Trading Economics, 2023, Investing.com, 2023, and FxStreet, 2023), and at least 15 years of data availability. For example, we include macroeconomic data releases explored in Beber et al. (2015) and Savor and Wilson (2013) with the required data coverage. Moreover, we add the US International Transactions announcement published by the US Bureau of Economic Analysis. Lastly, we download the FOMC interest rate announcement days from the Federal Reserve Archival System for Economic Research (FRASER) database.

Each release may contain data on more than one macroeconomic variable. For example, the Employment Situation report includes data on the current unemployment rate, non-farm payrolls, labor participation rate, and plenty of other variables. Hence, we consider each economic release as a whole, as opposed to, e.g., Baltussen and Soebhag (2022) or Gürkaynak et al. (2005), who work with individual macroeconomic variables.

Details about the 10 releases considered in this paper are displayed in Table 7 in the Appendix. In total, there are 2434 announcement days in our sample. The most common sources are the US Bureau of Labor Statistics and the US Bureau of Economic Analysis. Most of the announcements fall in the output category, and the majority of them occur with monthly frequency. While there are more than 100 release dates for every release, not all of the releases cover the whole sample. Some announcements become available between October 29, 1996, and July 31, 1998.

Similarly to Savor and Wilson (2013), we favor using only CPI or PPI release, whichever comes first in the given month, and we also adopt the proposition to move the FOMC interest rate announcement days to the day following the last day of the meeting before February 1994. According to our consideration, no similar adjustments are needed for any other pair (or group) of variables in our sample.

2.3. Announcement Sensitivity

We now turn to describe the measurement of the sensitivity of an asset to pre-scheduled macroeconomic data announcements. The relationship between the estimated sensitivities and future stock returns is then investigated in Section 4. We measure the sensitivities by regressing the asset's daily excess returns on the announcement day dummies, i.e., a series of 0's and 1's denoting whether the given day contains a macroeconomic data release (0) or not (1). If the slope coefficient from the regression is positive, then the given asset observes higher returns on announcement days, and vice versa. Assets that observe a slope coefficient close to 0 are considered not sensitive to macroeconomic announcements.

More specifically, the sensitivities are estimated by the following specification

$$R_{i,t} = a_i + as_i A day_t + \varepsilon_{i,t} \tag{1}$$

where $R_{i,t}$ is the excess return of stock *i* on the day *t*, A-day_t is the dummy variable taking the value of 1 when any of the covered macroeconomic data releases occur on the day *t* and $\varepsilon_{i,t}$ is the residual. In the above regression equation, a_i is the constant term and as_i represents the estimated announcement sensitivity.

For every month in our sample, we estimate the parameters of the above cross-sectional regressions for five different lookback periods. Specifically, when running the regression, we feed it with daily data from the past 6, 12, 24, 36, or 60 months. To estimate the announcement sensitivity, we require that prices and A-day data for at least 90% of the days in the lookback period are available.⁶ Because the stock returns sample starts in November 1999, the first estimates of as^{6m} are available in May 2000.

	Mean	Min	5%	25%	Med	75%	95%	Max	SD	Skew	Kurt	Count
as^{6m}	0.05	-1.23	-0.42	-0.13	0.04	0.22	0.54	1.37	0.29	0.10	1.16	2639
as^{12m}	0.05	-0.83	-0.29	-0.08	0.05	0.17	0.40	0.98	0.21	0.10	1.09	2566
as^{24m}	0.05	-0.58	-0.19	-0.04	0.05	0.14	0.30	0.73	0.15	0.10	1.06	2437
as^{36m}	0.05	-0.47	-0.15	-0.03	0.05	0.12	0.26	0.61	0.12	0.10	1.03	2304
as^{60m}	0.05	-0.35	-0.10	-0.01	0.05	0.11	0.21	0.48	0.10	0.10	0.92	2062

Table 1: Summary Statistics for Announcement Sensitivities

Note: The table shows summary statistics for sensitivities to a-day dummies estimated using Equation 1 over five different lookback periods: 6, 12, 24, 36, and 60 months. The descriptive measures used are the mean, minimum (Min), 5%, 25%, 50% (Med), 75%, 95% quantiles, maximum (Max), standard deviation (SD), skewness (Skew), kurtosis (Kurt), and count. The values are time-series averages of monthly cross-sectional statistics. The sample spans between May 2000 and March 2023.

In Table 1, we present summary statistics for the announcement sensitivities, which serve as an important determinant in our model explaining cross-sectional returns. The sensitivities are estimated via Ordinary Least Squares (OLS) regressions introduced above. For every measure of announcement sensitivity, we first compute the summary statistics for each month in the sample and then compute a time-series average of the monthly statistics, which are presented in the table. The mean and median sensitivity remains constant at 0.05 across all time horizons (with the exception of the median value being equal to 0.04 for the 6-month sensitivities), indicating that, on average, market reactions to announcements are positive regardless of the time window considered. The standard deviation, however, decreases with the time horizon, from 0.29 for the 6-month horizon to 0.10 for the 60-month horizon. This trend indicates that announcement sensitivities are more volatile over shorter periods, with the reactions becoming more stable as the observation window extends. This is expected as the lower number of observations in the sensitivity regression for shorter lookback periods allows for more extreme estimates of the announcement sensitivity.

This phenomenon is also captured in the quantiles. In the average month, the minimum values of sensitivities range from -1.23 for the 6-month horizon to -0.35 for the 60-month horizon, illustrating that the most negative reactions are more pronounced over shorter periods. Similarly,

⁶For example, if the lookback period contains 250 trading days (typical for the 12-month lookback period), we require at least 225 daily observations to successfully estimate the given stock's announcement sensitivity. If less than 225 observations are present, the sensitivity is labeled as missing.

the maximum sensitivities decrease from 1.37 at 6 months to 0.48 at 60 months, suggesting that the strongest positive reactions also taper off as the time horizon increases. A similar pattern can be observed for the 5%, 25%, 75%, and 95% quantiles.

The distribution's skewness is 0.10, indicating a slight but consistent positive skew in the distribution of sensitivities. Kurtosis decreases from 1.16 to 0.92 as the horizon increases, suggesting that the distributions are becoming less and less leptokurtic. The number of cross-sectional observations drops for larger horizons as it is more difficult to satisfy the data availability condition when estimating sensitivities in the early years of our sample.

Table 2: Correlations Announcement Sensitivities Across Different Lookback Periods

	as^{6m}	as^{12m}	as^{24m}	as^{36m}	as^{60m}
as^{6m}	1.00	0.71	0.49	0.41	0.33
as^{12m}		1.00	0.70	0.57	0.46
as^{24m}			1.00	0.81	0.65
as^{36m}				1.00	0.78
as^{60m}					1.00

Note: The table shows the upper triangle of the Pearson correlation matrix for sensitivities to a-day dummies estimated using Equation 1 over five different lookback periods: 6, 12, 24, 36, and 60 months. The values are time-series averages of monthly cross-sectional statistics. The sample spans between May 2000 and March 2023.

Table 2 documents correlations in the upper triangle of the correlation matrix of macroeconomic announcement sensitivities measured across different lookback periods. The highest correlations are observed between adjacent lookback periods, with the highest correlation achieved between the 24-month and 36-month sensitivities, reaching 0.81, indicating substantial similarity in announcement sensitivities over shorter intervals. However, as the lookback periods diverge, the correlations decrease, suggesting that sensitivities become less consistent over longer horizons. For instance, the correlation between the 6-month and 60-month sensitivities drops to 0.33, the lowest correlation observed.

3. Preliminary Analysis

In the paragraphs below, we first provide estimates of the risk premia earned on the announcement and non-announcement days, compare our results to those obtained by Savor and Wilson (2013), and attempt to explain the risk premia by other control variables. Last, we illustrate the practical importance of the results by running simple backtests of strategies built on top of the knowledge that the US equity market observes increased returns on announcement days.

3.1. Announcement Risk Premia on the Russell 3000 Index

We start the presentation of our empirical results by analyzing the overall announcement risk premia in the US equity market. First, we compute average excess returns separately for days of important macroeconomic data releases (a-days) and days when no important macroeconomic data announcement occurs (n-days).⁷ For each a-day, the return considered is the percentage difference

⁷We thus adopt the terminology used in Savor and Wilson (2014).

between the close price of the trading day, which precedes the announcement day, and the close price of the announcement day.

	A-days	N-days	All days	Diff
Mean	8.33***	1.42	3.37***	6.91***
t-stat	(3.52)	(1.09)	(2.89)	(2.52)
SD	115.17	117.08	116.52	
Count	2434	6527	8961	

Table 3: Summary Statistics for A-day and N-day Excess Returns

Note: The table shows summary statistics for excess returns on the Russell 3000 index for announcement days, non-announcement days, and all days. The sample spans between September 1987 and March 2023. The rightmost column contains the difference between returns on the announcement and non-announcement days. The returns are measured in basis points. t-statistics for the means are reported in parentheses. We allow for different variances when testing for the difference between a-days and n-days. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

The results are described in Table 3. In line with our hypothesis that additional releases might carry announcement risk premia, the daily average excess return on the Russell 3000 index is much higher on announcement days, when it reaches 8.33 bps, or 0.0833%, than on non-announcement days (1.42 bps) with the difference being 6.91 bps with a *t*-statistic of 2.52. Notice also that the standard deviation is even lower on announcement days than on other days.⁸⁹ Apart from being statistically significant at very low levels, our estimate of the a-day risk premia is highly significant also in economic terms. The Sharpe ratio on a-days is almost six times higher compared to n-days.¹⁰¹¹

3.2. Comparison with Previous Research

Let us now compare our preliminary results with the results we would have obtained using only the four releases studied by Savor and Wilson $(2013)^{12}$, namely the CPI, PPI, Employment

⁸Some releases, e.g., Employment Cost Index, are published quarterly. On the other hand, CPI and PPI, for example, are announced every month. See Table 7 in the Appendix for details about frequencies of releases in our sample. Our data suggests that the announcement risk premium increases with the release frequency. For the sake of brevity, the results are available upon request.

⁹Similarly to Baltussen and Soebhag (2022), we have split releases into five categories: output, sentiment, employment, inflation, and interest rate. However, while Baltussen and Soebhag (2022) work with individual macroeconomic variables, we study the releases as a whole. We have documented that the largest excess returns are observed for releases from the output and interest rate categories. The results are available upon request.

¹⁰Our results do not change qualitatively when we exclude extreme excess returns from the 1st and 100th percentile of their distribution, or when we consider returns on the S&P 500 index, or the value-weighted return of all CRSP firms provided in Kenneth R. French - Data Library (2023) instead of the Russell 3000.

¹¹We have also tested whether the number of macroeconomic reports being released on a given day or the number of days that have passed since any previous release affects the announcement risk premia, but we have found no meaningful impact. The results are available upon request.

 $^{^{12}}$ This study is, to our best knowledge, the closest to our research. For example, Hu et al. (2019) utilize several macroeconomic releases, but they focus on the pre-announcement returns, which do not cover the moment of the announcement. Laarits (2019) also examines pre-announcement returns. Other studies, e.g., Frazzini and Lamont (2007), investigate announcement risk premia for earnings releases.

Situation, and the FOMC interest rate announcement. In contrast, we add another 5 variables to the sample. Hence, the original four releases form a subset of the releases analyzed in this paper.

Table 8 in the Appendix includes the results of both approaches on the whole sample period. Both estimates of announcement risk premia are statistically significant at the 1% level. On days when either the CPI, PPI, Employment Situation, or the FOMC interest rate announcement occurs, investors earn about 9.57 bps (t-statistic = 2.62) in excess returns compared to 8.33 bps (t-statistic = 3.52) on days when any of the 10 releases occur. The difference between an a-day and n-day return is 6.86 bps (t-statistic = 1.79) for the four announcements, which is significant in economic terms, but not statistically significant at low levels. On the other hand, on days when the 10 releases occur, investors earn 6.91 bps (t-statistic = 2.52) more than on other days. That is less in absolute terms, but the difference is statistically significant at the 5% level.

The difference between the two approaches becomes more meaningful when we consider the number of observations. While the original announcements occur on 1117 days which accounts for 13% of all days, considering all 10 releases increases the a-day count to 2434, about 27% of all days in the sample. In terms of the cumulative risk premia earned, the higher average excess return earned on the 1117 announcement days cannot offset the impact of slightly lower returns earned on more than two times as many days. Consequently, while the CPI, PPI, Employment Situation, and the FOMC interest rate announcements earn about 30% of the cumulative risk premia in our sample¹³, the value increases to 69% for all 10 macroeconomic releases.¹⁴

3.3. Explaining the Announcement Risk Premia

In Subsection 3.1, we have established that significant risk premia are earned on days of important macroeconomic data announcements. We now run OLS regressions under the following three specifications and test whether additional controls cannot explain parts of the announcement effect. First, the announcement day dummy variable is used as the sole variable on which we regress the excess market returns. Second, we add the lagged market excess return, and its square. Last, the market excess returns are regressed on the previous set of explanatory variables plus day-of-the-week dummies. These controls capture some of the previously discovered asset pricing phenomena and might thus help explain the excess returns and even a part of the announcement risk premia.

For example, the regression equation of the second specification reported in Panel B of Table 9 in the Appendix takes the form

$$R_t = \beta_0 + \beta_1 A \cdot day_t + \beta_2 R_{t-1} + \beta_3 R_{t-1}^2 + \varepsilon_t \tag{2}$$

where t indexes days, R denotes excess returns, A-day is an announcement day dummy variable, β_0, \dots, β_4 are coefficients, and ε is the error term.

The coefficient on the risk announcement dummy under the specification in Panel A of Table 9 is both economically and statistically significant. On announcement days, an additional

 $^{^{13}}$ Taking into account differences in our sample choice, contrast the ratio to the 60% of the cumulative risk premia claimed in Savor and Wilson (2013).

¹⁴Let us stress that the comparison is made using a different sample period and using a different price index than in the original study. Unfortunately, we could not make the comparison on the same sample due to data availability. It is clear that the choice of the sample period or the price index that we examine influences the results to some extent. But even after taking the sample choice into account, we conclude that the newly studied macroeconomic releases convey an essential part of the overall announcement risk premia.

6.91 bps (t-statistic = 2.64) is earned on top of the average excess return. This should come as no surprise as the figure should correspond to the difference in means measured in Table 3. In the next two specifications, the lagged return is the only control variable that helps explain the excess returns at low levels of significance, but the estimates of the a-day coefficients do not qualitatively change. We can hence conclude that no evidence is found that the set of controls used in the regressions captures a meaningful part of the announcement risk premia. The sheer occurrence of an announcement on the given day is itself a very good predictor of the risk premia earned on that day.

3.4. Simple Backtests

To verify the magnitude of the economic impact of the announcement effect, we perform a set of simple backtests of trading strategies that benefit from the observation that the market returns on a-days are significantly larger than returns on n-days. This section is split into three subsections. Firstly, we lay out the assumptions and rules for the backtest. Secondly, we specify a set of strategies that are subject to backtesting. Lastly, we document the results.

3.4.1. Rules and Assumptions

We begin by setting a few rules that our trading strategies should follow. First, trading decisions are made every day. Two different actions can be taken - to have a positive or flat position in the Russell 3000 index. Because whether the given day is an a-day or an n-day is known well in advance, a few weeks at worst, it can be safely assumed that the trading decision for the next trading day can be executed in the closing auction of the current day and the execution latency is far from being important in this case.

The sizing of our trade is always the same because the variable that triggers the trade takes only two values - 0 and 1. The trading decisions can be repeated, i.e., we can have a long position lasting one or more days, and the trading fees are paid only for days when any change to the position is made. Similarly, the borrowing rate paid for the leverage is paid only when the position is not flat and the leverage is being used.

Now, let us set a few assumptions regarding the trading fees and leverage (borrowing rate). The trading fees are set to 0.5 bps of the traded volume. Large hedge funds will see lower trading fees compared to 0.5 bps, while retail investors will pay a larger fee per traded volume. The borrowing rate for leveraged positions is set to the risk-free rate plus 200 bps.

3.4.2. Strategies

We form 4 simple trading strategies that utilize the announcement effect to gain profits. The first strategy used as a benchmark is the simple buy-and-hold strategy that is always long, regardless of whether it is the announcement day or not. The second strategy restricts long positions only to announcement days, being flat on non-announcement days. Thirdly, we backtest a strategy that is similar to the second one. It goes long on a-days and stays flat on n-days while earning the risk-free rate on these days. Lastly, the fourth strategy is similar to the third one, with the exception of utilizing a $2 \times$ leverage on the announcement days, paying the risk-free rate plus 200 bps for the borrowed funds.

3.4.3. Performance

	Mean	SD	Sharpe Ratio
long_a_long_na	3.56	117.41	0.48
$long_a$	2.22	60.70	0.58
$long_a_neutral_na$	3.04	60.68	0.79
$2x_long_a_neutral_na$	4.81	121.34	0.63

 Table 4: Statistics for the Backtest Results

Note: The table summarizes key statistics of backtesting the four strategies defined in Subsection 3.4.2. $long_a_long_na$ represents the buy-and-hold strategy. $long_a$ is the strategy that holds long positions over announcement days and is flat otherwise. The profits of the strategy, which is long on a-days and earns the risk-free rate on n-days, can be found under $long_a_neutral_na$. $2x_long_a_neutral_na$ represents the strategy that utilizes the $2\times$ leverage on its long positions on a-days while earning the risk-free rate on n-days. Mean and SD are measured in basis points. SharpeRatio is the annualized Sharpe ratio computed using daily returns. The assumed trading fees are 0.5 bps per traded volume, and the borrowing rate for the leverage is the risk-free rate plus 200 bps. The sample spans between September 1987 and March 2023.

The backtest results presented in Figure 1 illustrate the performance of four distinct investment strategies specified in Subsection 3.4.2 over the period from 1987 to 2023. The mean return, its standard deviation, and the annualized Sharpe ratio for each strategy can be found in Table 4.

The buy-n-hold strategy $(long_a_long_na)$, represented by the blue line, serves as a benchmark and demonstrates steady growth throughout the period. This strategy delivers consistent daily average returns of 3.6 bps with medium volatility, resulting in a Sharpe ratio of 0.48. The long-a-day strategy $(long_a)$, shown by the orange line, holds long positions over announcement days and is flat otherwise. While delivering the lowest average returns, it maintains a low volatility as well, leading to a promising Sharpe ratio of 0.58. The third strategy depicted by the green line $(long_a_neutral_na)$ performs a little worse to the buy-n-hold strategy in terms of average returns (3.0 bps). The strategy is similar to the long-a-day strategy, but it deploys the available capital to earn the risk-free rate on n-days. Therefore, its standard deviation is also very low, and it hence achieves the highest Sharpe ratio of all the strategies, specifically 0.79. The last strategy $(2x_long_a_neutral_na)$, represented by the red line, shows the highest level of cumulative returns. On top of the third strategy, it utilizes a $2 \times$ leverage to boost its returns on a-days while also earning risk-free rates on n-days. It achieves record average daily returns of 4.8 bps but also exhibits the highest volatility, and its Sharpe ratio reaches 0.63, beating the buy-n-hold strategy as well.

Overall, the results indicate that more complex or leveraged strategies, such as the strategy of taking leveraged positions on a-days, may offer higher returns, albeit with increased risk. On the other hand, simpler strategies like the buy-n-hold strategy or long-a-day with earning risk-free rates on n-days tend to provide more modest but stable outcomes. These findings illustrate the practical impacts of this research.

4. Announcement Sensitivity and the Cross-section of Stock Returns

This section analyzes the sensitivity to macroeconomic data announcements as an asset pricing factor. We perform an empirical investigation into how the announcement sensitivity



Figure 1: PnL Curve of the Backtested Strategies

Note: The figure shows the PnL curve of the four strategies defined in Subsection 3.4.2. The blue line represents the buy-and-hold strategy $(long_a_long_na)$. The orange line is the strategy that holds long positions over announcement days and is flat otherwise $(long_a)$. The profit curve for the strategy, which is long on a-days and earns the risk-free rate on n-days $(long_a_neutral_na)$, is shown by the green line. The red line represents the strategy that utilizes the $2 \times$ leverage on its long positions on a-days while earning the risk-free rate on n-days $(2x_long_a_neutral_na)$. The profits are measured in basis points. The assumed trading fees are 0.5 bps per traded volume, and the borrowing rate for the leverage is the risk-free rate plus 200 bps. The sample spans between September 1987 and March 2023.

affects the prices of 4071 US companies in our sample which ranges from November 1999 to March 2023. Subsection 4.1 documents the results of the analysis of 1-month ahead returns of portfolios sorted based on the announcement sensitivities. Subsection 4.2 then provides time-series averages of the slope coefficients obtained by performing the Fama-MacBeth regression procedure.

4.1. Portfolios

In this subsection, we explore the relationship between announcement sensitivities and future stock returns by performing univariate portfolio sorts based on the estimated sensitivities to pre-scheduled macroeconomic data announcements. Specifically, for each month, we rank stocks by their announcement sensitivity and form quintile portfolios, with the first portfolio containing stocks with the lowest sensitivities and the fifth portfolio containing those with the highest sensitivities.¹⁵ For each portfolio, we then calculate equal-weighted excess returns over the risk-free rate in the following month. Additionally, we construct difference portfolios to test whether stocks with high sensitivity to macroeconomic announcements tend to outperform relative to stocks with

 $^{^{15}}$ We have performed the same analysis also for 2, 3 (both equal-size and 30-40-30 portfolios), and 10 portfolios with similar results.

low sensitivity.¹⁶

Next, we assess whether the difference portfolio generates abnormal returns controlling for the standard asset pricing factors of Fama and French (2015), namely the market, size, value, profitability, and investment. We regress the difference portfolio returns, i.e., the announcement sensitivity factor, on the Fama-French 5 Factor Model (FF5) factors. The estimate of the constant, which we label FF5 α , represents the average abnormal return of our factor. If it is statistically different from zero, it suggests that the announcement sensitivity factor captures excess returns not explained by the traditional asset pricing factors.

	1	2	3	4	5	5 - 1	5 - 1 FF5 α
as^{6m}	0.0073	0.0063	0.0066	0.0067	0.0078	0.0005	0.004
	(5.07)	(4.72)	(5.12)	(4.86)	(5.10)	(0.84)	(0.65)
as^{12m}	0.0069	0.0059	0.0062	0.0069	0.0083	0.0014	0.0013
	(4.80)	(4.47)	(4.66)	(4.87)	(5.20)	(2.60)	(2.15)
as^{24m}	0.0070	0.0063	0.0062	0.0067	0.0085	0.0015	0.0016
	(4.72)	(4.79)	(4.48)	(4.60)	(5.33)	(2.53)	(2.64)
as^{36m}	0.0071	0.0060	0.0061	0.0065	0.0087	0.0015	0.0016
	(4.51)	(4.46)	(4.29)	(4.52)	(5.14)	(2.61)	(2.76)
as^{60m}	0.0062	0.0058	0.0060	0.0067	0.0080	0.0018	0.0018
	(4.12)	(3.86)	(4.05)	(4.15)	(4.63)	(2.91)	(2.88)

Table 5: Portfolio Sorts

Note: The table shows the 1-month ahead equal-weighted excess returns of quintile portfolios sorted based on sensitivities to a-day dummies estimated using Equation 1 over five different lookback periods: 6, 12, 24, 36, and 60 months. Column 5–1 contains results for the difference portfolio that is short in the first quintile portfolio (low announcement sensitivity) and long in the fifth quintile portfolio (high sensitivity). Column 5-1 FF5 α documents the alpha from the regression of the difference portfolio returns on the five factors of Fama and French (2015). The values are time-series averages of monthly cross-sectional statistics. The sample spans between May 2000 and March 2023. T-statistics for the averages computed with Newey-West standard errors using 6 lags are reported in parentheses.

The results in Table 5 demonstrate a positive relationship between sensitivities to macroeconomic announcements and future stock returns. For all lookback periods (6, 12, 24, 36, and 60 months), the higher-sensitivity quintile portfolios (5) exhibit consistently higher 1-month-ahead equal-weighted excess returns than lower-sensitivity portfolios (1). For instance, with a 12-month lookback period, the most sensitive portfolio earns the excess return of 0.83% in the average month, compared to 0.69% for the least sensitive portfolio, resulting in the return of 0.14% for the difference portfolio (5 - 1), with a statistically significant t-statistic of 2.60.¹⁷ This positive return difference persists across all lookback periods, ranging from 0.05% to 0.18%, indicating that stocks with greater sensitivity to macroeconomic announcements tend to outperform those with lower

¹⁶The difference portfolio is a portfolio that is short in the first quintile portfolio (low announcement sensitivity) and long in the fifth quintile portfolio (high sensitivity).

 $^{^{17} {\}rm The}~0.14\%$ monthly return accumulates to an economically meaningful annualized return of 1.7% for the market-neutral difference portfolio.

sensitivity in subsequent months. The only exception is the 6-month announcement sensitivity, where the results miss the threshold for 5% significance by a small margin.

Furthermore, the Fama and French (2015) 5-factor alphas for the difference portfolios $(5 - 1 \text{ FF5 } \alpha)$ provide additional support for these findings. The positive and statistically significant alphas observed for lookback periods between 12 and 60 months suggest that the returns of the difference portfolios between high and low announcement sensitivity stocks are not fully explained by traditional risk factors. For example, the FF5 alpha for the 12-month lookback is 0.13% per month, with a t-statistic of 2.15, indicating a robust risk-adjusted return. This suggests that macroeconomic announcement sensitivity captures unique information beyond the conventional 5-factor asset pricing factors (Fama and French, 2015), making it a valuable factor for understanding cross-sectional stock returns.

4.2. Fama-MacBeth Regressions

After having tested the relationship between the announcement sensitivity and future returns using the non-parametric portfolio analysis, we now turn to perform Fama-MacBeth regressions. This way, we impose a functional form on the relationship.

The Fama-MacBeth regression procedure has two stages. First, for every month in the sample, we run cross-sectional regressions of the form

$$R_{i,m+1} = a_m + b_m a s_{i,m} + \varepsilon_{i,m} \tag{3}$$

where $R_{i,m+1}$ is the excess return of stock *i* in the month m+1, $as_{i,m}$ is the stock's announcement sensitivity in the month *m* and $\varepsilon_{i,m}$ is the residual. In the above regression equation, a_m is the constant term, and b_m is the estimated slope coefficient. In the second stage, we average the slope coefficients.

Table 6:	Fama-M	acBeth	Regression	Slope	Estimates

	Avg Slope
as^{6m}	0.001
	(0.93)
as^{12m}	0.003
	(3.07)
as^{24m}	0.004
	(2.85)
as^{36m}	0.005
	(2.90)
as^{60m}	0.007
	(3.01)

Note: The table shows the time-series averages of the monthly cross-sectional regression slope coefficients estimated using Equation 3 for announcement sensitivities specified for the 6m, 12m, 24m, 36m and 60m lookback periods. The sample spans between May 2000 and March 2023. T-statistics for the regression coefficients computed with Newey-West standard errors using 6 lags are reported in parentheses. All estimates are statistically significant at the 5% level.

The time-series averages of the slopes of as^{6m} , as^{12m} , as^{36m} and as^{60m} are reported in Table 6. The slope coefficients, which measure the relationship between stock returns and their sensitivities to macroeconomic data releases, increase as the lookback period extends. For the 12-month lookback, the average slope is 0.003 with a t-statistic of 3.07, indicating a significant positive relationship between announcement sensitivity and future returns. As the lookback period increases, the slope coefficients rise, reaching 0.007 for the 60-month lookback period, with a tstatistic of 3.01, demonstrating a stronger and highly significant positive relationship over longer time horizons.

The t-statistics for all lookback periods except 6 months indicate that the slopes are statistically significant at the 5% level, with increased values for longer lookback periods. These results confirm that stocks with higher sensitivities to macroeconomic announcements tend to earn higher returns. This further underscores the importance of announcement sensitivities as a predictor of cross-sectional stock returns.

5. Conclusion

This paper investigates the announcement risk premia on the US equity market. We find strong evidence that between 1987 and 2023, excess returns on the Russell 3000 index exhibit increased excess returns on days when important news on any of the 10 macroeconomic data release dates in our sample is published. In particular, a-day returns amount to an average of 8.33 bps, which is 6.91 bps more than n-day returns. Both figures are statistically significant on the 5% level. The inclusion of additional releases considerably improves previous results presented in Savor and Wilson (2013) who study announcement risk premia using reports on the CPI, PPI, employment situation, and interest rates. Lagged returns, lagged volatility, or, e.g., day-of-the-week dummies, are not able to capture the announcement day effect. Backtests of several trading strategies designed to draw upon the announcement risk premia show, for example, that the strategy of buying Russell 3000 on a-days and earning the risk-free interest rate on n-days achieves the average daily return of 3.04 bps with the annualized Sharpe ratio of 0.79.

At the core of our analysis, we measure monthly announcement sensitivities of individual US stocks by regressing the assets' daily returns on announcement day dummies using the 6, 12, 24, 36, or 60-month lookback periods. The mean sensitivity across all lookback periods remains constant at 0.05, being more volatile over shorter lookbacks. The sensitivities have a slight positive skew and are positively but not extremely correlated across the lookback periods.

Overall, our results imply that investors can potentially earn excess returns by constructing portfolios based on these sensitivities to macroeconomic announcements, which serve as a meaningful predictor of future performance. The announcement sensitivity factor, which mimics the difference between the returns of the stocks in the highest announcement sensitivity and the lowest sensitivity quintiles, observes returns of up to 18 bps with positive and statistically significant alpha after controlling for the five factors of Fama and French (2015). Better results are achieved with the less volatile sensitivities for lookback periods over 12 months. The results are confirmed with positive and statistically significant Fama-MacBeth regression slope estimates for the monthly announcement sensitivities estimated with larger than 12-month lookbacks.

The link between pre-scheduled economic releases and higher returns has been established in Savor and Wilson (2013). We have constructed a measure of individual stocks' sensitivities to the releases and documented that it earns significant alpha. Moreover, we have shown that the announcement risk premia should not be restricted to just the small set of CPI, PPI, employment, and interest rate announcements. However, there remains enough space for further research in this area, e.g. regarding the role of the expectations of the released figures, pre-announcement drifts, or the connection between the announcement risk factor and other asset pricing factors.

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Appendix

Release	Source	Category	Freq	Start Date	Count
Surveys of Consumers	Survey Research Center: University of Michigan	Sentiment	12	1998-07-31	297
Advance Monthly Sales for Retail and Food Services	US Census Bureau	Output	12	1987-09-15	453
Producer Price Index	US Bureau of Labor Statistics	Inflation	12	1987-09-11	447
Consumer Price Index	US Bureau of Labor Statistics	Inflation	12	1987-09-23	448
Employment Situation	US Bureau of Labor Statistics	Employment	12	1987-10-02	434
Employment Cost Index	US Bureau of Labor Statistics	Employment	4	1996-10-29	118
Interest Rate Announcement	US Federal Open Market Committee	Interest Rate	×	1987-09-23	285
Personal Income and Outlays	US Bureau of Economic Analysis	Output	12	1987-09-21	440
Gross Domestic Product	US Bureau of Economic Analysis	Output	12	1987-09-18	479
US International Transactions	US Bureau of Economic Analysis	Output	4	1996-12-10	107

Table 7: Releases Characteristics

with the exception of interest rates. Other characteristics have been extracted from the data. Freq represents the number of announcements per year, i.e., the value of 12 is assigned to releases being published every month. *Note:* The table lists all 10 releases used in this study along with the following characteristics. Source, caugery, source, used in Baltussen and Soebhag (2022) The category has been assigned manually by the researchers, and the categories correspond to those used in Baltussen and Soebhag (2022) The category has been assigned manually by the researchers, and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to those used in Baltussen and Soebhag (2022) and the categories correspond to the categories correspond to the categories correspond to the categories (2022) and (2

25, 1999, New Residential Construction was treated as if it belonged among releases with monthly frequency. Since August 25, 1999, we have *The New Residential Construction report was published monthly before August 25, 1999, and twice a month since then. Hence, before August placed it in the category of releases with a higher than monthly frequency.

Table 8: Summary Statistics for A-day and N-day Excess Returns: Comparison with Previous Research

	Panel A	A: All 10	releases	Panel B:	Original	4 releases
	A-days	N-days	Diff	A-days	N-days	Diff
Mean	8.33***	1.42	6.91***	9.57***	2.72**	6.86*
t-stat	(3.52)	(1.09)	(2.52)	(2.62)	(2.28)	(1.79)
SD	115.17	117.08		119.83	117.05	
Count	2434	6527		1117	7844	

Note: The table shows summary statistics for excess returns on the Russell 3000 index for announcement days and non-announcement days. In Panel A, all 10 releases in our sample are considered. In Panel B, only the four releases analyzed by Savor and Wilson (2013) are considered. The sample spans between September 1987 and March 2023. The rightmost column in each panel contains the difference between returns on the announcement and non-announcement days. The returns are measured in basis points. *t*-statistics for the means are reported in parentheses, and we allow for different variances when testing for the difference between a-days and n-days. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

	Panel A	Panel B	Panel C
Intercept	1.6455	0.9520	-1.9497
	(1.25)	(0.69)	(-0.67)
A-day	6.9137***	7.3522***	8.1674***
	(2.64)	(2.73)	(2.84)
$Return_{-1}$		-0.0530**	-0.0532**
		(-2.06)	(-2.07)
$Return_{-1}^2$		0.0001	0.0001
		(1.39)	(1.36)
Monday			0.8973
			(0.21)
Tuesday			5.9743
			(1.57)
Wednesday			5.6349
			(1.51)
Thursday			0.7255
			(0.19)
Count	8930	8930	8930
R^2	0.001	0.005	0.005

 Table 9: Regression Results

Note: The table shows the results of the regression of Russell 3000 excess returns on the announcement day dummy variable and several controls. Panel A contains results for the announcement day dummy as the single regressor. In Panel B, the lagged market excess return and its square are added as controls. Panel C ads day-of-the-week dummies to the previously used set of controls. The sample spans between September 1987 and March 2023. The returns are measured in basis points. *t*-statistics for the regression coefficients computed with Newey-West standard errors using 6 lags are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

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